CITY OF VENICE, FLORIDA

Request for Proposals

RFP # 3115-19

Date of Issue: November 2, 2019

Submission Deadline November 22, 2019 at 2:00 PM

Title and Purpose of RFP:

Audio/ Visual / Data Systems for the City of Venice Public Safety Facility

Offerors Are Not Required to Return This Form.

CITY OF VENICE, FLORIDA
REQUEST FOR PROPOSALS

NOTICE IS HEREBY GIVEN that the City of Venice invites and will receive sealed proposals from qualified vendors to perform the following work which is described in detail in the Request for Proposal (RFP) specifications.

RFP NUMBER: 3115-19
RFP TITLE: **Audio/ Visual/ Data Systems for the City of Venice Public Safety Facility**

PROJECT DESCRIPTION: The City of Venice is soliciting proposals to provide Audio/Visual and Data equipment, cabling and installation for the City's new Public Safety Facility, being constructed at 1575 East Venice Avenue, Venice, FL.

The attached documents describe the Audio/Visual and Data requirements for the facility.

RFP OPENING LOCATION: Finance Meeting Room #204
Venice City Hall
401 West Venice Avenue
Venice, Florida 34285

RFP SUBMITTAL DEADLINE DATE & TIME: November 22, 2019 at 2:00 p.m.

PRE-PROPOSAL CONFERENCE: No

The City is using a Request for Proposals for this project and will award the contract to the Proposer(s) the City finds, in its sole discretion, best meets the long term needs of the City.

Specifications and Bid/RFP documents are available by calling Onvia DemandStar at (800) 711-1712 or by their Internet address at www.demandstar.com. Proposers may also pick up Bid/RFP documents at the City of Venice Finance- Purchasing Department, Room 204, 401 West Venice Ave., Venice Florida 34285, (941) 882-7422 at no charge.

All proposers should ensure that the proposal is both complete and accurate. The City may require additional information or data from any of the Proposers. An evaluation committee that has been appointed by the City will evaluate proposals.

The evaluation committee has been selected by the City to ensure that all proposals are fairly considered. The evaluation committee will perform a review of proposals received from Proposers to determine completeness and responsiveness to the principal components of the technical, financial and legal requirements of the RFP. The evaluation committee will make a recommendation to the City Council following the evaluation committee's review of all proposals and consideration of any additional evidence or data desired by the evaluation committee.

Qualified firms are invited to deliver **ONE (1) ORIGINAL AND THREE (3) copies** of their proposals, in a sealed envelope marked **"SEALED REQUEST FOR PROPOSALS, RFP #3115- 19, Request for Proposals –** "**Audio/Visual/ Data Systems for the Public Safety Facility"**, and delivered to the City of Venice Purchasing Department, Room 204, City Hall, 401 West Venice Avenue, Venice, Florida 34285. The City assumes no responsibility for proposals received after 2:00 p.m., November 22, 2019, or at any office or location other than that specified herein, whether due to mail delay, courier mistake, mishandling or any other reason. Late proposals will be held unopened and will not be considered for award.

All questions, comments, or concerns about this RFP must be submitted in writing to Mr. Peter Boers, Procurement- Finance Department, for the City of Venice, Room 204, 401 West Venice Avenue, Venice, FL 34285, or via e-mail to pboers@venicegov.com. Mr. Boers is the only designated representative of the City authorized to respond to comments, questions, and concerns. The City will not respond to comments, questions or concerns addressed to any person other than Mr. Boers. If the City determines that a particular comment, question or concern necessitates a global response to all Proposers, the City will issue a clarifying memorandum or addendum. **The final day that the City will accept questions will be November 13, 2019 by 1:00 p.m.**

The City reserves the right to accept or reject any and/or all proposals, to waive irregularities and technicalities, and to request re-submission. Any sole response received by the submission date may or may not be rejected by the City, depending on available competition and timely needs of the City.

The City reserves the right to select a firm with or without interviews, and may decide to select one or more the firms submitting qualification packages. The City reserves the right to award the contract to a responsible proposer(s) submitting a responsive proposal, with a resulting negotiated agreement which is most advantageous and in the best interests of the City.

The City shall be the sole judge of the proposal, and the resulting negotiated agreement that is in its best interest and its decision shall be final. Also, the City reserves the right to make such investigation, as it deems necessary to determine the ability of any proposer to perform the work or service requested.

Proposers, their agents and associates shall not contact or solicit any City Council member, City employee, or official regarding this RFP during any phase of this RFP. Failure to comply with this provision may result in disqualification of the Proposer, at the option of the City. Only that individual listed, as the contact person in this Notice shall be contacted.

CITY OF VENICE, FLORIDA
Peter Boers, Procurement Manager

PUBLISH: November 2, 2019
November 6, 2019

SECTION 1: GENERAL CONDITIONS & INSTRUCTIONS TO OFFERORS

DEFINED TERMS

Terms used in this solicitation are defined and have the meaning assigned to them. The term "Offeror" means one that submits a proposal directly to CITY as distinct from a Sub-Offeror, who submits a Proposal to the Offeror. The term "Successful Offeror" means the qualified, responsible and responsive Offeror to whom the City of Venice (on the basis of CITY'S evaluation as hereinafter provided) makes an award. The term "CITY" refers to the City of Venice, a municipal corporation of the State of Florida. The term "RFP" refers to this Sealed REQUEST FOR PROPOSALS. The term "solicitation" refers to the entire RFP package and the Offeror's submittal as a response to this RFP. The term "submittal" refers to all documentation and information as submitted by the Offeror in response to this solicitation. The term "Department" refers to the State of Florida Department of Transportation.

1. OFFEROR REGISTRATION

Offerors who obtain solicitation documents from sources other than the City or download from http://www.demandstar.com/ must officially register receipt of the solicitation with the City's Procurement- Finance Department in order to be placed on the notification list for any forthcoming addendum or other official communications. Failure to register as a prospective Offeror may cause your submittal to be rejected as non-responsive if you have submitted a response without acknowledgment of issued addenda. The City of Venice is not responsible for the accuracy of bid documents and information obtained from any source other than http://www.demandstar.com/.

2. CONTACT

All prospective Offerors are hereby instructed not to contact any member of the City of Venice City Council, City Manager, or City of Venice staff member other than the contact person indicated in this RFP regarding this solicitation or their submittal at any time prior to the final evaluation and recommended ranking by the City staff for this project. Any such contact shall be cause for rejection of your submittal.

3. ADDENDA AND INQUIRIES

3.1 If there is any doubt as to the true meaning of the specifications and information provided, Offerors may submit written or faxed inquiries regarding this solicitation to the Procurement- Finance Department, 401 West Venice Avenue, Room # 204 Venice, FL 34285, Fax No. (941) 486-2790. The City will respond to written or faxed inquiries received by the posted deadline for questions. Inquiries must reference the date and time of opening, and the solicitation number. Failure to comply with this condition shall result in the Offeror waiving their right to dispute the specifications and information provided in the solicitation document.

3.2 Any change to this solicitation shall be made by addenda duly issued to each registered Offeror. Receipt of such addenda must be so noted on or within your response. It is the Offeror's responsibility to make contact through the Internet or phone to determine if Addenda have been issued.

3.3 Oral Inquiries: The City will not respond to oral inquiries.

4. PUBLIC OPENING

Submittals shall be received in the Procurement- Finance Department, 401 W. Venice Ave, Venice, FL 34285 by the date and time indicated on these documents. As soon as possible thereafter, the names of the Offerors and their proposed bid amount shall be read off at the specified location.

5. DELAYS

The City, at its sole discretion, may delay the scheduled due dates indicated above if it is to the advantage of the City to do so. The City will notify Offerors of all changes in scheduled due dates by written addenda.

6. PROPOSAL SUBMISSION AND WITHDRAWAL

6.1 Address to send submittal:

Procurement- Finance Department
City of Venice
401 W. Venice Ave, Room # 204.
Venice, FL 34285

6.2 The outside of the envelope/container must be identified with the solicitation number and title as stated above. The envelope/container must also include the Offeror's name and return address.

6.3 Submittals may be withdrawn by an appropriate document duly executed (in the manner that a Submittal must be executed) and delivered to the place where Submittals are to be submitted at any time prior to the deadline for submission. A request for withdrawal or a modification must be in writing and signed by a person duly authorized to do so. Evidence of such authority must accompany the request for withdrawal or modification. Withdrawal of a Submittal will not prejudice the rights of an Offeror to submit a new Submittal prior to the opening date and time. After expiration of the period for receiving Submittals, no Submittal may be withdrawn or modified.

6.4 Withdrawal of Submittals after Opening Date: Submittals, once opened, become the property of the City and will not be returned to the Offerors. Submittals not so withdrawn before the opening constitute an irrevocable offer for a period of one-hundred-eighty (180) days to provide the City the services set forth in these specifications until one or more of the proposals

have been accepted by City staff. No Offeror may withdraw their proposal during this one-hundred-eighty (180) day period.

6.5 Number of Submittal Copies: Offerors shall submit six (6) complete sets (one original and five copies) of the submittal complete with all supporting documentation (i.e. photographs, drawings, and exhibits) in a sealed envelope/container marked as noted above.

6.6 Proposal Is Not Binding: The Offeror understands that responding to this solicitation does not constitute an agreement or contract with the Offeror. A submittal is not binding until submittal is reviewed and accepted by the appropriate level of authority and both parties execute a contract.

6.7 Responsibility for getting a submittal to the City on or before the specified date and time is solely and strictly that of the Offeror. The City will not be responsible for any delay, for any reason whatsoever. Submittals by telephone, telegram, facsimile machines, and Internet, will not be acceptable. Submittals must be received and stamped on the outside of the envelope with the time and date, in the Purchasing Department by the date and time specified for opening.

6.8 LATE SUBMITTALS – Submittals received after the date and time of the opening will not be considered and will not be opened. It will be the Offeror's responsibility to make arrangements for the return of their submittal at their expense.

7. PRICES, TERMS AND PAYMENT:

Firm prices shall be bid F.O.B. requesting agency and include packing, handling and shipping charges fully prepaid by the vendor.

7.1 BID PRICE/MISTAKES: The Offeror shall show in the proposal both the unit price and the total amount on items when indicated. In the event of discrepancy between the unit price and the extension, THE UNIT PRICE SHALL PREVAIL. Prices shall be extended in decimals.

7.2 INVOICING AND PAYMENT: The Successful Offeror shall be paid upon submission of proper certified invoices to the ordering agency at the prices stipulated on the contract. Invoices shall contain the purchase order number. THE SUCCESSFUL OFFEROR SHALL ACCEPT NO ORDER WITHOUT A PURCHASE ORDER NUMBER FROM THE CONTRACTING ENTITY. The City reserves the right to pay for purchases made under any agreement resulting from a solicitation through its Purchasing Card Program which utilizes VISA credit cards, check or the ACH (Automated Clearing House) process. When payment is received utilizing the City credit card, an original invoice should not be mailed to the Finance Department. Only the credit card receipt is issued for this charge with the original receipt being provided with the delivery to the individual cardholder placing the order. No surcharges will be accepted for the use of purchasing cards.

7.3 TAXES: The purchase of certain items by the Contracting Entity is exempt from the payment of excise, transportation and sales tax imposed by the Federal, State and/or City governments. Such taxes must not be included in proposal prices. Upon request, applicable Federal Excise Exemption certificates will be furnished.

8. CONDITION AND PRICING:

It is understood and agreed that any item offered or shipped as a result of this bid shall be new (current model at the time of this bid). All containers shall be suitable for storage or shipment and all prices shall include standard commercial packaging.

9. SAFETY STANDARDS:

Unless otherwise stipulated in the bid, all manufactured items or fabricated assemblies shall comply with applicable requirements of occupational Safety and Health Act and any standards

10. MANUFACTURER'S NAME AND APPROVED EQUIVALENTS:

Any manufacturer's names, trade names, brand names, information and/or catalog numbers listed in a specification are for information and not intended to limit competition unless otherwise indicated. The bidder may offer any brand for which he/she is an authorized representative, which meets or exceeds the bid specification for any item(s). If bids are based on equivalent products, indicate on the bid form the manufacturer's product name and reference number. Offeror shall submit with its proposal, cuts, sketches, and descriptive literature, and/or complete specifications. Reference to literature submitted with a previous bid will not satisfy this provision. The bidder shall explain in detail the reason(s) why the proposed equivalent will meet the specifications and not be considered an exception thereto. Bids that do not comply with these requirements, are subject to rejection. Bids lacking any written indication of intent to quote an alternate brand will be received and considered in complete compliance with the specifications as listed on the bid form. The City's Purchasing Office is to be notified of any proposed changes in (a) materials used, (b) manufacturing process, or (c) construction. However, changes shall not be binding upon the City unless evidenced by a Change Notice issued and signed by the Purchasing Director or designated representative.

11. DELIVERY:

All prices shall be F.O.B. Destination, Venice, Florida. Delivery date and warranties must be written out and submitted with bids. Delivery dates, as specified, must be met.

12. ADDITIONAL PURCHASES ("PIGGY-BACK") BY OTHER PUBLIC AGENCIES:

The Successful Offeror, by submitting a bid, authorizes other Public Agencies to "Piggy-Back" or purchase equipment or services being proposed in this Request for Proposals at prices bid unless otherwise noted on the proposal sheet.

13. SUBMITTAL PREPARATION COST

The City shall not be liable for any expense incurred in connection with preparation of a submittal to this document. Offerors should prepare a straightforward and concise description of the Offeror's ability to meet the requirements of this document.

14. ACCURACY OF SUBMITTAL INFORMATION

Any Offeror, who states in their submittal any information that is determined to be substantially inaccurate, misleading, exaggerated, or incorrect, shall be disqualified from consideration.

15. LICENSES

Licensed and Certified: Offeror's, both corporate and individual, must be fully licensed and certified for the type of work to be performed in the state of Florida at the time of submittal and during the entire Contract time.

16. LOCAL PREFERENCE

16.1 Unless otherwise noted in the solicitation, preference shall be given to a "local business" in the awarding of any Invitation to Bid (ITB), Request for Proposal (RFP) or Request for Proposals (RFP) in accordance with Section 2-217 of the City of Venice's Code. Local preference shall not apply to other types of solicitations unless explicitly stated in the subject solicitation.

16.2 "Local business" means the vendor has paid a local business tax to either Sarasota, Manatee, DeSoto or Charlotte County, whichever county the vendor is located, if applicable prior to bid submission that authorizes the vendor to provide the commodities or services to be purchased, and maintains a permanent physical business address located within the limits of either Sarasota, Manatee, DeSoto or Charlotte County from which the vendor operates or performs business, and at which at least one full time employee is located.

16.3 In addition, fifty percent (50%) or more of the employees based at the local business location must reside within Sarasota, Manatee, DeSoto or Charlotte County.

16.4 In the event the local office is not the primary location of the vendor, at least ten percent (10%) of the vendor's entire full-time employees must be based at the local office location. and at least one corporate officer, managing partner or principal owner of the vendor resides in Sarasota, Manatee, DeSoto or Charlotte County.

16.5 Offerors wishing to be given preference as a local business must submit **with their offer**, all of the Local Preference documentation identified in the "Required Forms Section" of the solicitation.

16.6 For local preference to be granted, the name of the company represented on the required forms must be the same as the name on the Local Preference documentation.

16.7 Information regarding Sarasota County's Local Business Tax can be found at www.sarasotataxcollector.governmax.com.

16.8 In case of a proposal submitted by more than one entity, any one of those entities can qualify the proposal for the local preference. Sub-contractors or sub-consultants cannot qualify a proposal for local preference.

17. POSTING OF NOTICE OF INTENT

A notice of intent for award will be posted for review by interested parties in City Hall and/or on the City's website prior to submission through the appropriate approval process to the appropriate level for final approval of award.

18. PUBLIC RECORDS/TABULATION

Submittals are public records, subject to the provisions of Chapters 119 and 120, Florida Statutes, but, as provided under statute, shall not be made public until such time as notice of a decision or intended decision is provided, or within thirty (30) days after the solicitation opening, whichever is earlier. A copy of the tabulation results will be forwarded upon receipt of a stamped, self-addressed envelope. An electronic tabulation will be posted on Demand Star at their Internet Website at http://www.demandstar.com/.

19. RESERVED RIGHTS

19.1 The City reserves the right to waive formalities in any submittal, and to reject any or all submittals in whole or in part, with or without cause and/or to accept the submittal that in the City's judgment will be in the best interest of the City. The City specifically reserves the right to reject any conditional submittal.

19.2 To the extent permitted by applicable state and federal laws and regulations, City reserves the right to reject any and all submittals, to waive any and all informalities not involving price, time or changes in the work with the Successful Offeror, and the right to disregard all nonconforming, non-responsive, unbalanced or conditional submittals. Submittals will be considered irregular and may be rejected, if they show serious omissions, alterations in form, additions not called for, conditions or unauthorized alterations, or irregularities of any kind.

19.3 City reserves the right to reject the submittal of any Offeror if the City believes that it would not be in the best interest of the City to make an award to that Offeror, whether because the submittal is not responsive or the Offeror is unqualified or of doubtful financial ability or fails to meet any other pertinent standard or criteria established by City.

19.4 The City reserves the right to terminate the contract with any vendor who fails to meet a deadline or shows incompetency.

20. INDEMNIFICATION/HOLD HARMLESS

The Offeror shall indemnify and hold harmless the City and its officers and employees from liabilities, damages, losses, and costs, including, but not limited to, reasonable attorneys' fees, to the extent caused by the negligence, recklessness, or intentionally wrongful conduct of the Offeror and other persons employed or utilized by the Offeror in the performance of the contract.

21. PUBLIC ENTITY CRIMES/NON-COLLUSIVE AFFIDAVIT

21.1 Each Offeror shall complete the Non-Collusive Affidavit and the Public Entity Crimes Form and shall submit the forms with the submittal. CITY considers the failure of the Offeror to submit these documents to be a major irregularity and may be cause for rejection of their submittal.

21.2 A person or affiliate who has been placed on the convicted vendor list following a conviction for a public entity crime may not submit a response on a contract to provide any

goods or services to a public entity, may not submit a response on a contract with a public entity for the construction or repair of a public building or public work, may not submit responses on leases of real property to a public entity, may not be awarded or perform work as a Offeror, supplier, Sub-Offeror, or consultant under a contract with any public entity, and may not transact business with any public entity in excess of the threshold amount provided in Section 287, for CATEGORY TWO for a period of 36 months from the date of being placed on the convicted vendor list.

21.3 Termination for Cause: Any Agreement with the City obtained in violation of this Section shall be subject to termination for cause. A Sub-Offeror who obtains a subcontract in violation of this Section shall be removed from the Project and promptly replaced by a Sub-Offeror acceptable to the City.

22. GRATUITIES AND KICKBACKS

22.1 Gratuities: It is unethical for any person to offer, give, or agree to give any employee or for any employee to solicit, demand, accept or agree to accept from another person, a gratuity or an offer of employment in connection with any decision, approval, disapproval, recommendation, preparation of any part of program requirement or a purchase request, influencing the content of any specification or procurement standard, rendering of advice, investigation, audit, or in any other advisory capacity in any proceeding or application, request for ruling, determination claim or controversy, or other particular matter, pertaining to any program requirement or an Agreement or subcontract, or to any solicitation or proposal therefore.

22.2 Kickbacks: It shall be unethical for any payment, gratuity, or offer of employment to be made by or on behalf of a Sub-Offeror under a Contract to Offeror or higher tier Sub-Offeror any person associated therewith, as an inducement of the award of a subcontract or order.

22.3 Contract Clause: The prohibition against gratuities and kickbacks prescribed in this section shall be conspicuously set forth in every Contract and subcontract and solicitation therefore.

23. EQUAL EMPLOYMENT OPPORTUNITY

Offeror shall be in compliance with Executive Order 11426 Equal Opportunity as amended by Executive Order 11375, and as supplemented by the Department of Labor Regulations as applicable.

24. CONFLICT OF INTEREST

No employee of an agency acting in his or her official capacity as a purchasing agent, or public officer acting in his or her official capacity, shall either directly or indirectly purchase, rent, or lease any realty, goods, or services for his or her own agency from any business entity of which the officer or employee or the officer's or employee's spouse or child is an officer, partner, director, or proprietor or in which such officer or employee or the officer's or employee's spouse or child, or any combination of them, has a material interest. Nor shall a public officer or employee, acting in a private capacity, rent, lease, or sell any realty, goods, or services to the officer's or employee's own agency, if he or she is a state officer or employee, or to any political subdivision or any agency thereof, if he or she is serving as an officer or employee of that political subdivision. The foregoing shall not apply to district offices maintained by legislators when such offices are located in the legislator's place of business or when such offices are on property wholly or partially owned by the legislator. This subsection shall not affect or be construed to prohibit contracts entered into prior to: October 1, 1975. Qualification for elective office. Appointment to public office. Beginning public employment

25. DRUG FREE WORKPLACE:

The City of Venice has adopted a policy in observation of the Drug Free Work Place Act of 1988. Therefore, it is unlawful to manufacture, distribute, disperse, possess, or use any controlled substance in the City of Venice workplace.

The City of Venice requests the attached Drug Free Workplace Affidavit to accompany your response. This form has been adopted by the City in accordance with the Drug Free Workplace Act. The City will not disqualify any respondent who does not concur with the affidavit. The Drug Free Workplace Affidavit is primarily used as tiebreaker when two or more separate entities have submitted proposals at the same price, terms and conditions.

26. APPLICABLE LAWS

Interested parties are advised that all City contracts and/or documentation pertinent to this solicitation are subject in full or in part to all legal requirements provided in applicable City Ordinances, State Statutes, and Federal Regulations. Uniform Commercial Code, Chapter 672, Florida State Statutes shall prevail, as the basis for contractual obligations between the Offeror and the City for any terms and conditions not specifically stated within the context of this contract.

27. COMPETENT PERSONNEL

The Offeror agrees that it will endeavor to perform services in a manner consistent with that degree of care and skill ordinarily exercised by members of the engineering profession currently practicing under similar circumstances.

28. EXAMINATION OF CONTRACT DOCUMENTS AND SITE

28.1 Before delivering a submittal, each Offeror must (a) consider federal, state and local laws, ordinances, rules and regulations that may in any manner affect cost, or performance of the work, (b) study and carefully correlate the Offeror's observations with the solicitation documents; and notify the Purchasing Manager of all conflicts, errors and discrepancies, if any, in the solicitation documents.

28.2 The Offeror, by and through delivering a submittal, agrees that they shall be held responsible for having familiarized themselves with the nature and extent of any local conditions that may affect the services.

29. SPECIFICATIONS

29.1 The apparent silence of the specification as to any detail, or the apparent omission from it of a detailed description concerning any point, shall be regarded as meaning that only the best commercial practice is to prevail and that only material and workmanship of the finest quality are to be used. All interpretations of the Specifications shall be made on the basis of this statement.

29.2 For the purpose of evaluation, the Offeror must indicate any variance or exceptions to the stated Specifications, no matter how slight. Deviations should be explained in detail. Absence of variations and/or corrections will be interpreted to mean that the Offeror meets all the Specifications in every respect.

30. CANCELLATION CLAUSE

Failure to comply with any of the terms, conditions, specifications and/or service requirements will be just cause for termination of this contract by a thirty (30) day written notice of intent forwarded to the successful Offeror.

31. ACCEPTING CONTENT OF PROPOSAL

By delivering a submittal in response to this solicitation document, the Offeror certifies that they have fully read and understand the context of the solicitation document and have full knowledge of the scope, nature, and detailed requirements of services and/or commodities to be provided and performed. Submittals shall be returned in the sequential manner as requested in the “Submittal Format and Requirements” section of this solicitation.

32. TAXES

The negotiated cost shall include all freight, handling, delivery, surcharges or other incidental charges that may be required to provide the services or deliver the commodities. The City of Venice is exempt from the payment of Federal and State taxes, including sales tax. Your cost proposal shall not include sales tax to be collected from the City. The City’s sales tax exemption is not available to you for items you purchase, regardless of whether these items will be transferred to the City.

33. ASSIGNMENT

33.1 Successful Offeror shall not assign, transfer or subject the Contract or its rights, title or interests or obligations therein without City’s prior written approval.

33.2 Violation of the terms of this paragraph shall constitute a breach of the Contract by Successful Offeror and City may, at its discretion, cancel the Contract and all rights, title and interest of Successful Offeror shall thereupon cease and terminate.

34. SOLICITATION FORMS

34.1 If the Offeror cannot meet a service or equipment requirement, then the phrase "not available" should be entered on the Proposal Form for that service requirement. In the case of a "not available" remark, the Offeror may offer an alternative service. Alternate submittals may be submitted for consideration. It will be at the City’s sole discretion to accept or reject any and all alternate submittals received.

34.2 This solicitation presents the City's minimum requirements under present methods of operation. Responses to this request should address these requirements, but Offerors are encouraged to suggest any additional services or commodities, which in their opinion, would be in the best interest of the City.

34.3 Submittals may be delivered, which deviate from the requirements herein, providing that they are clearly identified as alternate submittals and providing further that it can be demonstrated that stated requirements are substantially improved or are not compromised or prejudiced by such deviations; and, that it would be clearly in the interest of the City that an alternative proposal be considered. Such alternative proposals will be provisionally accepted for consideration, subject to the reserved right of the City to make the determination whether the above stated conditions for alternate proposals have been satisfied and subject further to the reserved right of the City to accept or reject these proposals upon the basis of the determination.

35. DISCLOSURE – PUBLIC OFFICER, PUBLIC EMPLOYEE OR ADVISORY BOARD MEMBER OF CITY

35.1 Sections 112.313(3) and 112.313(7), Florida Statutes, prohibit any public officer, employee, or advisory board member of the City from holding any employment or contractual relationship with any business entity doing business with the City. Section 112.313(12) provides that a public officer, employee, or advisory board member will not be in violation of the prohibition if all three of the following conditions are met. The filing of the disclosure form with the Supervisor of Elections is the sole responsibility of the Proposer and must be filed prior to or at the time of submission of the proposal. A copy of the filed disclosure form shall be submitted as part of the proposal.

35.2 Bid is awarded under a sealed, competitive Proposal to lowest or best Proposer system. Advisory board member is required to, prior to or at the time of the submission of the proposal, file a statement with the Supervisor of Elections, disclosing his interest and the nature of the intended business. The form is entitled "Form 3A Interest in Competitive Proposal for Public Business," a copy of which is available from the City's Procurement- Finance Department.

35.3 The public officer, employee, or advisory board member, spouse, or child is required to have in no way used or attempted to use his influence to persuade a member of the City or any of its personnel to enter into such a contract other than by the mere submission of the proposal.

35.4 The public officer, employee, or advisory board member, spouse, or child is required to have in no way participated in the determination of the Bid specifications or the determination of the lowest or best Proposer.

36. BID PROTESTS

In any case where a bidder wishes to protest either the results of or the intended disposition of any bid, the bidder must:

36.1 File a written notice to the City Manager of the bidder's intention to protest within three (3) business days of the bid opening or the City's declaration of intent with regard to the disposition. Upon receipt of a protest, the bid process shall be suspended until the protest procedure herein described has been completed.

36.2 Within five (5) days of filing the written notice of intent to protest, the protester shall file a formal written protest with the City Manager, acting as the bid protest officer, explaining in detail the nature of the protest and the grounds on which it is based. During this five-day period, the protester is encouraged to attempt to resolve the issue with the City's Finance Department.

36.3 The protester must include with the formal written protest a bid protest bond in the form of a certified check, cashier's check or money order made payable to the city in an amount equal to five percent (5%) of the lowest acceptable bid. The bond will be deposited with the Cashier's Office where it will be put into an account and the protester will receive a receipt.

36.4 Upon timely receipt of the formal written protest and protest bond, the City must:

(1) Issue formal findings of fact and a written decision with regard to the validity or non-validity of the formal written protest within ten (10) business days of the City's receipt of the protest.

(2) Within two (2) business days of receipt of the formal findings of fact and written decision, the City shall notify the protester of the decision of the bid protest officer. Such notification shall be transmitted via certified return receipt mail.

36.5 Should the protest be found to be without merit or validity, the bid protest bond shall be forfeited to the City in its entirety, and the bid process may resume. If a decision favorable in whole or in part to the protest is rendered, a check for the full amount of the bond will be returned to the protester.

37. SCRUTINIZED COMPANIES

Pursuant to Section 287.135, F.S., a company that, at the time of bidding or submitting a proposal for a new contract or renewal of an existing contract, is on the Scrutinized Companies with Activities in Sudan List or the Scrutinized Companies with Activities in the Iran Petroleum Energy Sector List, created pursuant to Section 215.473, F.S., is ineligible for, and may not bid on, submit a proposal for, or enter into or renew a contract with an agency or local governmental entity for goods or services of $1 million or more. Any contract with an agency or local governmental entity for goods or services of $1 million or more entered into or renewed on or after 1, 2011, must contain a provision that allows for the termination of such contract at the option of the awarding body if the company is found to have submitted a false certification as provided under Subsection 287.135(5), F.S., or has been placed on either of the aforementioned lists. The City agrees to comply with the requirements of Section 287.135, F.S. in connection with the implementation of this Project.

SECTION 2: SCOPE OF WORK

PURPOSE: The City of Venice is soliciting proposals to provide Audio/Visual and Data equipment, cabling and installation for the City's new Public Safety Facility, being constructed at 1575 East Venice Avenue, Venice, FL. Construction is currently underway with Substantial Completion scheduled for May 2020, and Final Closeout and payment to be completed on or before August 1, 2020. The attached documents describe the Audio/Visual and Data requirements for the facility.

SCOPE OF WORK: The general scope of work includes Audio Visual Systems, Data/Voice Systems, CATV Distribution and associated cabling and installation. Proposals shall include all costs associated with completing the specified scopes, including but not be limited to cost for access, equipment, permitting, labor, insurances, restoration, engineering, reporting and other costs that may be incurred. The specific scopes of work are further defined in Specification Section **27 0010 TECHNOLOGY GENERAL PROVISIONS**, page 17, included in *EXHIBIT B.*

REQUIREMENTS: The selected firm shall be responsible for all required equipment, cabling, accessories, installation, programming and commissioning of Audio/Visual and Data systems as defined by *EXHIBIT A* and *EXHIBIT B*.

The selected firm will be required to comply with all requirements stipulated by the Construction Manager-Ajax/Tandem a JV, defined in attached *EXHIBIT C*.

Low Voltage wire/cabling rough-in installation is currently planned to begin around the first of the year, but could be accelerated into December. The selected firm will be required to meet the obligations and completion requirements of the Construction Schedule as currently defined by *EXHIBIT D* and as updated based on the field progress.

FORM OF CONTRACT: The submitted Proposal Form signed by the Proposer, together with the complete Proposal package furnished by the City, shall constitute a binding contract. The Proposer shall be required to perform according to the Proposer's submitted Proposal form and the City's Proposal package.

NOTICE TO PROCEED: A Notice to Proceed, or Purchase Order, shall be issued bearing the agreed-upon commencement date. No work under the Contract shall begin until after the Notice to Proceed/Purchase Order has been issued.

ARITHMETIC DISCREPANCIES: For the purpose of initial evaluation of Proposals, the following will be utilized in resolving arithmetic discrepancies found on the face of the Proposal forms as submitted by Proposers:

A. Obviously misplaced decimal points will be corrected.
B. In case of discrepancy between unit price and extended price, the unit price will govern. Apparent errors in extension will be corrected.
C. Apparent errors in addition of lump sum and extended prices will be corrected.

For the purpose of Proposal evaluation, the City will proceed on the assumption that the Proposer intends his Proposal be evaluated on the basis of the unit prices, extensions, and totals arrived at by resolution of arithmetic discrepancies as provided above, and the Proposal will be so reflected on the

tabulation of Proposals.

CANCELLATION: The City shall have the right to unilaterally cancel, terminate or suspend this Contract, in whole or in part, by providing the Contractor thirty (30) days written notice by certified mail.

SECTION 3: INSURANCE INFORMATION

Before performing any work, the CONTRACTOR shall procure and maintain, during the life of the Contract, insurance listed below. The policies of insurance shall be primary and written on forms acceptable to the City and placed with insurance carriers approved and licensed by the Insurance Department in the State of Florida and meet a minimum financial AM Best and Company rating of no less than A: VII. No changes are to be made to these specifications without prior written specific approval by the City.

1. The City of Venice is to be specifically included as an ***ADDITIONAL INSURED*** (with regards to General Liability and Business Auto).

2. The City of Venice shall be named as Certificate Holder. ***Please Note that the Certificate Holder should read as follows:***

The City of Venice
401 W. Venice Avenue
Venice, FL 34285

No City Division, Department, or individual name should appear on the certificate. ***NO OTHER FORMAT WILL BE ACCEPTABLE.***

3. The "Acord" certification of insurance form should be used.

4. Required Coverage

a) **Commercial General Liability:** including but not limited to bodily injury, property damage, contractual liability, products and completed operations, and personal injury with limits of not less than $1,000,000 per occurrence, $1,000,000 aggregate covering all work performed under this Contract. Include broad form property damage (provide insurance for damage to property under the care custody and control of the CONTRACTOR)

b) **Business Auto Policy:** including bodily injury and property damage for all vehicles owned, leased, hired and non-owned vehicles with limits of not less than $1,000,000 combined single limit covering all work performed under this Contract.

c) **Workers Compensation:** CONTRACTOR will provide Workers Compensation Insurance on behalf of all employees, including sub-contractors, who are to provide a service under this Contract, as required under Florida Law, Chapter 440, and Employers Liability with limits of not less than $100,000 per employee per accident; $500,000 disease aggregate; and $100,000 per employee per disease.

5. Policy Form:

a) All policies required by this Contract, with the exception of Workers Compensation, or unless specific approval is given by the City, are to be written on an occurrence basis, shall name the City of Venice, its Elected Officials, Officers, Agents, Employees as additional insured as their interest may appear under this Contract. Insurer(s), with the exception of Workers Compensation, shall agree to waive all rights of subrogation against the City of Venice, its Elected Officials, Officers, Agents, and Employees.

b) Insurance requirements itemized in this Contract, and required of the CONTRACTOR, shall be provided on behalf of all subcontractors to cover their operations performed under this Contract. The CONTRACTOR shall be held responsible for any modifications, deviations, or omissions in these insurance requirements as they apply to subcontractors.

c) Each insurance policy required by this Contract shall:

(1) apply separately to each insured against whom claim is made and suit is brought, except with respect to limits of the insurer's liability;

(2) be endorsed to state that coverage shall not be suspended, voided or canceled by either party except after thirty (30) calendar days prior written notice by certified mail, return receipt requested, has been given to the City of Venice's Director of Administrative Services.

d) The City shall retain the right to review, at any time, coverage form, and amount of insurance.

e) The procuring of required policies of insurance shall not be construed to limit CONTRACTOR's liability nor to fulfill the indemnification provisions and requirements of this Contract.

f) The CONTRACTOR shall be solely responsible for payment of all premiums for insurance contributing to the satisfaction of this Contract and shall be solely responsible for the payment of any deductible and/or retention to which such policies are subject, whether or not the City is an insured under the policy. In the event that claims in excess of the insured amounts provided herein are filed by reason of operations under the contract, the amount excess of such claims, or any portion thereof, may be withheld from any payment due or to become due to the CONTRACTOR until such time the CONTRACTOR shall furnish additional security covering such claims as may be determined by the City.

g) Claims Made Policies will be accepted for professional and hazardous materials and such other risks as are authorized by the City. All Claims Made Policies contributing to the satisfaction of the insurance requirements herein shall have an extended reporting period option or automatic coverage of not less than two years. If provided as an option, the CONTRACTOR agrees to purchase the extended reporting period on cancellation or termination unless a new policy is affected with a retroactive date, including at least the last policy year.

h) Certificates of Insurance evidencing Claims Made or Occurrence form coverage and conditions to this Contract, as well as the City's Bid Number and description of work, are to be furnished to the City's Director of Administrative Services, 401 West Venice Avenue, Venice, FL 34285, ten (10) business days prior to commencement of work and a minimum of thirty (30) calendar days prior to expiration of the insurance policy.

i) Notices of Accidents and Notices of Claims associated with work being performed under this Contract, shall be provided to the CONTRACTOR's insurance company and the City's Director of Administrative Services, as soon as practicable after notice to the insured.

j) All property losses shall be payable to, and adjusted with, the City.

SECTION 4: SELECTION PROCESS

RFP SELECTION PROCEDURES

Selection Process

A Selection Committee made up of members as described herein will review all responses to the RFP, establish a shortlist, and may hear presentations by the Firms on the shortlist, rank the Firms, and present the rankings to the City Council for approval. Negotiations will begin with the top ranked firm(s).

To determine the relative ability of each firm to provide the required services, the City shall consider as a minimum the criteria given below. The order of the format is important to facilitate an efficient and uniform review of the packages as provided for in the submission criteria. A list of the top ranked Firms will be established after detailed review of the qualifications. The Firms will be ranked using the qualifications criteria below.

The following steps will be followed in the selection process:

1. City management and staff will review each response that is submitted and determine which ones are considered responsive to the RFP.
2. The City staff tasked with the review of the responses to the RFP will meet to review, discuss, and independently score the responses in a publicly advertised meeting using the selection criteria matrix attached.
3. The City may shortlist proposals and interview the shortlisted proposers before ranking the proposers.
4. City staff will negotiate a contract with the top ranked proposer(s)
5. The City Council will approve the final negotiated contract(s).

Selection Committee

The City reserves the right to increase or decrease the number of individuals that are members of the Selection Committee and/or replace individuals as needed in order to assure meeting the schedule. However, no less than three (3) individuals will be used for shortlisting the Proposals received. The same individuals shall be utilized for the presentations, if necessary. However, if a conflict in schedule causes a change in personnel, the City reserves the right to proceed without that individual. It is the intention to utilize a Selection Committee during the presentations consisting of no less than three (3) individuals to hear the presentations.

SECTION 5 : EVALUATION AND AWARD

EVALUATION METHOD AND CRITERIA: All Proposals will be subject to a review and evaluation process. It is the intent of the City that all Proposers responding to this solicitation, who meet the requirements, will be ranked in accordance with the criteria established in these documents. The City will consider all responsive and responsible Proposals received in its evaluation and award process.

Proposers shall include all of the information solicited, and any additional data that the Proposer deems pertinent to the understanding and evaluating of the Proposal. Each proposer will be ranked based on the criteria herein addressed.

During the evaluation process and at the sole discretion of the City, requests for clarification of one or more Proposer submittals may be conducted. This request for clarification will be performed by the City through scheduled oral interviews. Such clarification request will provide Proposers with an opportunity to answer any questions the City may have on a Proposer's submittal.

EVALUATION CRITERIA: Proposals will be reviewed by staff from the City of Venice and evaluated based on the format and content outlined in this proposal as follows:

Remarks: The assigned value is judged on a scale of **0 through 5**

0= Information/documentation provided is not adequate for evaluation
1=Poor, unacceptable, needs major help to be acceptable
2=Marginal, Weak, Workable but needs clarifications
3=Good, no major weaknesses, Fully Acceptable as is
4=Excellent, very good, solid in all respects
5=Outstanding, out-of-the-box, Innovative

Evaluation Criteria	*Value*	*Assigned Value*	*Weight 1-6*	*Score*
QUALIFICATIONS/EXPERIENCE OF FIRM AND	**0-5**		**X 5**	=
REFERENCES OF PROPOSER/FIRM	**0-5**		**X 1**	=
PROPOSED APPROACH AND PLAN TO SUPPORT THE CITY/QUALITY OF RESPONSE	**0-5**		**X 6**	=
COMPREHENSIVENESS SERVICES OFFERED	**0-5**		**X 4**	=
FEES AND COSTS	**0-5**		**X 3**	=
LOCAL PREFERENCE	**0 or 5**		**X 1**	=
			Sub-Total Points	=

Selection Committee (SC): The SC shall evaluate and rank the Proposals submitted by all responsive firms.

CRITERIA/BASIS FOR AWARD: Firms are ranked according to the evaluation criteria above and shall not be limited to, considerations listed in this solicitation. The City shall be the sole judge as to the merits of the submittals, and the resulting award to the most qualified, responsive, and responsible Proposer, who fulfills all requirements, and whose evaluation by the City indicates that the award will be in the best interest of the City. The City's decision will be final.

The City reserves the right to reject the Proposal of any Proposer who has previously failed to perform properly, or on time, contracts of similar nature; or who is not in a position to satisfactorily perform the contract.

TAXES: City of Venice is exempt from Federal Excise and State Sales Taxes. The CONTRACTOR shall assume liability for Local, State, or Federal Tax that is applicable to the work.

PAYMENT: All invoices will be paid in accordance with the Local Government Prompt Payment Act (F.S. 218.74).

The City of Venice will not review Proposals that are not submitted on time.

SECTION 6: SUBMISSIONS DETAILS

REQUIREMENTS FOR SUBMITTAL:

Response Due Date

Technical Proposals due no later than the date provided in the Request for Proposals.

Submittals are to be delivered to:

City of Venice
Procurement- Finance Department
401 W. Venice Avenue – Purchasing - Room 204
Venice, FL 34285

Required Response Format

Proposal is limited to a maximum of no more than 150 single sided pages. Pages must be numbered to verify quantity. Tab dividers are excluded from the page count. Proposal must have a front cover that contains the following:

- Company Name
- Number and Title of the Request for Proposal
- Due Date of Proposal

A total of one original and three (3) printed copies need to be included. This information should be included on the front cover. Example: ORIGINAL or COPY 1 of 3 etc…

Include one (1) electronic copy on a compact disk (CD) or a flash drive. Electronic copy should include a consolidated copy of the proposal in one PDF file

TAB 1 Executive Summary-
One page summary of what you are proposing on the contract.

TAB 2 Qualifications-
1. Company Information
a. A brief company history.
b. How many years has your organization been in business as a provider of the products and services you're proposing to offer under this solicitation?
c. How many years has your organization been in business under its' present business name?
d. Location of the Consultant's office and location of the office where the project will be produced. Include the name and titles of those members of the project team that are permanently assigned to the project office.
    i. How many full time employees?
    ii. How many years at prior project location?
    iii. Is work to be shared amongst employees working out of different proposer office locations? If so, what is the allocation of personnel and related work they are to perform?
e. Under what other or former names has your organization operated?
f. If your organization is a corporation, answer the following:
    i. Date of incorporation
    ii. State of incorporation
    iii. President's name
    iv. Vice-President's name(s)

v. Secretary's name
vi. Treasurer's name

g. If your organization is a partnership, answer the following:
i. Date of organization
ii. Type of partnership (if applicable)
iii. Name(s) of general partner(s)

h. If your organization is individually owned, answer the following:
i. Date of organization
ii. Name of owner

i. If the form of your organization is other than those listed above, describe it and the name of the principals.

j. Financial Responsibility.

i. Form of business, i.e., proprietorship, partnership, corporation; years in business, changes in ownership; bank reference; any other information the applicant may wish to supply to verify financial responsibility. Unless there is a clear statement that the vendor/contractor is a joint venture, it will be assumed the firm shown on the transmittal letterhead will be the prime CONTRACTOR/Vendor with whom the City would contract and all other firms shown as team members would be sub-consultants.

k. Experience of your company or firm with the services, products or combination thereof as stated in the scope of work or specification.

TAB 3- Fee and Pricing Proposal

Costs shall be categorized by the main and sub headings 1.00 - 5.00 defined in **27 0010**, page 17. Each piece of proposed equipment shall be itemized as a separate line, and include Manufacturer, Model Number, Quantity, Unit Cost and Total Cost.

TAB 4- Schedule for Work

RFP response shall identify schedule durations for mobilization from contract award, material procurement, installation, systems commissioning/programming and final closeout.

TAB 5 – Personnel

For the key individuals who will be marketing, consulting, estimating, coordinating, supervising and managing before, during and after-sales services, warranty, maintenance, and support services offered in response to this solicitation, in your response, provide a listing of and the qualifications of these key individuals. Provide the name, title, qualifications and experience in the area(s) of service(s) that they will be providing. Include awards, certification, membership in professional organizations and licensing. Resume may be included but key personnel qualification sheets are limited to 1 page per employee. Max number of key personnel is ten.

1. Provide organizational plan for management of project(s).

a. A proposed relationship between key members and support staff and aspects of work each will be responsible for working.

2. Identify all CONTRACTORs and sub-contractors to be used on project(s).

a. Describe work experience, field(s) of specialization, education, and certifications.

TAB 6 - Proposal Requirements

State how you plan to provide your product or service based on the evaluation criteria and specifications list in the Request for Proposal.

TAB 7 - References, Required Forms, Certificate of Insurance, Certifications

Litigation Statement

CONTRACTORs shall verify in writing that they have not been sued by or taken legal action against the City within the last 5 years. If either event has occurred, the CONTRACTOR is to provide documentation describing events.

Drug Free Workplace Act

CONTRACTORs shall certify in writing to the City that they have established a drug free workplace.

Conflict of Interest Statement

CONTRACTOR verifies absence of or identifies up front any potential conflicts of interest.

Public Entities Crimes (FS 287.133)

A person or affiliate who has been placed on the convicted vendor list following a conviction for a public entity crime may not submit a bid on a contract to provide any goods or services to a public entity, may not submit a bid or proposal on a contract with a public entity for the construction or repair of a public building or public work, may not submit bids on leases of real property to a public entity, may not be awarded or perform work as a CONTRACTOR, Supplier, Subcontractor, under a contract with any public entity, and may not transact business with any public entity in excess of twenty-five thousand dollars ($25,000.00) for a period of 36 months from the date of being placed on the convicted vendor list.

Required Forms

Each respondent shall submit the required information form as attached:

- Submittal Signature Form,
- References – Client List,
- Local Preference Worksheet
- Public Entity Crimes Form,
- Drug Free Workplace Form,
- Indemnification/Hold Harmless Statement,
- Certification Regarding Debarments, Suspension, Ineligibility and Voluntary Exclusion,
- Conflict of Interest, and Litigation Statement,
- Non-Collusion Affidavit.

All Required forms are included in this package.

Questions during RFP Phase

Questions must be submitted in writing to pboers@venicegov.com or by fax to (941) 486-2790, Attn: Peter Boers, Purchasing Manager, for the City's consideration no later than November 13, 2019. Responses will be provided in writing by and posted on www.demandstar.com for download and will also be available through the Purchasing office.

APPENDIX

SUBMITTAL SIGNATURE FORM

The signature below is a guarantee that the Proposer shall not withdraw his/her Proposal for a period of **ninety (90) days after the scheduled Proposal due date. If notified of the acceptance of the Proposer's submittal, the undersigned agrees to accept the form of contract designated in this RFP by the City for** the stated compensation in the form as prescribed by the City.

The undersigned further certifies that he/she has read the Request for Quotation, Terms and Conditions, Insurance Requirements and any other documentation relating to this request and this quotation is submitted with full knowledge and understanding of the requirements and time constraints noted herein.

As addenda are considered binding as if contained in the original specifications, it is critical that the contractor acknowledge receipt of same. The submittal may be considered void if receipt of an addendum is not acknowledged.

Addendum No._____Dated _____ Addendum No._____Dated _____
Addendum No._____Dated _____ Addendum No._____Dated _____

Company Information
Type of Organization (Please Check One):
Individual Ownership _____ **Joint Venture** _____ **LLC/LLP** _____
Partnership _____ **Corporation** _____ **OTHER** _____

Federal Identification Number: _____

Is this a Florida Corporation: ☐ Yes or ☐ No

If not a Florida Corporation,
In what state was it created: _____
Name as spelled in that State: _____

State of Florida Department of State Certificate of Authority Document No.:_____Respondent shall submit proof that it is authorized to do business in the State of Florida unless registration is not required by law.

Does it use a registered fictitious name: ☐ Yes or ☐ No

DBA (if any): _____

SUBMITTAL SIGNATURE FORM (CONTINUED)

Company Name_____

Telephone # **E-Mail** **Fax #**

Mailing Address

Location Address

City **State** **Zip Code**

Telephone # **E-mail** **Fax #**

Print Name & Title of Firm Representative

Signature of person authorized to bind the company **Date Do**

you accept Visa as payment for goods/services? ☐ **YES** ☐ **NO**

REFERENCES - CLIENT LIST

SUMMARY EXPERIENCE/QUALIFICATIONS/CLIENT LIST (List similar projects, with completion dates showing experience)
(At least three (3) in the past three (3) years).

1. Project Location:_____

Name of Contact Person:_____ Telephone #_____

Project Description:_____

_____

_____

Total Project Amount: $_____ Start Date:_____ Completion Date:_____

2. Project Location:_____

Name of Contact Person:_____ Telephone #_____

Project Description:_____

_____

_____

Total Project Amount: $_____ Start Date:_____ Completion Date:_____

3. Project Location:_____

Name of Contact Person:_____ Telephone #_____

Project Description:_____

_____

_____

Total Project Amount: $_____ Start Date:_____ Completion Date:_____

PROPOSERS NAME _____

"LOCAL PREFERENCE" DETERMINATION

The following questions will help you determine local preference for your company.
Please answer questions 1 through 4 **FIRST**. If you answer **NO** to any questions 1 through 4, local preference does **NOT** apply.
ONLY if you answer **YES** to questions 1 through 4, may you proceed to question 5.
If you answer **YES** to any questions 5 and 6, local preference applies.
If you are unsure of how to answer any questions, please contact the City of Venice's Purchasing Department at 941-486-2626.

Questions 1 – 4

1. Has your company paid a local business tax either to Sarasota, DeSoto or Charlotte County (Manatee County does not currently have a local business tax) authorizing your company to provide goods or services described in this solicitation?

   YES ___ If "yes", proceed to question 2.
   NO ____ **If "no", STOP, local preference does not apply.**
   ***** If the name on the local business tax receipt is not the same as the name on the bid/solicitation submittal, local preference does not apply.

2. Does your company maintain a permanent physical business address located within the limits of Sarasota, Manatee, DeSoto or Charlotte County from which your company operates or performs business?

   YES ____ If "yes", proceed to question 3.
   NO ____ **If "no", STOP, local preference does not apply.**

3. Does your company's local business office (identified in question 2) have a least one full time employee?

   YES ____ If "yes", proceed to question 4.
   NO _____ **If "no", STOP, local preference does not apply.**

4. Do at least fifty percent (50%) of your company's employees who are based in the local business location (identified in question 2) reside within Sarasota, Manatee, DeSoto or Charlotte County?

   YES ____ If "yes", proceed to question 5.
   NO ____ **If "no", STOP, local preference does not apply.**

Questions 5 – 6

5. Is your company's local business office (identified in question 2) the primary location (headquarters) of your company?

YES ____ If "yes", STOP, local preference applies.
NO ____ If "no", proceed to question 6.

6. If the local business office (identified in question 2) is not the primary location of your company, are at least ten percent (10%) of your company's entire full-time employees based at the local office location AND does at least one corporate officer, managing partner or principal owner of your company reside in Sarasota, Manatee, DeSoto or Charlotte County?

YES ____ If "yes", STOP, local preference applies.
NO ____ If "no", local preference does not apply.

PUBLIC ENTITY CRIME INFORMATION

A person or affiliate who has been placed on the State of Florida's convicted vendor list following a conviction for a public entity crime may not submit an RFP proposal on a contract to provide any goods or services to a public entity, may not submit a response on a contract with a public entity for services in the construction or repair of a public building or public work, may not submit bids on leases of real property to a public entity, may not be awarded or perform work as a Contractor, supplier, Sub-Contractor, or Contractor under a contract with any public entity, and may not transact business with any public entity in excess of the threshold amount provided in **Section 2876.017, for CATEGORY TWO for a period of 36 months from the date of being placed on the convicted vendor list.**

I, _____, being an authorized representative of the firm of _____, located at City: _____ State: _____ Zip: _____, have read and understand the contents of the Public Entity Crime Information and of this formal RFP package, hereby submit our proposal accordingly.

Signature: _____ Date: _____

Phone: _____ Fax: _____

Federal ID#: _____

DRUG FREE WORKPLACE

Preference shall be given to business with drug-free workplace programs. Whenever two or more RFPs, which are equal with qualifications and service, are received by the City for the procurement of commodities or contractual services, an RFP received from a business that certifies that it has implemented a drug-free workplace program shall be given preference in the award process. In order to have a drug-free workplace program, your firm shall:

1. Publish a statement notifying employees that the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance is prohibited in the workplace and specifying the action that will be taken against employees for violations of such prohibition.
2. Inform employees about the dangers of drug abuse in the workplace, the business's policy of maintaining a drug-free workplace, any programs, and the penalties that may be imposed upon employees for drug abuse violations.
3. Give each employee engaged in providing the commodities or contractual services that are under an RFP, a copy of the statement specified in subsection (1).
4. In the statement specified in subsection (1), notify the employees that as a condition of working on the commodities or contractual services that are under RFP, the employee will abide by the terms of the statement and will notify the employer of any conviction of, or plea of the United Sates or any state, for a violation occurring in the workplace no later than five (5) days after such conviction.
5. Impose a sanction on, or require the satisfactory participation in a drug abuse assistance or rehabilitation program if such is available in the employee's community, by an employee who is so convicted.
6. Make a good faith effort to continue to maintain a drug-free workplace through implementation of this section.

As the person authorized to sign the statement, I certify that this firm complies fully with the above requirements.

Concur_____

Variance _____

_____
Contractor's Signature

_____
Date

INDEMNIFICATION/HOLD HARMLESS

The elected firm shall indemnify and hold harmless the City and its officers and employees from liabilities, damages, losses, and costs, including, but not limited to, reasonable attorneys' fees, to the extent caused by the negligence, recklessness, or intentionally wrongful conduct of the elected firm and other persons employed or utilized by the elected firm in the performance of the contract.

I, _____, being an authorized representative of the firm of _____ located at City _____, State _____, Zip Code _____ Phone: _____ Fax: _____. Having read and understood the contents above, hereby submit accordingly as of this Date, _____, 2019.

_____
Please Print Name

_____
Signature

This signed document shall remain in effect for a period of one (1) year from the date of signature or for the contract period, whichever is longer.

CERTIFICATION REGARDING DEBARMENTS, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION-LOWER TIER FEDERALLY FUNDED TRANSACTIONS STATE OF FLORIDA GRANT ASSISTANCE PURSUANT TO AMERICAN RECOVERY AND REINVESTMENT ACT UNITED STATES DEPARTMENT OF ENERGY AWARDS

1. The undersigned hereby certifies that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.
2. The undersigned also certifies that it and its principals:
    a. Have not within a three-year period preceding this certification been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State anti-trust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property.
    b. Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph 2.(a) of this Certification; and (b) Have not within a three-year period preceding this certification had one or more public transactions (Federal, State or Local) terminated for cause or default.
3. Where the undersigned is unable to certify to any of the statements in this certification, an explanation shall be attached to this certification.

Dated this _____day of_____, 2019.

By: _____
Authorized Signature

_____
Typed Name of Title

_____
Recipient's Firm Name

_____
Street Address

_____
City/State/Zip Code

CONFLICT/NON CONFLICT OF INTEREST AND LITIGATION STATEMENT

CHECK ONE

☐ To the best of our knowledge, the undersigned firm has no potential conflicts of interest due to any other clients, contracts, or property interest for this project.

OR

☐ The undersigned firm, by attachment to this form, submits information which may be a potential conflict of interest due to other clients, contracts, or property interest for this project.

LITIGATION STATEMENT

IN FLORIDA ONLY, JUDGMENTS AGAINST THE FIRM, AND SUITS AGAINST CITY OF VENICE. INCLUDE ACTIONS AGAINST THE FIRM BY OR AGAINST ANY LOCAL, STATE, OR FEDERAL REGULATORY AGENCY.

CHECK ONE

☐ The undersigned firm has had no litigation adjudicated against the firm on any projects in the last five (5) years and has filed no litigation against City of Venice in the last five (5) years.

OR

☐ The undersigned firm, BY ATTACHMENT TO THIS FORM, submits a summary and disposition of individual cases of litigation in Florida adjudicated against the firm during the past five (5) years; all legal actions against City of Venice during the past five (5) years; and actions by or against any Federal, State and local agency during the past five (5) years.

Company Name: _____

Authorized Signature: _____

Name (print or type): _____

Title: _____

Failure to check the appropriate blocks above may result in disqualification of your proposal. Failure to provide documentation of a possible conflict of interest, or a summary of past litigation, may result in disqualification of your proposal. Should additional information regarding the above items come to the attention of City of Venice after award, the awarded contract shall be subject to immediate termination.

NON-COLLUSION AFFIDAVIT

State of _____

County of _____

_____ being first duly sworn, deposes and says that:

1. He/she is the _____, (Owner, Partner, Officer, Representative or Agent) of _____ the Proposer that has submitted the attached Proposal;
2. He/she is fully informed respecting the preparation and contents of the attached Proposal and of all pertinent circumstances respecting such Proposal;
3. Such Proposal is genuine and is not a collusive or sham Proposal;
4. Neither the said Proposer nor any of its officers, partners, owners, agents, representatives, employees or parties in interest, including this affiant, have in any way colluded, conspired, connived or agreed, directly or indirectly, with any other Proposer, firm, or person to submit a collusive or sham Proposal in connection with the Work for which the attached Proposal has been submitted; or have in any manner, directly or indirectly sought by agreement or collusion, or have in any manner, directly or indirectly, sought by agreement or collusion, or communication or conference with any Proposer, firm, or person to fix the price or prices in the attached Proposal or of any other Proposer, or to fix any overhead, profit, or cost elements of the Proposal price or the Proposal price of any other Proposer, or to secure through any collusion, conspiracy, connivance, or unlawful agreement any advantage against (Recipient), or any person interested in the proposal Work.

Signed, sealed and delivered in the presence of: _____

By: _____

_____ _____

(Printed Name) (Title)

ACKNOWLEDGEMENT

State of _____

County of _____

On this the _____ day of _____, 2019, before me, the undersigned Notary Public of the State of _____, personally appeared _____ and (Names of individual(s) who appeared before Notary) whose name(s) in/are subscribed to within instrument, and he/she/they acknowledge that he/she/they executed it.

_____

NOTARY PUBLIC, STATE OF FLORIDA

NOTARY PUBLIC
SEAL OF OFFICE: _____
(Name of Notary Public: Print, stamp, or type as commissioned)

☐Personally known to me, or ☐Produced Identification: _____ ☐ **DID** take an oath, or ☐**DID NOT** take an oath

'T' SERIES GENERAL NOTES

1. REFER TO SPECIFICATION SECTION "TECHNOLOGY GENERAL PROVISIONS" FOR MORE INFORMATION ABOUT DRAWINGS AND BID DOCUMENTS.
2. MANY SYMBOLS USED IN THIS PROJECT HAVE A TYPE ASSOCIATED WITH THEM. SEE SHEETS WITH DETAILS AND PROJECT SPECIFICATIONS FOR MORE INFORMATION ON THE DESCRIPTION OF EACH TYPE.
3. ALL CONDUIT FOR TECHNOLOGY SYSTEM INDOOR ABOVE GRADE SHALL BE EMT AND ALL CONDUIT FOR BELOW GRADE SHALL BE PVC.
4. SEE LIFE SAFETY PLANS FOR LOCATIONS OF FIRE RATED PARTITIONS IN THIS PROJECT. PROVIDE AN APPROVED FIRE STOP SYSTEMS FOR EACH RACEWAY OR CABLE GOING THROUGH A RATED WALL. SEE SPECIFICATION "RACEWAYS FOR TECHNOLOGY" FOR MORE INFORMATION.
5. WORKING CLEARANCES AROUND ELECTRICAL EQUIPMENT SHALL BE MAINTAINED IN COMPLIANCE WITH THE NATIONAL ELECTRICAL CODE ARTICLE 110. COORDINATE EQUIPMENT INSTALLATION TO MAINTAIN REQUIRED CLEARANCES.
6. SYMBOLS USED ON THE TECHNOLOGY DRAWINGS ARE NOT THE SAME SIZE AS THE ACTUAL OBJECT BEING REPRESENTED. THEREFORE LOCATIONS OF THE SYMBOLS ON THE FLOOR PLANS ARE AN APPROXIMATION TO THE ACTUAL LOCATION OF THE DEVICE AND NEED TO BE CAREFULLY COORDINATED WITH OTHER ELEMENTS IN THE VICINITY. AS A GENERAL GUIDELINE:
   A. VOICE/DATA OUTLET FOR WORK-AREAS SHALL BE INSTALLED WITHIN 6 INCHES OF A POWER OUTLET INDICATED IN ELECTRICAL DRAWINGS.
   B. TV OUTLETS SHALL BE INSTALLED WITHIN 6 INCHES OF A POWER OUTLET SHOWN ON THE ELECTRICAL DRAWINGS.
   C. WHEN MULTIPLE TECHNOLOGY SYSTEM OUTLETS ARE INDICATED NEXT TO EACH OTHER WITH SYMBOLS, THE SPACING BETWEEN OUTLETS SHALL BE CONSISTENT IF NO ELEVATION IS SHOWN ON THE DRAWINGS.
   D. WHEN INSTALLER IS NOT CERTAIN ABOUT SPECIFIC ADJACENCIES OF A DEVICE, THE QUESTION SHALL BE ASKED TO THE ENGINEER PRIOR TO INSTALLATION.
7. FOR EXACT LOCATION OF CEILING MOUNTED EQUIPMENT REFER TO THE ARCHITECTURAL REFLECTED CEILING PLAN. LOCATIONS OF EQUIPMENT NOT INCLUDED ON THE REFLECTED CEILING PLAN SHALL BE COORDINATED WITH THOSE ITEMS SHOWN. COORDINATION OF CEILING MOUNTED EQUIPMENT SHALL BE PRIOR TO ANY ROUGH-IN. NOTIFY ENGINEER OF ANY DISCREPANCY.
8. LOCATIONS OF FLOOR BOXES AND FLOOR PENETRATIONS SHALL NOT BE MEASURED FROM THIS SET OF DRAWINGS, INSTALLER SHALL REQUEST PRECISE LOCATIONS FROM ARCHITECT.
9. EACH VOICE/DATA RJ45 JACK SHALL BE CONNECTED TO A DEDICATED 4 PR CABLE.
10. THE RESPONSIBILITY OF RACEWAY INSTALLATION SHALL BE AS DIRECTED BY THE CONSTRUCTION MANAGER OR GENERAL CONTRACTOR, BUT ALL RACEWAYS FOR TECHNOLOGY ARE TO BE INCLUDED IN THIS CONTRACT.
11. WHEN CONDUIT RUNS ARE INDICATED ABOVE GRADE OR BELOW GRADE ON THESE DRAWINGS NOT EVERY SINGLE JUNCTION BOX (OR COMMUNICATIONS VAULT) REQUIRED OS INDICATED IN THE DRAWINGS. TYPICALLY ONLY END POINT LOCATIONS OR SPECIFIC PASS-THROUGH LOCATIONS WHERE THE ENGINEER DESIRES A BOX ARE SHOWN ON THE DRAWINGS. SEE SPECIFICATION "RACEWAYS FOR TECHNOLOGY" FOR REQUIREMENTS THAT INDICATE ADDITIONAL JUNCTION BOXES OR COMMUNICATION VAULTS THAT SHALL BE PROVIDED UNDER THIS CONTRACT. SUCH REQUIREMENTS INCLUDE ADDITIONAL BOXES REQUIRED BECAUSE OF NUMBER OF CONDUIT BENDS OR CHANGES IN ELEVATION.
12. SOME SYMBOLS INCLUDED IN THE SYMBOL LEGEND MAY NOT BE USED IN THESE PROJECT DRAWINGS.
13. UNDER NO CONDITIONS, CONDUITS FOR LOW VOLTAGE FOR FLOOR BOXES SHALL BE DAISY CHAINED TOGETHER BETWEEN ADJACENT FLOOR BOXES. ALL CONDUITS FOR FLOOR BOXES SHALL BE HOME RUNS TO NEAREST ACCESSIBLE CEILING SPACE.
14. THIS SET OF DRAWINGS DOES NOT INDICATE ALL GROUNDING AND BONDING REQUIREMENTS FOR TECHNOLOGY SYSTEMS. REFER TO SPECIFICATION SECTION "GROUNDING FOR TELECOMMUNICATION SYSTEM" FOR ADDITIONAL REQUIREMENTS.
15. ALL CABLES FOR TECHNOLOGY SYSTEMS RUN UNDER SLAB OR BELOW GRADE IN CONDUITS STUBBING UP INSIDE THE TELECOM ROOM SHALL BE INDOOR/OUTDOOR RATED. FOR CONDUITS STUBBING UP IN OTHER LOCATIONS DIFFERENT FROM TELECOM ROOMS AND FURTHER THAN 50 FT. FROM A TELECOM ROOM, DO NOT USE INDOOR/OUTDOOR RATED CABLES.
16. GRAPHICS USED FOR EQUIPMENT IN ELEVATIONS AND CHANNELS (LINE DRAWINGS) DO NOT NECESSARILY REPRESENT THE PART NUMBER OF THE EQUIPMENT SPECIFIED. THE PART NUMBERS LISTED IN THE DRAWINGS AND SPECIFICATIONS ARE TO BE FOLLOWED FOR BASIS OF DESIGN, NOT THE GRAPHICS.
17. THE TECHNOLOGY DRAWINGS DO NOT SHOW ALL REQUIRED CONDUITS/RACEWAYS TO BE PROVIDED UNDER THIS CONTRACT. TYPICALLY CONDUIT SLEEVES SMALLER THAN 2" ARE NOT SHOWN ON THE DRAWINGS. SEE SPECIFICATIONS "RACEWAYS FOR TECHNOLOGY" AND DRAWING DETAILS FOR ADDITIONAL RACEWAY REQUIREMENTS.
18. DEFINITION OF ACRONYMS USED IN THESE DRAWINGS:
   A. NIC (N.I.C.) - NOT IN CONTRACT
   B. OFE (O.F.E.) = OWNER FURNISHED EQUIPMENT. SEE RESPONSIBILITY MATRIX FOR MORE INFORMATION.
   C. DHI (D.H.I.) = DOOR HARDWARE INSTALLER
   D. USC (U.S.C.) = UNDER SEPARATE CONTRACT.
19. ALL REQUIRED WALL PENETRATIONS, EXISTING AND NEW, SHALL MAINTAIN THE NEW WALL RATING AFTER CABLING HAS BEEN INSTALLED OR REMOVED.
20. ALL SPEAKERS MOUNTED IN A CEILING TILE SHALL BE CENTERED IN THE CEILING TILE.

BASIC MATERIALS

- CONDUIT TURNED UP
- CONDUIT TURNED DOWN
- CAPPED CONDUIT
- CONDUIT STUBBED AND BUSHED INTO ACCESSIBLE CEILING CAVITY
- CONDUIT CONTINUED
- CONDUIT SLEEVES (X)(Y) — X= QTY OF SLEEVES; Y= SIZE OF CONDUITS SLEEVES PENETRATING WALL ABOVE CEILING SPACE. IF NO QUANTITY INDICATED USE AS MANY SLEEVES AS REQUIRED TO MATCH CROSS SECTIONAL AREA OF CABLE TRAY NEXT TO SLEEVE.
- TUBULAR RUNWAY, HUNG ABOVE CEILING OR AS NOTED
- CABLE TRAY (TYPE), HUNG ABOVE CEILING OR AS NOTED
- SURFACE MOUNTED ENCLOSED TECHNOLOGY SYSTEMS. SEE SHEETS WITH DETAILS FOR ADDITIONAL INFORMATION
- [J] JUNCTION BOX WALL MOUNTED. SIZE PER NEC IF NOT INDICATED ON DRAWING. NEMA 1 FOR INTERIOR, NEMA 4X FOR EXTERIOR USE WITH HINGED COVER AND LOCKING COVER
- (J) JUNCTION BOX CEILING MOUNTED. SIZE PER NEC IF NOT INDICATED ON DRAWING. NEMA 1 FOR INTERIOR, NEMA 4X FOR EXTERIOR USE WITH HINGED COVER AND LOCKING COVER
- [V]X TELECOMMUNICATIONS GROUND VAULT. SEE DETAILS AND SPECIFICATIONS FOR MORE INFORMATION. X = BOX TYPE

GENERAL

- NEW EQUIPMENT
- EXISTING WORK AND/OR EQUIPMENT REFERENCE, SHOWN ON MULTIPLE DRAWINGS
- DEVICE TO BE REMOVED (DEMO PLANS) UNDERFLOOR CONDUIT (NEW PLANS)
- WIRE AND/OR CONDUIT RUN CONTINUED ON REFERENCED DETAIL
- MATCH LINE REFERENCING CONTINUATION ON OTHER DRAWINGS
- DETAIL AND/OR SECTION REFERENCE
- CABLE ROUTING BOUNDARY
- FUTURE WORK

DRAWING NOTES AND DESIGNATIONS

- (X) DRAWING KEYED NOTES
- (X) CABLE ROUTING NOTES
- (Y/X) DETAIL OR SECTION REFERENCE TAG

AUDIO VISUAL EQUIPMENT

- (SX)YZ/W CEILING MOUNTED SPEAKER. X= SPEAKER TYPE; Y= SPEAKER ZONE; Z= DENOTES SPEAKER # IN ZONE; W= DENOTES SPEAKER WATTAGE TAP. NO ZONE INDICATES LOCAL ZONE FOR A/V SYSTEM IN ROOM
- [SX]YZ/W WALL MOUNTED SPEAKER. X= SPEAKER TYPE; Y= SPEAKER ZONE; Z= DENOTES SPEAKER # IN ZONE; W= DENOTES SPEAKER WATTAGE TAP. NO ZONE INDICATES LOCAL ZONE FOR A/V SYSTEM IN ROOM
- [VC] VOLUME CONTROL, WALL MOUNTED
- [FT] FLIP TOP DEVICE MOUNTED ON TABLE
- [SM] SENS MICROPHONE FOR AMBIENT NOISE, WALL MOUNTED
- [SM] SENS MICROPHONE FOR AMBIENT NOISE, CEILING MOUNTED
- [MX] MICROPHONE, DESK MOUNTED. X= TYPE. IF NOT SHOWN ONLY ONE TYPE IN THE PROJECT
- [MX] MICROPHONE, WALL MOUNTED. X= TYPE. IF NOT SHOWN ONLY ONE TYPE IN THE PROJECT
- (MX) MICROPHONE, CEILING MOUNTED. X= MICROPHONE TYPE. IF NOT SHOWN ONLY ONE TYPE IN THE PROJECT
- [TS]X TOUCH SCREEN FOR AUDIO/VIDEO CONTROL, DESK MOUNTED. X= TYPE. IF NOT SHOWN ONLY ONE TYPE IN THE PROJECT
- [TS]X TOUCH SCREEN FOR AUDIO/VIDEO CONTROL, WALL MOUNTED, INCLUDES BACK BOX. X= TYPE, IF NOT SHOWN, ONLY ONE TYPE IN PROJECT
- [AV X] CAMERA FOR AV SYSTEM, WALL MOUNTED. X= TYPE
- [AV X] CAMERA FOR AV SYSTEM, CEILING MOUNTED. X= TYPE
- [ALT] ASSISTED LISTENING TRANSMITTER, WALL MOUNTED
- [RSP] ROOM SCHEDULING PANEL, WALL MOUNTED
- [RC]X ROOM CONTROLLER FOR AUDIO/VIDEO CONTROL, WALL MOUNTED, INCLUDES BACK BOX. X= TYPE, IF NOT SHOWN, ONLY ONE TYPE IN PROJECT
- TT XX +YY AUDIO VISUAL DISPLAY. TT= DISPLAY TYPE WITH MOUNT; XX= SCREEN SIZE; YY= HEIGHT TO CENTER OF SCREEN
- TT XX +YY INTERACTIVE WHITEBOARD. TT= DISPLAY TYPE WITH MOUNT; XX= SCREEN SIZE; YY= HEIGHT TO CENTER OF SCREEN
- [X] OVERHEAD PROJECTOR WITH MOUNT. X= TYPE; Y= LENS THROW RATIO
- X PULLDOWN PROJECTION SCREEN. X= DIAGONAL DIMENSION IN INCHES
- X MOTORIZED PROJECTION SCREEN. X= DIAGONAL DIMENSION IN INCHES
- S_{LV} WALL SWITCH FOR MOTORIZED SCREEN
- [PX] PODIUM FOR AV EQUIPMENT, REFER TO DETAIL SHEETS. X= TYPE
- [WA] WIRELESS ANTENNA FOR WIRELESS MICRPHONE, WALL MOUNTED
- [BB] BACK BOX FOR CREDENZA RACK, REFER TO DETAIL SHEETS

AUDIO/VISUAL DRAWING INDEX

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VENICE PUBLIC SAFETY FACILITY
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Venice FL 34285
BID & PERMIT SET

KEY PLAN

SCALE

REVISIONS

NO.	DESCRIPTION	DATE

DRAWN BY	JM
APPROVED BY	SB
CHECKED BY	SB
DATE	06-05-19

TITLE

AV SYMBOLS, LEGEND, NOTES AND INDEX

PROJECT NO. 50102099

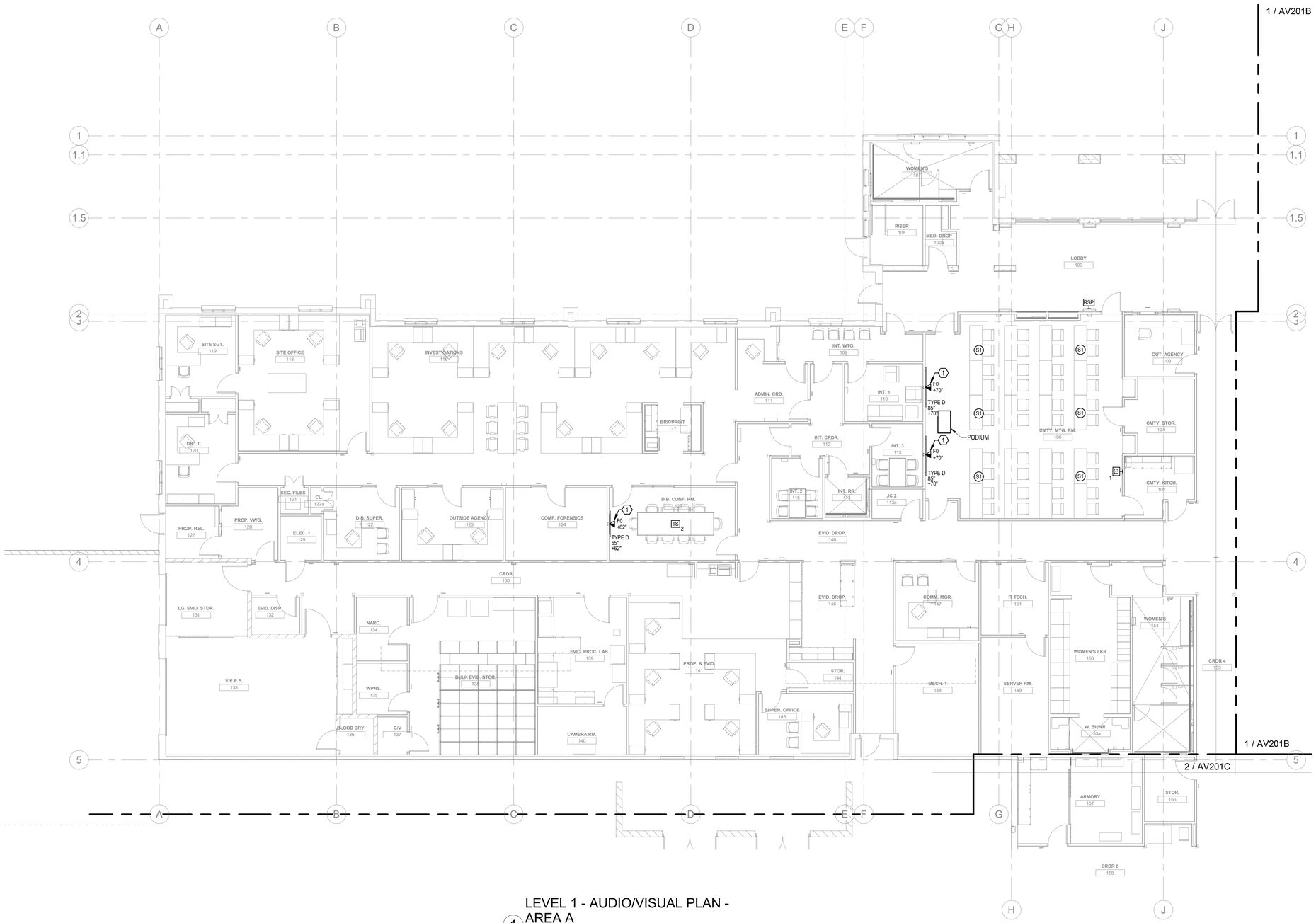
AV001

SHEET NO.

10/3/2019 3:29:52 PM

KEYED NOTES ⬡:

1. OUTLET DEDICATED FOR HDMI TRANSMISSION SYSTEM.



LEVEL 1 - AUDIO/VISUAL PLAN - AREA A
1/8" = 1'-0"

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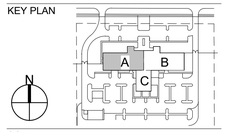
KEY PLAN



SCALE

0' 4' 8' 16'
SCALE: 1/8" = 1' - 0"

REVISIONS

NO.	DESCRIPTION	DATE

DRAWN BY	JM
APPROVED BY	SB
CHECKED BY	SB
DATE	06-05-19

TITLE

AUDIO/VISUAL FLOOR PLAN - AREA A

PROJECT NO. 50102099

AV201A

SHEET NO.

EXHIBIT A AVS & TECHNOLOGY PLANS & DETAILS

10/3/2019 3:29:58 PM

KEYED NOTES⬡:

1. OUTLET DEDICATED FOR HDMI TRANSMISSION SYSTEM.

LEVEL 1 - AUDIO/VISUAL PLAN - AREA B

1 1/8" = 1'-0"

10/3/2019 3:30:08 PM

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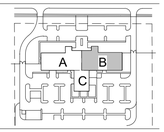
BID & PERMIT SET

KEY PLAN



SCALE

0' 4' 8' 16'

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

REVISIONS

NO.	DESCRIPTION	DATE

DRAWN BY	JM
APPROVED BY	SB
CHECKED BY	SB
DATE	06-05-19

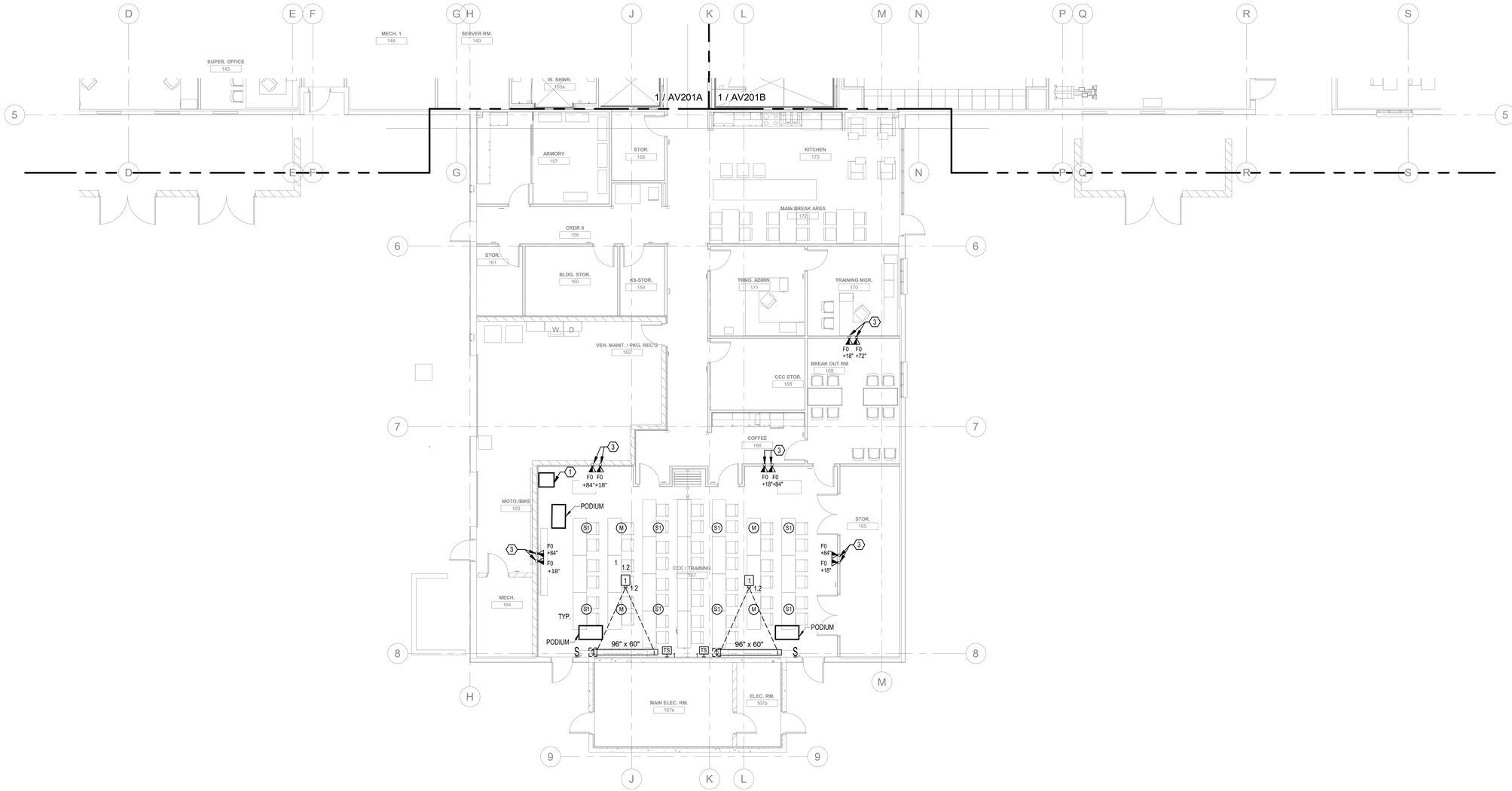
TITLE

AUDIO/VISUAL FLOOR PLAN - AREA B

PROJECT NO. 50102099

AV201B

SHEET NO.



LEVEL 1 - AUDIO/VISUAL PLAN - AREA C

2 1/8" = 1'-0"

KEYED NOTES ⬡:

1. PROVIDE 1 BAY CREDENZA RACK, MIDDLE ATLANTIC C5 SERIES, 27" DEEP, SINGLE BAY W/ DOOR AND LOCKING KIT
2. PROVIDE PROJECTION SCREEN. SCREEN TO BE TENSIONED, CEILING RECESSED, MOTORIZED, AND SCREEN SURFACE SHALL BE MATTE WHITE. TYPICAL OF ALL.
3. OUTLETS DEDICATED FOR HDMI TRANSMISSION SYSTEM.

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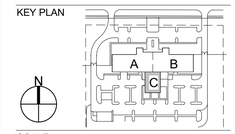
KEY PLAN



SCALE

0' 4' 8' 16'

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

REVISIONS

NO.	DESCRIPTION	DATE

DRAWN BY	JM
APPROVED BY	SB
CHECKED BY	SB
DATE	06-05-19

TITLE

AUDIO/VISUAL FLOOR PLAN - AREA C

PROJECT NO. 50102099

AV201C

SHEET NO.

10/15/2019 10:53:45 AM

EXHIBIT A AVS & TECHNOLOGY PLANS & DETAILS

AUDIO-VIDEO CHANNEL KEYED NOTES:
(NOT ALL KEYED NOTES ARE USED IN EVERY CHANNEL)

1. LINE LEVEL AUDIO SIGNAL (STEREO). PROVIDE (2) TWISTED PAIR CABLES FOR STEREO SIGNAL. 22 AWG STRANDED (7 X 30) TINNED COPPER CONDUCTORS, OVERALL FOIL SHIELD (100% COVERAGE), WITH 22 AWG STRANDED TINNED COPPER DRAIN WIRE.
2. LINE LEVEL AUDIO SIGNAL (MONO). PROVIDE (1) TWISTED PAIR CABLE FOR MONO SIGNAL. 22 AWG STRANDED (7 X 30) TINNED COPPER CONDUCTORS, OVERALL FOIL SHIELD (100% COVERAGE), WITH 22 AWG STRANDED TINNED COPPER DRAIN WIRE.
3. MIC LEVEL AUDIO SIGNAL. PROVIDE (1) TWISTED PAIR CABLE, 20 AWG STRANDED (7 X284) TINNED COPPER CONDUCTORS, OVERALL FOIL SHIELD (100% COVERAGE), WITH 20 AWG STRANDED TINNED COPPER DRAIN WIRE.
4. COMPOSITE VIDEO SIGNAL. PROVIDE (1) RG-59 CABLE, 22 AWG STRANDED (7 X 29) .031" BARE COMPACTED COPPER CONDUCTOR. TINNED COPPER /BARE COPPER DOUBLE BRAID SHIELD (95% COVERAGE)
5. ANALOG VIDEO/AUDIO/CONTROL SIGNAL USING TWISTED PAIR CABLES. PROVIDE ONE OR TWO 4-PAIR UTP CATEGORY CABLES AS REQUIRED BY EQUIPMENT MANUFACTURER. MATCH DESIGN CRITERIA FOR VOICE/DATA SPECIFICATIONS.
6. CONTROL SIGNAL PROVIDE (1) CABLE WITH (1) TWISTED PAIR, 22 AWG STRANDED (7 X 30) TINNED COPPER CONDUCTORS, OVERALL FOIL, TINNED COPPER DRAIN WIRE AND (1) UTP, 18 AWG (16 X 30) TINNED COPPER CONDUCTORS. (I.E. AXLINK OR CRESNET CONTROL)
7. SPEAKER AUDIO SIGNAL. PROVIDE (1) UNSHIELDED TWISTED PAIR CABLE, 16 AWG STRANDED (AWG 16) TINNED COPPER CONDUCTORS.
8. S-VIDEO SIGNAL. PROVIDE (2) COAXIAL CABLES, 30 AWG STRANDED (7 X 38) .012" TINNED COPPER CONDUCTOR S, TINNED COPPER FRENCH BRAID SHIELD (98% COVERAGE)
9. RS-232/ RS-422 / RS-485 SIGNAL. PROVIDE TWISTED PAIR CABLE, 22 AWG STRANDED (7 X 30) TINNED COPPER CONDUCTORS, OVERALL FOIL SHIELD (100% COVERAGE), WITH 22 AWG STRANDED TINNED COPPER DRAIN WIRE. PROVIDE QUANTITY OF PAIRS AS REQUIRED BY APPLICATION.
10. VGA VIDEO SIGNAL. PROVIDE 5 COAXIAL CABLES, 25 AWG SOLID .018" TINNED COPPER CONDUCTORS, FOIL SHIELD (100% COVERAGE) WITH TINNED COPPER INTERLOCKED SERVE SHIELD (95% COVERAGE)
11. COMPONENT VIDEO SIGNAL. PROVIDE 3 COAXIAL CABLES, 25 AWG SOLID .018" TINNED COPPER CONDUCTORS, FOIL SHIELD (100% COVERAGE) WITH TINNED COPPER INTERLOCKED SERVE SHIELD (95% COVERAGE)
12. ETHERNET SIGNAL (PATCH). PROVIDE (1) CABLE, WITH (4) TWISTED PAIRS CATEGORY TYPE, FACTORY TESTED AND MATCHING DESIGN CRITERIA FOR VOICE-DATA SPECIFICATIONS.
13. ETHERNET SIGNAL (STATION) . PROVIDE (1) CABLE, WITH (4) TWISTED PAIRS CATEGORY. MATCH DESIGN CRITERIA FOR VOICE-DATA SPECIFICATIONS.
14. IR CONTROL SIGNAL . PROVIDE (1) 1 PAIR ,UNSHIELDED TWISTED PAIR, CABLE, 22 AWG SOLID CONDUCTOR.
15. CONTACT CLOSURE SIGNAL. PROVIDE (1) UNSHIELDED TWISTED PAIR CABLE, 22 AWG SOLID CONDUCTOR CABLE. PROVIDE QUANTITY OF PAIRS AS REQUIRED BY APPLICATION.
16. HDMI/DVI SIGNAL . PROVIDE (1) HDMI/DVI FACTORY MADE CABLE. FOR DVI CABLES, MATCH CONNECTOR TYPES TO EQUIPMENT. FOR RUNS IN CONDUIT, ONLY USE HDMI CABLES AND USE HDMI/DVI ADAPTERS IF REQUIRED.
17. COAXIAL ANTENNA CABLE . PROVIDE COAXIAL CABLE RG-58 50 OHM. CABLE SPECIFICATIONS TO MATCH RECOMMENDATION OF EQUIPMENT MANUFACTORY.
18. RF SIGNAL . PROVIDE COAXIAL CABLE. REFER TO CATV CHANNELS AND SPECIFICATIONS FOR CABLE TYPE.
19. IR SIGNAL OVER COAX . PROVIDE (1) RG-59 CABLE, 22 AWG STRANDED (7 X 29) .031" BARE COMPACTED COPPER CONDUCTOR. TINNED COPPER /BARE COPPER DOUBLE BRAID SHIELD (95% COVERAGE)
20. TELEPHONE SIGNAL (DIAL TONE) . PROVIDE VOICE STATION CABLE. MATCH DESIGN CRITERIA FOR VOICE/DATA SPECIFICATIONS.
21. SPDIF DIGITAL AUDIO : PROVIDE COAXIAL CABLE RG-59 WITH RCA CONNECTORS
22. USB SIGNAL . PROVIDE FACTORY MADE USB CABLE. TYPE OF USB CONNECTORS TO MATCH EQUIPMENT CONNECTORS.
23. AV SIGNAL OVER FIBER OPTICS (BACKBONE) : FIBER OPTICS BACKBONE CABLE. OM3 SEE SPECIFICATIONS. CONNECTORS TO MATCH EQUIPMENT
24. AV SIGNAL OVER FIBER OPTICS (PATCH CORD) : 2-STRAND FIBER OPTICS PATCH CORD CABLE: OM3. SEE SPECIFICATIONS.
25. DIGITAL VIDEO/AUDIO/CONTROL SIGNAL USING TWISTED PAIR CABLES . PROVIDE ONE, TWO OR MORE 4-PAIR UTP OR SCTP CABLES AS REQUIRED BY EQUIPMENT MANUFACTURE. IF MANUFACTURE SUPPORTS STANDARD UTP CATEGORY CABLES, MATCH DESIGN CRITERIA FOR VOICE/DATA SPECIFICATIONS.
26. POWER SUPPLY CABLE : PROVIDE CABLE WITH ONE PAIR AWG-18 (16X30) TINNED COPPER CONDUCTORS, WITH RISER RATED CABLE JACKET
27. HD-SDI CABLE : PROVIDE COAXIAL CABLE RG-59, 20 AWG SOLID 0.032" BARE COPPER CONDUCTOR, GAS INJECTED FOAM HDPE INSULATION,DUOFOILD + TINNER COPPER BRAID SHIELD (95% COVERGAE), PVC JACKET. USE ONLY BELDEN 1505A
28. KVM CABLE : PROVIDE CABLE FOR MONITOR, KEYBOARD AND MOUSE. MATCH CONNECTORS IN EQUIPMENT (USB OR PS2 FOR KM AND VGA OR DVI FOR VIDEO).
29. ASI SIGNAL : PROVIDE COAXIAL CABLE RG-59, 20 AWG SOLID 0.032" BARE COPPER CONDUCTOR, GAS INJECTED FOAM HDPE INSULATION, DUOFOILD + TINNER COPPER BRAID SHIELD (95% COVERGAE), PVC JACKET. USE ONLY BELDEN 1505A
30. COAXIAL ANTENNA CABLE . PROVIDE CABLE RG-58 AS RECOMMENDED BY EQUIPMENT MANUFACTURER.
31. FIBER OPTICS CABLES SINGLE MODE F.O. CABLE PART OF THE GPON SYSTEM (N.I.C.)
32. LIMITED POWER CLASS 1 CIRCUIT : PROVIDE THREE CONDUCTORS AWG-18 GAUGE CABLE JACKET AS REQUIRED BY ARTICLE 725 ON NEC.
33. FIBER OPTICS PATCH CORD: SINGLE MODE FIBER OPTICS PATCH CORD. CONNECTOR TO MATCH EQUIPMENT CONNECTORS

AV NOTES FOR ALL AV RISERS

No Scale

1

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CITY OF VENICE

VENICE PUBLIC SAFETY FACILITY

1575 East Venice Avenue,
Venice FL 34285

BID & PERMIT SET

KEY PLAN

SCALE

REVISIONS

NO.	DESCRIPTION	DATE

DRAWN BY JM
APPROVED BY SB
CHECKED BY SB
DATE 06-05-19

TITLE

AUDIO/VISUAL RISER DIAGRAMS

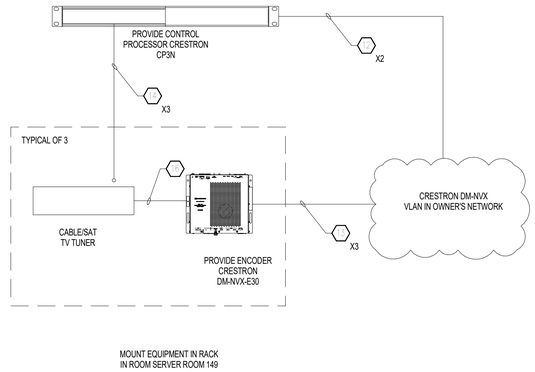
PROJECT NO. 50102099

AV501

SHEET NO.

10/3/2019 3:30:22 PM

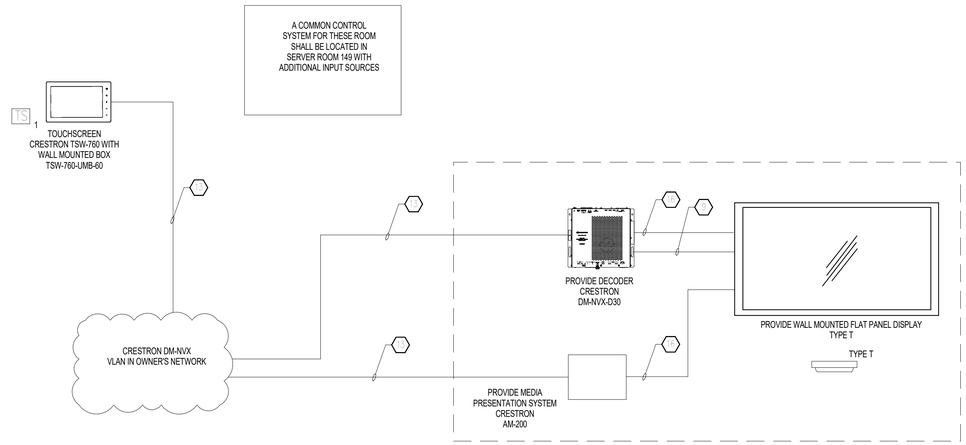
EXHIBIT A AVS & TECHNOLOGY PLANS & DETAILS



AV RISER - COMMON EQUIPMENT FOR ROOMS 125, 179 AND 203

No Scale

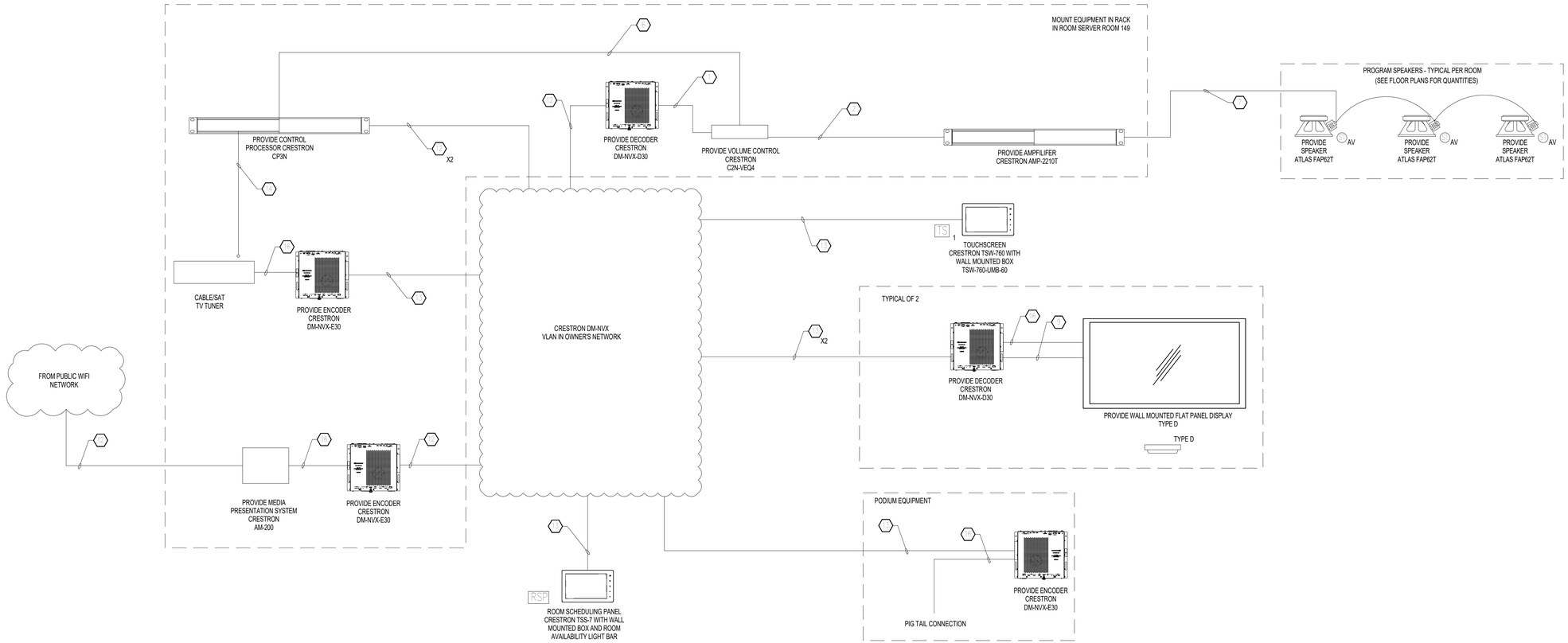
3



AV RISER - BRIEFING ROOM 179

No Scale

1



AV RISER - COMMUNITY MEETING ROOM 106

No Scale

2

Dewberry

Dewberry
800 N. Magnolia Ave.
Suite 1000
Orlando, FL 32803
407.843.5120

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KEY PLAN

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AUDIO/VISUAL
RISER DIAGRAMS

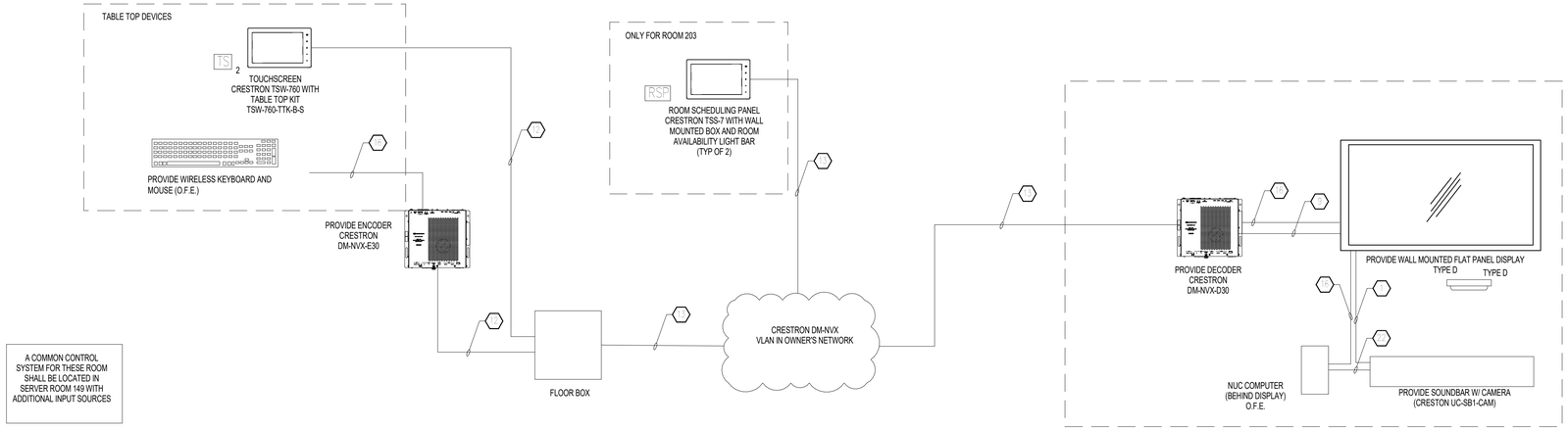
PROJECT NO. 50102099

AV502

SHEET NO.

10/3/2019 3:30:28 PM

EXHIBIT A AVS & TECHNOLOGY PLANS & DETAILS



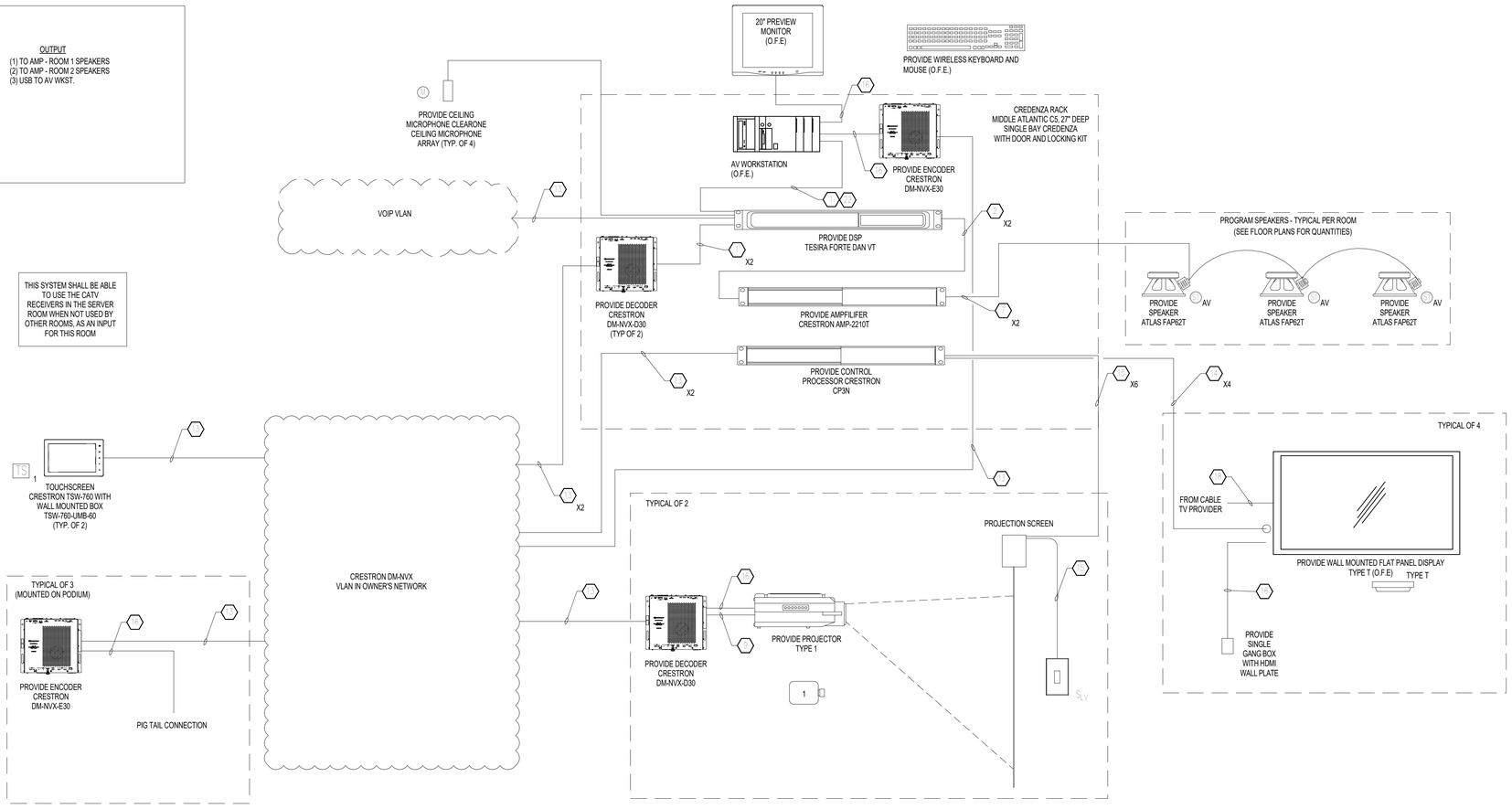
AV RISER - CONFERENCE ROOM 125 AND 203

No Scale

1

DSP SYSTEM SCHEDULE

INPUT	OUTPUT
(1) PROGRAM IN DECODER 1- LEFT	(1) TO AMP - ROOM 1 SPEAKERS
(2) PROGRAM IN DECODER 1- RIGHT	(2) TO AMP - ROOM 2 SPEAKERS
(3) MIC 1	(3) USB TO AV WKST.
(4) MIC 2	
(5) MIC 3	
(6) MIC 4	
(7) PROGRAM IN DECODER 2 - LEFT	
(8) PROGRAM IN DECODER 2 - RIGHT	
(9) AV WKS - LEFT	
(10) AV WKS - RIGHT	



AV RISER - TRAINING ROOM

No Scale

2

Dewberry

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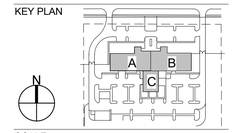
BID & PERMIT SET

KEY PLAN



SCALE

0' 8' 16' 32'
SCALE: 1/16" = 1' -0"

REVISIONS

NO.	DESCRIPTION	DATE

DRAWN BY	JM
APPROVED BY	SB
CHECKED BY	SB
DATE	06-05-19

TITLE

AUDIO/VISUAL RISER DIAGRAMS

PROJECT NO. 50102099

AV503

SHEET NO.

EXHIBIT A AVS & TECHNOLOGY PLANS & DETAILS

'T' SERIES GENERAL NOTES

1. REFER TO SPECIFICATION SECTION "TECHNOLOGY GENERAL PROVISIONS" FOR MORE INFORMATION ABOUT DRAWINGS AND BID DOCUMENTS.
2. MANY SYMBOLS USED IN THIS PROJECT HAVE A TYPE ASSOCIATED WITH THEM. SEE SHEETS WITH DETAILS AND PROJECT SPECIFICATIONS FOR MORE INFORMATION ON THE DESCRIPTION OF EACH TYPE.
3. ALL CONDUIT FOR TECHNOLOGY SYSTEM INDOOR ABOVE GRADE SHALL BE EMT AND ALL CONDUIT FOR BELOW GRADE SHALL BE PVC.
4. SEE LIFE SAFETY PLANS FOR LOCATIONS OF FIRE RATED PARTITIONS IN THIS PROJECT. PROVIDE AN APPROVED FIRE STOP SYSTEMS FOR EACH RACEWAY OR CABLE GOING THROUGH A RATED WALL. SEE SPECIFICATION "RACEWAYS FOR TECHNOLOGY" FOR MORE INFORMATION.
5. WORKING CLEARANCES AROUND ELECTRICAL EQUIPMENT SHALL BE MAINTAINED IN COMPLIANCE WITH THE NATIONAL ELECTRICAL CODE ARTICLE 110. COORDINATE EQUIPMENT INSTALLATION TO MAINTAIN REQUIRED CLEARANCES.
6. SYMBOLS USED ON THE TECHNOLOGY DRAWINGS ARE NOT THE SAME SIZE AS THE ACTUAL OBJECT BEING REPRESENTED. THEREFORE LOCATIONS OF THE SYMBOLS ON THE FLOOR PLANS ARE AN APPROXIMATION TO THE ACTUAL LOCATION OF THE DEVICE AND NEED TO BE CAREFULLY COORDINATED WITH OTHER ELEMENTS IN THE VICINITY. AS A GENERAL GUIDELINE:
   - A. VOICE/DATA OUTLET FOR WORK-AREAS SHALL BE INSTALLED WITHIN 6 INCHES OF A POWER OUTLET INDICATED IN ELECTRICAL DRAWINGS.
   - B. TV OUTLETS SHALL BE INSTALLED WITHIN 6 INCHES OF A POWER OUTLET SHOWN ON THE ELECTRICAL DRAWINGS.
   - C. WHEN MULTIPLE TECHNOLOGY SYSTEM OUTLETS ARE INDICATED NEXT TO EACH OTHER WITH SYMBOLS, THE SPACING BETWEEN OUTLETS SHALL BE CONSISTENT IF NO ELEVATION IS SHOWN ON THE DRAWINGS.
   - D. WHEN INSTALLER IS NOT CERTAIN ABOUT SPECIFIC ADJACENCIES OF A DEVICE, THE QUESTION SHALL BE ASKED TO THE ENGINEER PRIOR TO INSTALLATION.
7. FOR EXACT LOCATION OF CEILING MOUNTED EQUIPMENT REFER TO THE ARCHITECTURAL REFLECTED CEILING PLAN. LOCATIONS OF EQUIPMENT NOT INCLUDED ON THE REFLECTED CEILING PLAN SHALL BE COORDINATED WITH THOSE ITEMS SHOWN. COORDINATION OF CEILING MOUNTED EQUIPMENT SHALL BE PRIOR TO ANY ROUGH-IN. NOTIFY ENGINEER OF ANY DISCREPANCY.
8. LOCATIONS OF FLOOR BOXES AND FLOOR PENETRATIONS SHALL NOT BE MEASURED FROM THIS SET OF DRAWINGS, INSTALLER SHALL REQUEST PRECISE LOCATIONS FROM ARCHITECT.
9. EACH VOICE/DATA RJ45 JACK SHALL BE CONNECTED TO A DEDICATED 4 PR CABLE.
10. THE RESPONSIBILITY OF RACEWAY INSTALLATION SHALL BE AS DIRECTED BY THE CONSTRUCTION MANAGER OR GENERAL CONTRACTOR, BUT ALL RACEWAYS FOR TECHNOLOGY ARE TO BE INCLUDED IN THIS CONTRACT.
11. WHEN CONDUIT RUNS ARE INDICATED ABOVE GRADE OR BELOW GRADE ON THESE DRAWINGS NOT EVERY SINGLE JUNCTION BOX (OR COMMUNICATIONS VAULT) REQUIRED OS INDICATED IN THE DRAWINGS. TYPICALLY ONLY END POINT LOCATIONS OR SPECIFIC PASS-THROUGH LOCATIONS WHERE THE ENGINEER DESIRES A BOX ARE SHOWN ON THE DRAWINGS. SEE SPECIFICATION "RACEWAYS FOR TECHNOLOGY" FOR REQUIREMENTS THAT INDICATE ADDITIONAL JUNCTION BOXES OR COMMUNICATION VAULTS THAT SHALL BE PROVIDED UNDER THIS CONTRACT. SUCH REQUIREMENTS INCLUDE ADDITIONAL BOXES REQUIRED BECAUSE OF NUMBER OF CONDUIT BENDS OR CHANGES IN ELEVATION.
12. SOME SYMBOLS INCLUDED IN THE SYMBOL LEGEND MAY NOT BE USED IN THESE PROJECT DRAWINGS.
13. UNDER NO CONDITIONS, CONDUITS FOR LOW VOLTAGE FOR FLOOR BOXES SHALL BE DAISY CHAINED TOGETHER BETWEEN ADJACENT FLOOR BOXES. ALL CONDUITS FOR FLOOR BOXES SHALL BE HOME RUNS TO NEAREST ACCESSIBLE CEILING SPACE.
14. THIS SET OF DRAWINGS DOES NOT INDICATE ALL GROUNDING AND BONDING REQUIREMENTS FOR TECHNOLOGY SYSTEMS. REFER TO SPECIFICATION SECTION "GROUNDING FOR TELECOMMUNICATION SYSTEM" FOR ADDITIONAL REQUIREMENTS.
15. ALL CABLES FOR TECHNOLOGY SYSTEMS RUN UNDER SLAB OR BELOW GRADE IN CONDUITS STUBBING UP INSIDE THE TELECOM ROOM SHALL BE INDOOR/OUTDOOR RATED. FOR CONDUITS STUBBING UP IN OTHER LOCATIONS DIFFERENT FROM TELECOM ROOMS AND FURTHER THAN 50 FT. FROM A TELECOM ROOM, DO NOT USE INDOOR/OUTDOOR RATED CABLES.
16. GRAPHICS USED FOR EQUIPMENT IN ELEVATIONS AND CHANNELS (LINE DRAWINGS) DO NOT NECESSARILY REPRESENT THE PART NUMBER OF THE EQUIPMENT SPECIFIED. THE PART NUMBERS LISTED IN THE DRAWINGS AND SPECIFICATIONS ARE TO BE FOLLOWED FOR BASIS OF DESIGN, NOT THE GRAPHICS.
17. THE TECHNOLOGY DRAWINGS DO NOT SHOW ALL REQUIRED CONDUITS/RACEWAYS TO BE PROVIDED UNDER THIS CONTRACT. TYPICALLY CONDUIT SLEEVES SMALLER THAN 2" ARE NOT SHOWN ON THE DRAWINGS. SEE SPECIFICATIONS "RACEWAYS FOR TECHNOLOGY" AND DRAWING DETAILS FOR ADDITIONAL RACEWAY REQUIREMENTS.
18. DEFINITION OF ACRONYMS USED IN THESE DRAWINGS:
   - A. NIC (N.I.C.) - NOT IN CONTRACT
   - B. OFE (O.F.E.) = OWNER FURNISHED EQUIPMENT. SEE RESPONSIBILITY MATRIX FOR MORE INFORMATION.
   - C. DHI (D.H.I.) = DOOR HARDWARE INSTALLER
   - D. USC (U.S.C.) = UNDER SEPARATE CONTRACT.
19. ALL REQUIRED WALL PENETRATIONS, EXISTING AND NEW, SHALL MAINTAIN THE NEW WALL RATING AFTER CABLING HAS BEEN INSTALLED OR REMOVED.
20. ALL SPEAKERS MOUNTED IN A CEILING TILE SHALL BE CENTERED IN THE CEILING TILE.

SECURITY SYSTEM GENERAL NOTES

1. SYMBOLS USED TO REPRESENT DEVICES SUCH AS CCTV CAMERAS, INTERCOM STATIONS, SECURITY WORKSTATIONS, CALL STATIONS, AND EMERGENCY PHONE STATIONS REQUIRE ONE (1) DATA DROP FOR SUCH DEVICE. THIS DATA DROP IS NOT SHOWN ON THE VOICE/DATA FLOOR PLANS, BUT SHALL BE PROVIDED FOLLOWING ALL REQUIREMENTS FOR VOICE/DATA DROPS INDICATED IN THE DRAWING DETAILS AND IN THE SPECIFICATION "STRUCTURED CABLING SYSTEM".
2. ANY DATA DROPS FOR SECURITY DEVICES EXCEEDING A 295 FT. OF PERMANENT LINK DISTANCE TO THE TELECOM ROOM WHERE CAMERA WILL BE WIRED TO, SHALL BE WIRED WITH FIBER OPTICS FOR HORIZONTAL CABLING AND A 2 CONDUCTOR AWG-16 CL2(P) CABLE. THE FIBER CABLE SHALL BE AS DESCRIBED IN SPECIFICATION "STRUCTURED CABLING SYSTEM". IF NO INDICATION IN SUCH SPECIFICATION, FIBER OPTIC CABLE SHALL BE A 2-STRAND OM1 CABLE WITH A SUITABLE JACKET FOR THE APPLICATION.
3. ALL DOUBLE DOORS THAT ARE SHOWN WITH TWO DOOR POSITIONS SWITCHES ARE TO RECEIVE (1) DOOR POSITION SWITCH ON EACH DOOR LEAF AND SHALL REPORT AS ONE ALARM POINT.
4. ALL CAMERAS, CARD READERS AND/OR KEYPADS DEDICATED FOR ELEVATOR FLOOR SELECTION CONTROL ARE SHOWN INSIDE THE ELEVATOR CAB ON THE LOWEST LEVEL FLOOR PLAN TO WHICH THE ELEVATOR TRAVELS.
5. LOCATION OF SURVEILLANCE CAMERAS SHALL BE CLOSELY COORDINATED WITH OTHER TRADES TO AVOID OBSTRUCTIONS IN THE FIELD OF VIEW. IT IS NOT REQUIRED FOR CAMERAS TO BE MOUNTED IN CENTER OF A CEILING TILE (OR CENTER OF A HALLWAY) IF THAT LOCATION CAUSES AN OBSTRUCTION IN THE FIELD OF VIEW OF THE CAMERA. ALL CAMERAS ARE TO BE INSTALLED AS TO MINIMIZE THE OBSTRUCTIONS IN THE FIELD OF VIEW WITHIN A 4' RADIUS OF THE SPECIFIED LOCATION.
6. SURVEILLANCE CAMERAS INDICATED IN THE CORNER OF A ROOM SHALL BE INSTALLED AS CLOSE AS PHYSICALLY POSSIBLE TO THE CORNER OF THE ROOM TO GAIN THE BEST FIELD OF VIEW FOR THAT CAMERA.
7. EACH ACCESS CONTROLLED DOOR IN THE PROJECT HAS A DOOR IDENTIFIER SYMBOL THAT ASSOCIATES THE DOOR TO A CORRESPONDING ROUGH-IN DETAIL IN THE DRAWINGS AND A SPECIFIC FUNCTIONALITY OF THE DOOR IN THE SECURITY SPECIFICATIONS.

BASIC MATERIALS

- CONDUIT TURNED UP
- CONDUIT TURNED DOWN
- CAPPED CONDUIT
- CONDUIT STUBBED AND BUSHED INTO ACCESSIBLE CEILING CAVITY
- CONDUIT CONTINUED
- CONDUIT SLEEVES (X/Y) X= QTY OF SLEEVES; Y= SIZE OF CONDUITS SLEEVES PENETRATING WALL ABOVE CEILING SPACE. IF NO QUANTITY INDICATED USE AS MANY SLEEVES AS REQUIRED TO MATCH CROSS SECTIONAL AREA OF CABLE TRAY NEXT TO SLEEVE.
- TUBULAR RUNWAY, HUNG ABOVE CEILING OR AS NOTED
- CABLE TRAY (TYPE), HUNG ABOVE CEILING OR AS NOTED
- SURFACE MOUNTED ENCLOSED TECHNOLOGY SYSTEMS. SEE SHEETS WITH DETAILS FOR ADDITIONAL INFORMATION
- JUNCTION BOX WALL MOUNTED. SIZE PER NEC IF NOT INDICATED ON DRAWING. NEMA 1 FOR INTERIOR, NEMA 4X FOR EXTERIOR USE WITH HINGED COVER AND LOCKING COVER
- JUNCTION BOX CEILING MOUNTED. SIZE PER NEC IF NOT INDICATED ON DRAWING. NEMA 1 FOR INTERIOR, NEMA 4X FOR EXTERIOR USE WITH HINGED COVER AND LOCKING COVER
- TELECOMMUNICATIONS GROUND VAULT. SEE DETAILS AND SPECIFICATIONS FOR MORE INFORMATION. X = BOX TYPE

GENERAL

- NEW EQUIPMENT
- EXISTING WORK AND/OR EQUIPMENT REFERENCE, SHOWN ON MULTIPLE DRAWINGS
- DEVICE TO BE REMOVED (DEMO PLANS) UNDERFLOOR CONDUIT (NEW PLANS)
- WIRE AND/OR CONDUIT RUN CONTINUED ON REFERENCED DETAIL
- MATCH LINE REFERENCING CONTINUATION ON OTHER DRAWINGS
- DETAIL AND/OR SECTION REFERENCE
- CABLE ROUTING BOUNDARY
- FUTURE WORK

DRAWING NOTES AND DESIGNATIONS

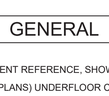
- DRAWING KEYED NOTES
- CABLE ROUTING NOTES
- DETAIL OR SECTION REFERENCE TAG

VOICE AND DATA SYSTEM

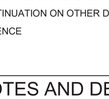
- TELECOMMUNICATION OUTLET (W,WP / XNYZ / +H) X= MOUNTING: (E= EXISTING, F= FLUSH, S= SURFACE, M= MODULAR FURNITURE ADAPTER, P= POLE, R= RAISED FLOOR, L= FLOOR, R= RACEWAY) N= NUMBER OF DATA CABLES IN THE FACEPLATE Y= NOT USED Z= NUMBER OF FIBER OPTIC STRANDS IN THE FACEPLATE +H= INSTALLATION HEIGHT IN INCHES AT CENTER OF OUTLET, COORDINATE WITH ELECTRICAL. IF NOT SHOWN INSTALL AT TYPICAL RECEPTACLE HEIGHT. W= WALL TELEPHONE FACEPLATE WITH SUPPORT STUDS, INSTALLED AT 48" AFF AT CENTER OF OUTLET AND 12" FROM EDGE OF WALL. WP=WEATHERPROOF
  EXAMPLE: F2 = TWO DATA JACKS IN A SINGLE FACEPLATE, FLUSH MOUNTED
- OUTLET FOR MECHANICAL/ ELECTRICAL/ FIRE ALARM/ ELEVATOR/ STAR CONNECTION (MECH SY) Y: AS DESCRIBED FOR TELECOMMUNICATIONS OUTLET
- OUTLET FOR WIRELESS ACCESS POINT, WALL MOUNTED (WAP XY) XY: AS DESCRIBED FOR TELECOMMUNICATIONS OUTLET
- CEILING MOUNTED INFORMATION OUTLET, MOUNTED ON FINISHED CEILING (XY) XY: AS DESCRIBED FOR TELECOMMUNICATIONS OUTLET
- OUTLET FOR WIRELESS ACCESS POINT, MOUNTED ON FINISHED CEILING (WAP XY) XY: AS DESCRIBED FOR TELECOMMUNICATIONS OUTLET
- FLOOR BOX FOR TECHNOLOGY SYSTEMS AND POWER OUTLETS. (YZ / XN) XN= AS DESCRIBED FOR COMMUNICATIONS OUTLET Y= DENOTES BOX TYPE (1,2,3...) Z= DENOTES PLATE TYPE (A,B,C....), A= NO AUDIO/VISUAL
- POKE-THRU FOR TECHNOLOGY SYSTEMS AND POWER OUTLETS. (YZ / XN) XN= AS DESCRIBED FOR COMMUNICATIONS OUTLET Y= DENOTES BOX TYPE (1,2,3...) Z= DENOTES PLATE TYPE (A,B,C....), A= NO AUDIO/VISUAL
- WALL MOUNTED FURNITURE FEED USED TO FEED CABLES TO MODULAR FURNITURE OR CABLES
- POKE THRU FURNITURE FEED USED TO FEED CABLES TO MODULAR FURNITURE OR CABLES
- POWER POLE FOR COMBINED USE - TECHNOLOGY SYSTEMS AND POWER. X= TYPE. IF NOT SHOWN ONLY ONE TYPE IN THE PROJECT

COVERAGE FOR IDF

COVERAGE OF EACH TELECOM ROOM. THE SHADED REGIONS REPRESENT THE MAXIMUM DISTANCE LOW VOLTAGE CABLES CAN BE RUN FROM EACH IDF.



COVERAGE FOR IT ROOM 1



COVERAGE FOR IT ROOM 2

DISTRIBUTED ANTENNA SYSTEMS

- DAS ANTENNA, WALL MOUNTED (A / X / Y / Z) X= ANTENNA TYPE Y= ANTENNA NUMBER Z= SPLITTER NUMBER THE ANTENNA IS ASSOCIATED WITH
- DAS ANTENNA, CEILING MOUNTED (A / X / Y / Z) X= ANTENNA TYPE Y= ANTENNA NUMBER Z= SPLITTER NUMBER THE ANTENNA IS ASSOCIATED WITH
- DAS SPLITTER (Y / Z) X= SPLITTER NUMBER
- ROOF ANTENNA, WALL MOUNTED
- FIBER BDA (BDA / X) X= FBDA NUMBER
- DAS REPEATER (RP)

BROADBAND TELEVISION SYSTEM

- RX ANTENNA
- TX ANTENNA
- TX/RX ANTENNA
- 2 WAY SPLITTER
- 3 WAY SPLITTER
- 4 WAY SPLITTER
- 8 WAY SPLITTER
- SATELLITE DISH (SD)
- CATV AMPLIFIER (I / O / X) I= INPUT LEG O= OUTPUT LEG T= TEST PORT X= AMPLIFIER TYPE - SP: SERVICE PROVIDER, H: HEADEND AMPLIFIER, D: DISTRBUTION AMPLIFIER
- DISTRIBUTION TAP (I / O) I= INPUT LEG O= OUTPUT LEG T= TAP LEGS, QTY AS INDICATED IN RISER
- DIRECTIONAL COUPLER (I / O) I= INPUT LEG O= OUTPUT LEG T= TAP LEGS, QTY AS INDICATED IN RISER
- CATV TAP DEFINITION TAG (XW-Y) X= NUMBER OF TAP LEGS Y= TAP VALUE IN dB
- CATV EQUALIZER (I / X / O / EQ) X= EQUALIZING VALUE IN dB I= INPUT LEG O= OUTPUT LEG
- TERMINATOR
- SURGE SUPRESSOR AT BUILDING ENTRY POINT
- TELEVISION OUTLET, CORRDINATE ROUGH-IN WITH TV MOUNT INSTALLER, WALL MOUNTED (TV / X / +H) X= DENOTES TYPE OF OUTLET, SEE DETAIL FOR MORE INFORMATION +H= MOUNTING HEIGHT IN INCHES AT CENTER OF OUTLET, IF NOT SHOWN INSTALL AT 7'-0" AFF
- TELEVISION OUTLET, CORRDINATE ROUGH-IN WITH TV MOUNT INSTALLER, CEILING MOUNTED (TV / X / +H) X= DENOTES TYPE OF OUTLET, SEE DETAIL FOR MORE INFORMATION +H= MOUNTING HEIGHT IN INCHES AT CENTER OF OUTLET, IF NOT SHOWN INSTALL AT 7'-0" AFF

AUDIO VISUAL EQUIPMENT

- CEILING MOUNTED SPEAKER (SX / W / Z) X= SPEAKER TYPE Y= SPEAKER ZONE Z= DENOTES SPEAKER # IN ZONE W= DENOTES SPEAKER WATTAGE TAP NO ZONE INDICATES LOCAL ZONE FOR A/V SYSTEM IN ROOM
- WALL MOUNTED SPEAKER (SX / W / Z) X= SPEAKER TYPE Y= SPEAKER ZONE Z= DENOTES SPEAKER # IN ZONE W= DENOTES SPEAKER WATTAGE TAP NO ZONE INDICATES LOCAL ZONE FOR A/V SYSTEM IN ROOM
- VOLUME CONTROL, WALL MOUNTED (VC)
- FLIP TOP DEVICE MOUNTED ON TABLE (FT)
- SENS MICROPHONE FOR AMBIENT NOISE, WALL MOUNTED (SM)
- SENS MICROPHONE FOR AMBIENT NOISE, CEILING MOUNTED (SM)
- MICROPHONE, DESK MOUNTED (MX) X= TYPE. IF NOT SHOWN ONLY ONE TYPE IN THE PROJECT
- MICROPHONE, WALL MOUNTED (MX) X= TYPE. IF NOT SHOWN ONLY ONE TYPE IN THE PROJECT
- MICROPHONE, CEILING MOUNTED (MX) X= MICROPHONE TYPEIF NOT SHOWN ONLY ONE TYPE IN THE PROJECT
- TOUCH SCREEN FOR AUDIO/VIDEO CONTROL, DESK MOUNTED (TS / X) X= TYPE. IF NOT SHOWN ONLY ONE TYPE IN THE PROJECT
- TOUCH SCREEN FOR AUDIO/VIDEO CONTROL, WALL MOUNTED, INCLUDES BACK BOX (TS / X) X= TYPE, IF NOT SHOWN, ONLY ONE TYPE IN PROJECT
- CAMERA FOR AV SYSTEM, WALL MOUNTED (AV / X) X= TYPE
- CAMERA FOR AV SYSTEM, CEILING MOUNTED (AV / X) X= TYPE
- ASSISTED LISTENING TRANSMITTER, WALL MOUNTED (ALT)
- ROOM CONTROLLER FOR AUDIO/VIDEO CONTROL, WALL MOUNTED, INCLUDES BACK BOX (RC / X) X= TYPE, IF NOT SHOWN, ONLY ONE TYPE IN PROJECT
- AUDIO VISUAL DISPLAY (TT / XX / +YY) TT= DISPLAY TYPE WITH MOUNT XX= SCREEN SIZE YY= HEIGHT TO CENTER OF SCREEN
- INTERACTIVE WHITEBOARD (TT / XX / +YY) TT= DISPLAY TYPE WITH MOUNT XX= SCREEN SIZE YY= HEIGHT TO CENTER OF SCREEN
- OVERHEAD PROJECTOR WITH MOUNT (X / Y) X= TYPE Y= LENS THROW RATIO
- PULLDOWN PROJECTION SCREEN (X) X= DIAGONAL DIMENSION IN INCHES
- MOTORIZED PROJECTION SCREEN (X) X= DIAGONAL DIMENSION IN INCHES
- WALL SWITCH FOR MOTORIZED SCREEN (SLV)
- PODIUM FOR AV EQUIPMENT, REFER TO DETAIL SHEETS (PX) X= TYPE
- WIRELESS ANTENNA FOR WIRELESS MICRPHONE, WALL MOUNTED (WA)
- BACK BOX FOR CREDENZA RACK, REFER TO DETAIL SHEETS (BB)

ELECTRONIC SECURITY SYSTEM

- CARD READER, WALL MOUNTED (CR)
- CARD READER WITH INTEGRATED KEYPAD, WALL MOUNTED (CK)
- BIOMETRIC ACCESS CONTROL DEVICE, WALL MOUNTED (BR)
- KEYPAD, WALL MOUNTED (KP)
- INTEGRATED CARD READER /LOCK, DOOR MOUNTED (CL)
- INTRUSION ALARM KEYPAD (IK)
- ELECTRIC MORTISE LOCK OR ELECTRIC TRIM (EM)
- DELAYED EGRESS LATCH LOCK (DE)
- DELAYED EGRESS MAG LOCK (ML)
- ELECTRIC LATCH RETRACTION LOCK (EL)
- ELECTROMAGNETIC LOCK (ML)
- ELECTRIC DOOR STRIKE (ES)
- ELECTRIC DOOR OPERATOR (ACTUATOR ARM) (DO)
- DOOR POSITION SWITCH (DPS)
- LOCAL ALARM - HORN/STROBE, WALL MOUNTED (LA)
- ASSISTANCE STATION, WALL MOUNTED (AS / X) X= TYPE, IF NOT SHOWN, ONLY ONE TYPE IN PROJECT, REFER TO SPECIFICATION FOR TYPE
- INTERCOM SUBSTATION (DOOR STATION) (IS / X) X= TYPE. IF NOT SHOWN ONLY ONE TYPE IN THE PROJECT
- INTERCOM MASTER STATION (IM / X) X= TYPE. IF NOT SHOWN ONLY ONE TYPE IN THE PROJECT
- SPEAKER PHONE (SP / X) X= TYPE. IF NOT SHOWN ONLY ONE TYPE IN THE PROJECT
- CALL STATION (THROUGH PHONE LINE), WALL MOUNTED (CS)
- CALL BOX, WALL MOUNTED (CB)
- ALARM, BLUE LIGHT, WALL MOUNTED (BL)
- DOOR TYPE IDENTIFIER (XXX) X= TYPE (A1,C3,B6..) REFER TO SECURITY DOOR DETAILS
- DOOR RELEASE BUTTON (A) X= A: ADA ACCESSIBLE - (PALM ACTUATOR), W: HAND WAVE, IF NOT SHOWN, REGULAR PUSH BUTTON
- DOOR RELEASE BUTTON, DESK MOUNTED
- REQUEST TO EXIT DEVICE (IR SENSOR), MOUNT CENTERED ABOVE DOOR FRAME (REX)
- GLASS BREAK SENSOR (GB)
- ELECTRIC GATE OPERATOR, REFER TO GENERAL NOTE ON SHEET T100 FOR MORE INFORMATION (EG)
- DURESS PANIC BUTTON, WALL MOUNTED (D)
- DURESS PANIC BUTTON, MOUNTED UNDER DESK (D)
- MOTION DETECTOR, WALL MOUNTED, MOUNT 6" BELOW CEILING OR 8'-0" AFF MAX (MD)
- MOTION DETECTOR, 360 DEGREE SENSOR, CEILING MOUNTED (MD)
- INFANT ABDUCTION SYSTEM (IA)
- LINE BETWEEN SECURITY DEVICES, INDICATES ASSOCIATED EQUIPMENT
- CONTROLLED DOOR INTERLOCK GROUP. PROGRAMMED SO ONLY ONE DOOR CAN BE OPEN AT A TIME.

VIDEO SURVEILLANCE SYSTEMS

- PAN/TILT/ZOOM CCTV CAMERA, WALL MOUNTED (PTZ / X) X= MOUNTING TYPE (1,2,3), SEE SHEET WITH DETAILS FOR MORE INFORMATION
- PAN/TILT/ZOOM CCTV CAMERA, CEILING MOUNTED (PTZ / X) X= MOUNTING TYPE (1,2,3), SEE SHEET WITH DETAILS FOR MORE INFORMATION
- FIXED CCTV CAMERA, WALL MOUTED (FIX / X) X= MOUNTING TYPE (1,2,3), SEE SHEET WITH DETAILS FOR MORE INFORMATION
- FIXED CCTV CAMERA, CEILING MOUNTED (FIX / X) X= MOUNTING TYPE (1,2,3), SEE SHEET WITH DETAILS FOR MORE INFORMATION
- FLAT PANEL DISPLAY WITH MOUNT (CCTV / XX / +YY) XX= SCREEN SIZE YY= HEIGHT TO CENTER OF SCREEN
- SECURITY SYSTEM WORKSTATION, DESK MOUNTED (PC / X) X= TYPE

TECHNOLOGY DRAWING INDEX

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KEY PLAN

SCALE

REVISIONS

NO.	DESCRIPTION	DATE
2	ADD 01	04/22/19

DRAWN BY: JM
APPROVED BY: SB
CHECKED BY: SB
DATE: 06-05-19

TITLE

TECHNOLOGY SYMBOLS, LEGEND, NOTES AND INDEX

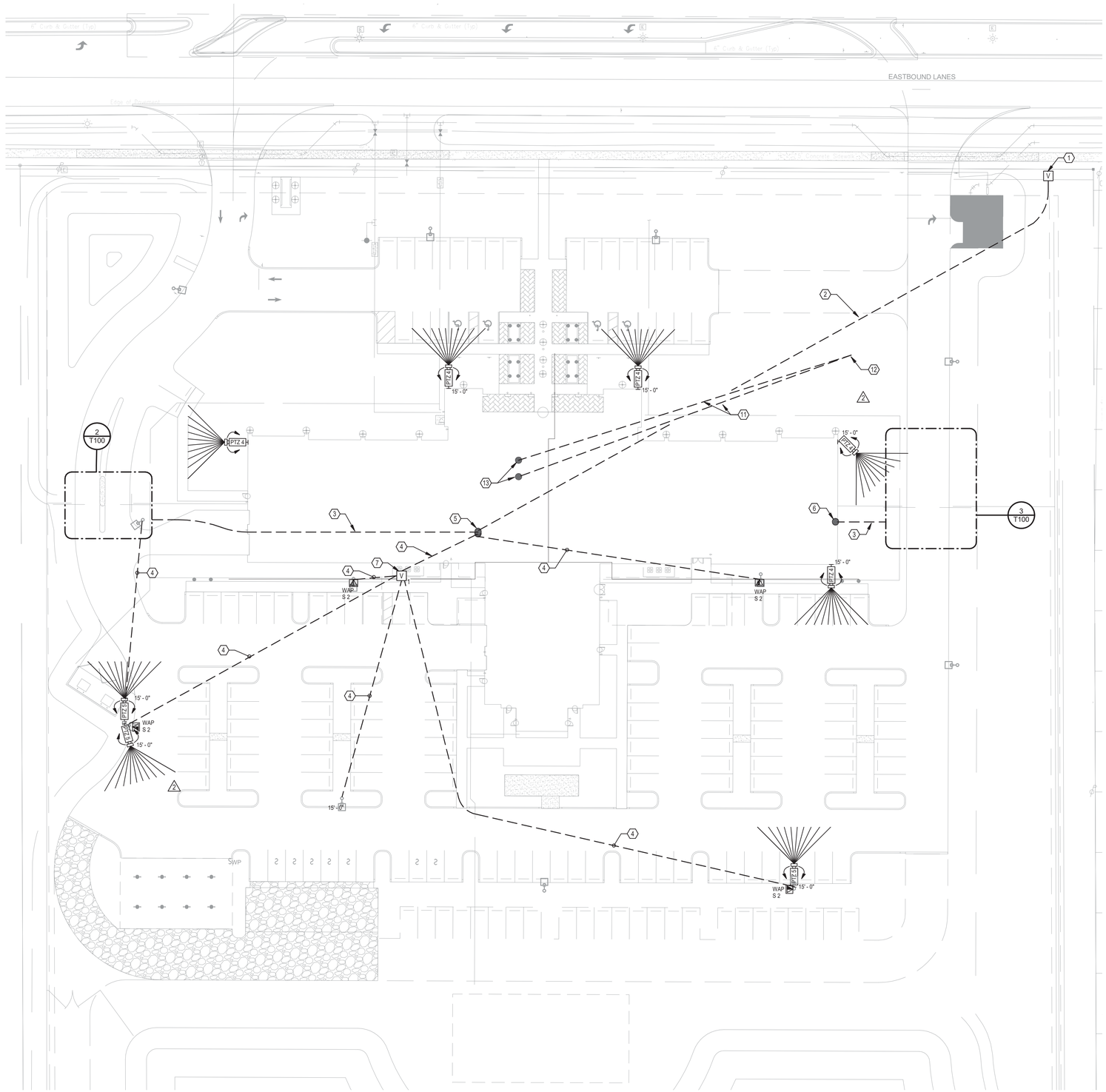
PROJECT NO. 50102099

T001

SHEET NO.

6/20/2019 1:44:26 PM

EXHIBIT A AVS & TECNOLOGY PLANS & DETAILS



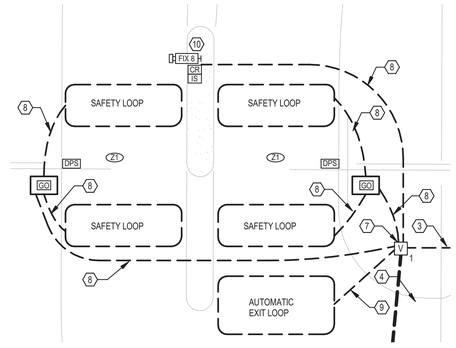
1 TECHNOLOGY SITE PLAN
1" = 30'-0"

KEYED NOTES ⬡:

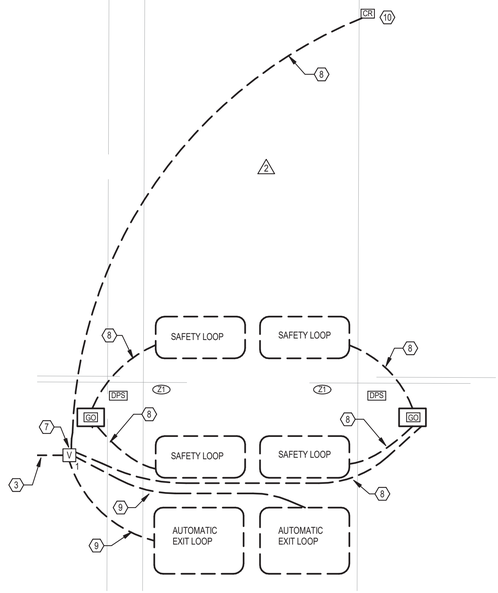
1. EXISTING COMMUNICATIONS VAULT. THIS VAULT IS CONNECTED WITH THE EXISTING CITY NETWORK SERVICES.
2. PROVIDE (2) 4" CONDUITS WITH (3) 3" 3-CELL MAXCELL INNERDUCTS IN EACH CONDUIT.
3. PROVIDE (2) 2" CONDUITS.
4. PROVIDE (1) 2" CONDUIT.
5. STUB CONDUITS UP IN TOP LEFT CORNER OF SERVER ROOM 149. REFER TO SHEET T401 FOR STUB UP LOCATION.
6. STUB CONDUITS UP IN TOP RIGHT CORNER OF STORAGE ROOM 149 TO ACCESSIBLE CEILING. ROUTE LOW VOLTAGE CABLES TO NEAREST CABLE TRAY.
7. PROVIDE 24" X 24" X 24 PRECAST COMMUNICATION VAULT W/ AASHTO H-20 TYPE COVER. REFER TO XXXX FOR MORE DETAIL. LABEL COVER "COMM VAULT" IN 2" LETTERS.
8. PROVIDE (1) 1" CONDUIT.
9. PROVIDE (1) 3/4" CONDUIT.
10. DEVICES MOUNTED IN PEDESTAL. REFER TO DETAILS 1,2, AND 3 ON SHEET T703.
11. PROVIDE 2" CONDUIT.
12. APPROXIMATE MEDIA PEDESTAL LOCATION. COORDINATE PRECISE LOCATION WITH CIVIL DRAWINGS.
13. TURN CONDUIT UP IN COMMUNITY MEETING ROOM 106, REFER TO SHEET T201A FOR CONDUIT TURN UP LOCATION.

GENERAL NOTES:

1. THE GENERAL CONTRACTOR SHALL PROVIDE THE GATE OPERATOR, THE SAFETY MECHANISM FOR THE GATE, CONCRETE PADS FOR THE GATE OPERATORS, ALL POWER AND RACEWAYS FOR THE GATES. THE OWNER SELECTED SECURITY SYSTEM INSTALLER WILL PROVIDE ALL LOW VOLTAGE WIRES, CARD READERS, INTERCOMS, DOOR CONTACTS, CAMERAS, PEDESTALS FOR THE READERS/INTERCOM AND ALL LABOR TO INSTALLATION OF THE SECURITY SYSTEM.



2 ENLARGED WEST GATE PLAN
1/8" = 1'-0"



3 ENLARGED EAST GATE PLAN
1/8" = 1'-0"

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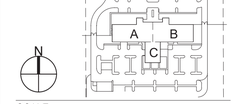
KEY PLAN



SCALE

REVISIONS

NO.	DESCRIPTION	DATE
2	ADD 01	04/22/19

DRAWN BY	JM
APPROVED BY	SB
CHECKED BY	SB
DATE	06-05-19

TITLE

TECHNOLOGY SITE PLAN

PROJECT NO. 50102099

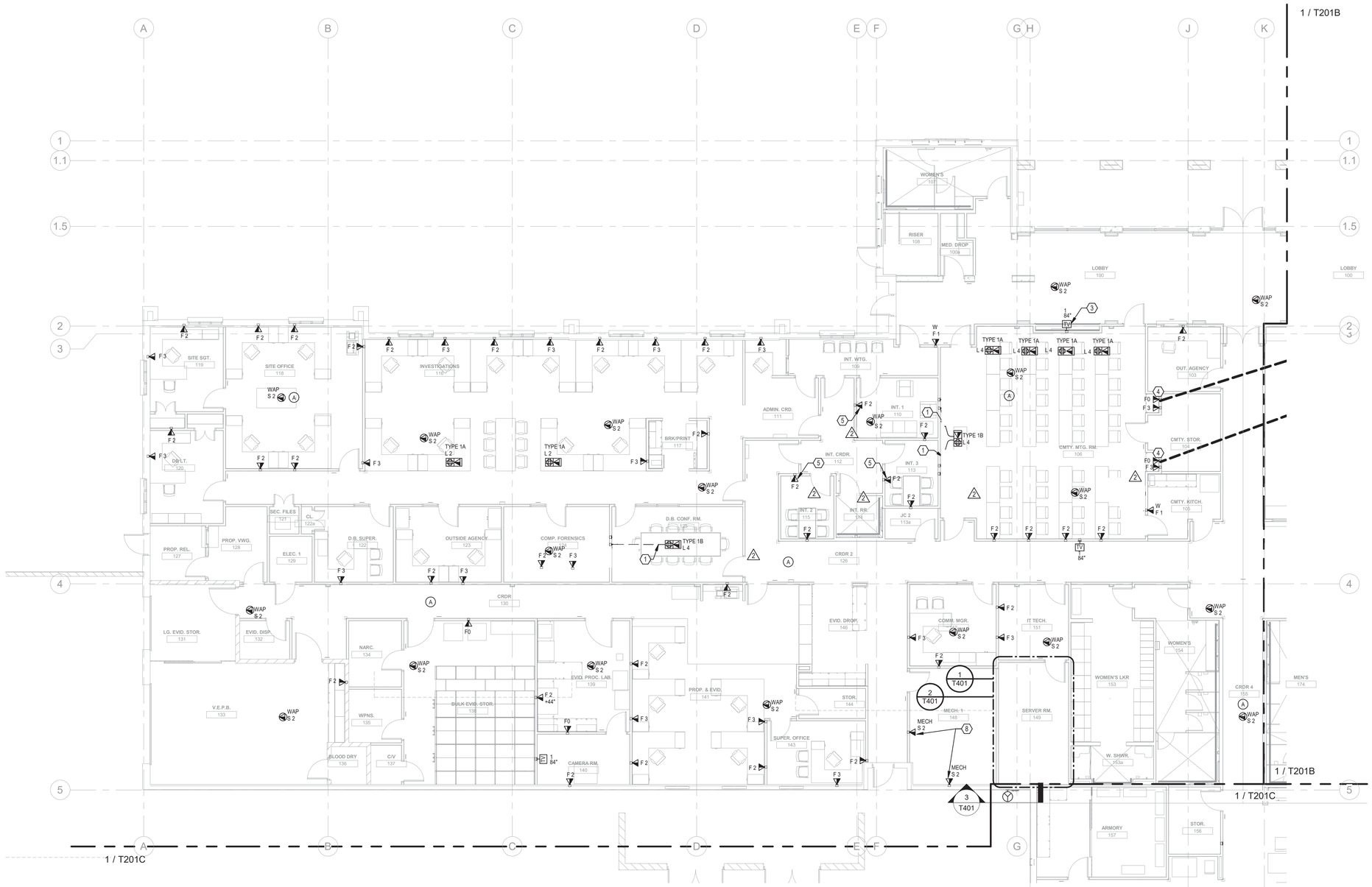
T100

SHEET NO.

6/20/2019 1:44:31 PM

KEYED NOTES ⬡:

1. PROVIDE AND ROUTE 1.25" CONDUIT FROM FLOOR BOX TO JUNCTION BOX BEHIND DISPLAY. CONDUIT DEDICATED FOR A/V CABLING.
2. COORDINATE LOCATION OF MECH OUTLET WITH MECHANICAL INSTALLER.
3. DATA FOR PORTRAIT TV IN MILLWORK. COORDINATE DATA OUTLET LOCATION WITH TV MOUNT INSTALLER.
4. TURN CONDUIT UP AT THIS LOCATION. PRECISE LOCATION AND AV PLATE TO BE COORDINATED WITH AV INSTALLER AND OWNER'S REPRESENTATIVE PRIOR TO INSTALLATION. REFER TO TECHNOLOGY SITE PLAN FOR CONDUIT ROUTING AND MORE INFORMATION.
5. DATA DEDICATED FOR WATCH GUARD CONSOLE. COORDINATE OUTLET LOCATION WITH CONSOLE INSTALLER.
6. COORDINATE ROUGH-IN LOCATION FOR AV PLATE WITH AV INSTALLER AND OWNERS REPRESENTATIVE PRIOR TO INSTALLATION.
7. COORDINATE ROUGH-IN LOCATION FOR TOUCHSCREEN WITH A/V INSTALLER AND OWNERS REPRESENTATIVE PRIOR TO INSTALLATION



1 / T201C

1 / T201B

1 T201A LEVEL 1 - TECHNOLOGY PLAN - AREA A
1/8" = 1'-0"

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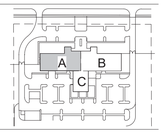
KEY PLAN



SCALE

0' 4' 8' 16'
SCALE: 1/8" = 1' - 0"

REVISIONS

NO.	DESCRIPTION	DATE
	AVS/DATA RFP PACKAGE	10/16/19
2	ADD 01	04/22/19

DRAWN BY	JM
APPROVED BY	SB
CHECKED BY	SB
DATE	06-05-19

TITLE

TECHNOLOGY FLOOR PLAN - AREA A

PROJECT NO. 50102099

T201A

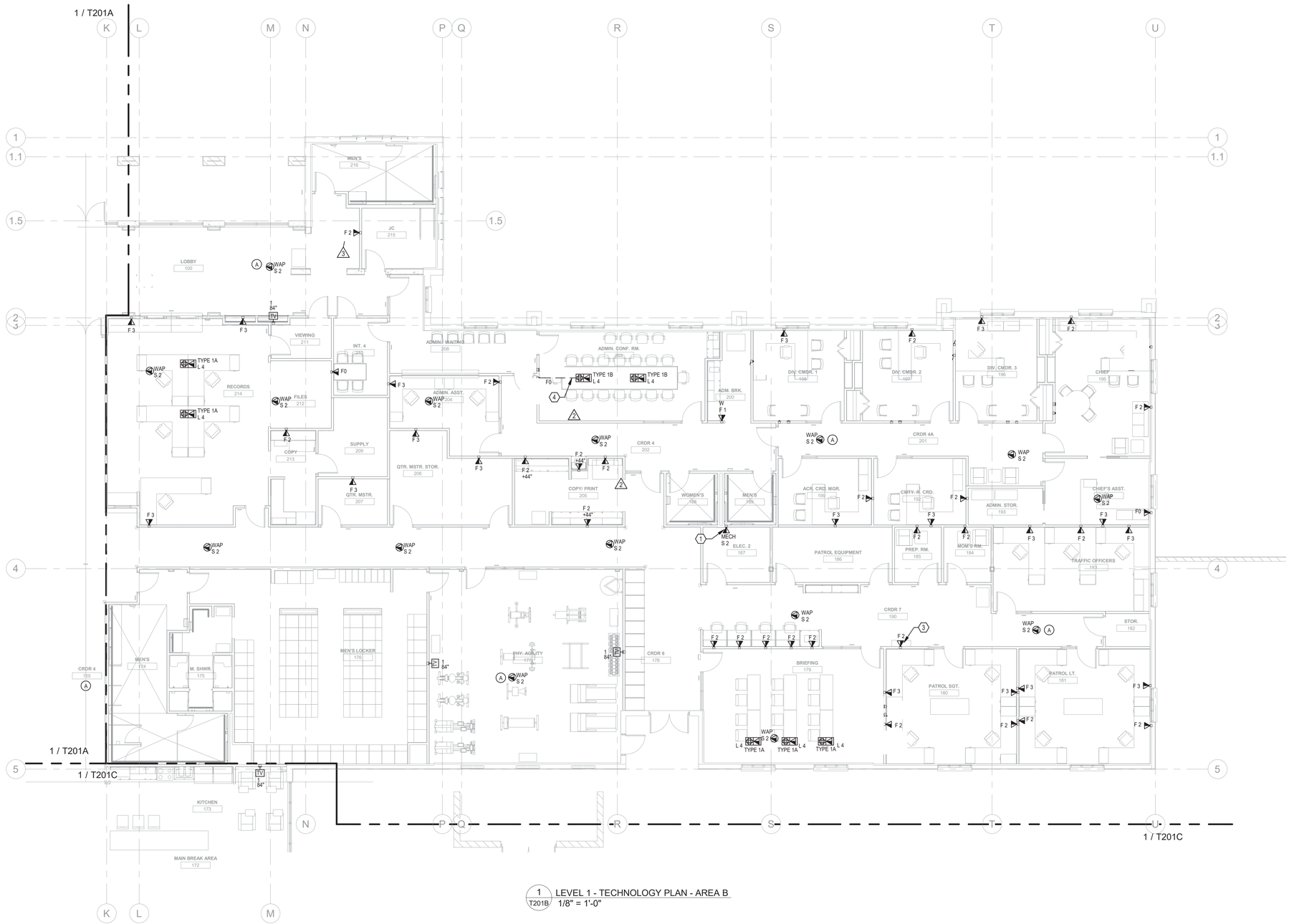
SHEET NO.

6/20/2019 1:44:47 PM

EXHIBIT A AVS & TECHNOLOGY PLANS & DETAILS

KEYED NOTES ⬡:

1. COORDINATE LOCATION OF MECH OUTLET WITH ELECTRICAL EQUIPMENT INSTALLER.
2. DATA FOR PORTRAIT TV IN MILLWORK. COORDINATE DATA OUTLET LOCATION WITH TV MOUNT INSTALLER.
3. DATA DEDICATED FOR KEY BOX STATION.
4. PROVIDE AND ROUTE 1.25" CONDUIT FROM FLOOR BOX TO JUNCTION BOX BEHIND DISPLAY. CONDUIT DEDICATED FOR A/V CABLING.
5. COORDINATE ROUGH-IN LOCATION FOR AV PLATE WITH AV INSTALLER AND OWNERS REPRESENTAVIE PRIOR TO INSTALLATION



1 T201B LEVEL 1 - TECHNOLOGY PLAN - AREA B
1/8" = 1'-0"

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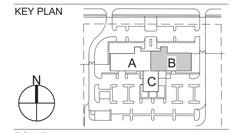
KEY PLAN



SCALE

0' 4' 8' 16'
SCALE: 1/8" = 1' - 0"

REVISIONS

NO.	DESCRIPTION	DATE
	AVS/DATA RFP PACKAGE	10/16/19
3	ASI #1	06/20/19
2	ADD 01	04/22/19

DRAWN BY	JM
APPROVED BY	SB
CHECKED BY	SB
DATE	06-05-19

TITLE

TECHNOLOGY FLOOR PLAN - AREA B

PROJECT NO. 50102099

T201B

SHEET NO.

6/20/2019 1:44:50 PM

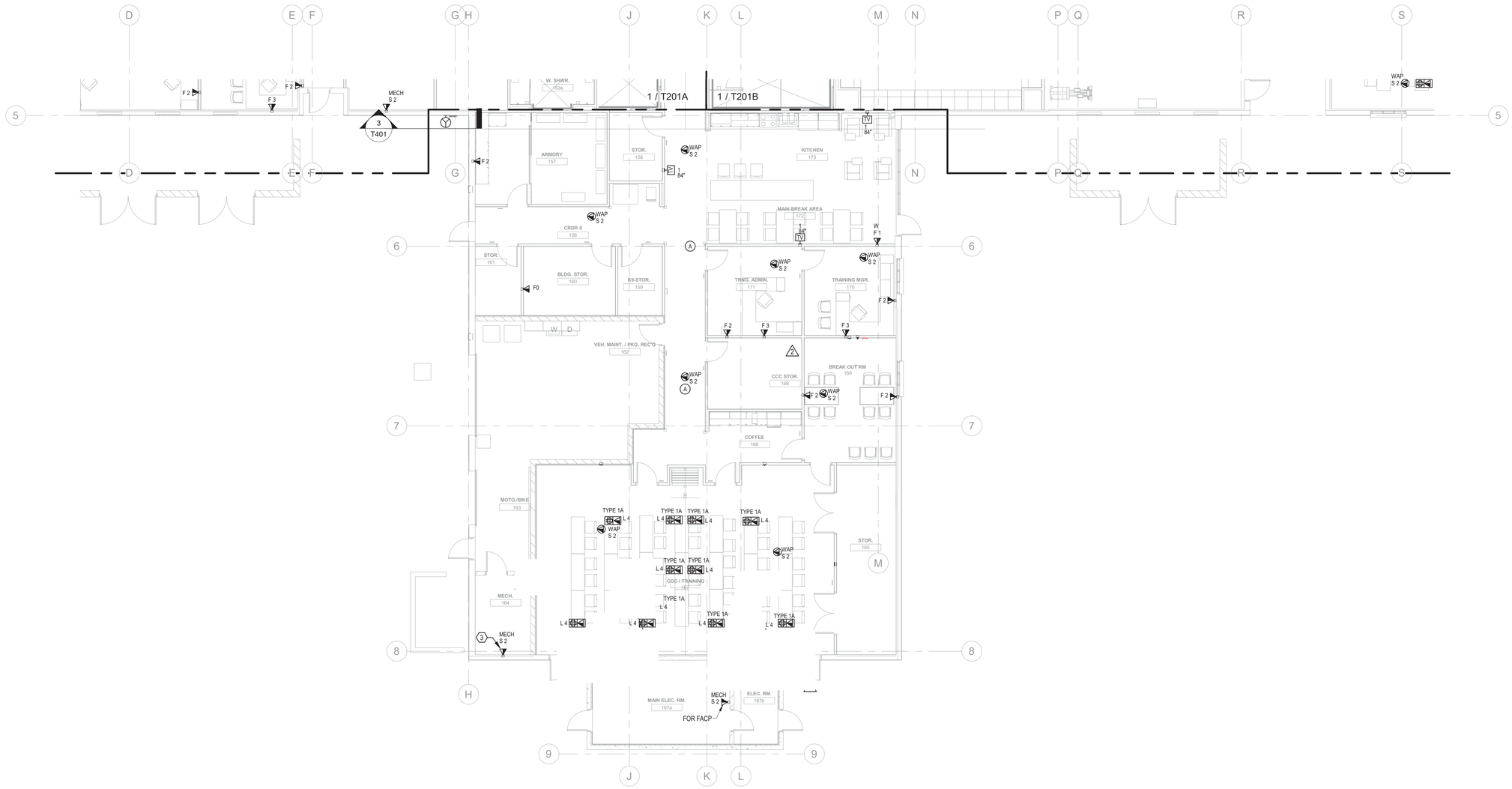
EXHIBIT A AVS & TECHNOLOGY PLANS & DETAILS

KEYED NOTES ⬡:

1. PROVIDE PROJECTOR WITH 1.2 THROW RATIO.

3. COORDINATE LOCATION OF MECH. OUTLET WITH MECHANICAL INSTALLER.

4. PROVIDE AND ROUTE 1.25" CONDUIT FROM FLOOR BOX TO JUNCTION BOX BEHINDE DISPLAY. CONDUIT DEDICATED FOR A/V CABLING.



1 T201C LEVEL 1 - TECHNOLOGY PLAN - AREA C
1/8" = 1'-0"

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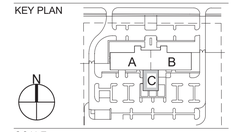
KEY PLAN



SCALE

0' 4' 8' 16'
SCALE: 1/8" = 1' - 0"

REVISIONS

NO.	DESCRIPTION	DATE
	AVS/DATA RFP PACKAGE	10/16/19
2	ADD 01	04/22/19

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CHECKED BY	SB
DATE	06-05-19

TITLE

TECHNOLOGY FLOOR PLAN - AREA C

PROJECT NO. 50102099

T201C

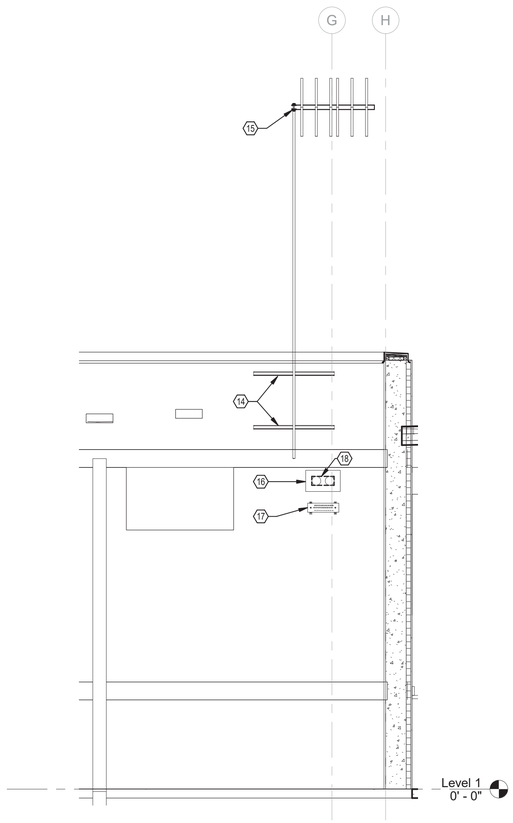
SHEET NO.

6/20/2019 1:44:55 PM

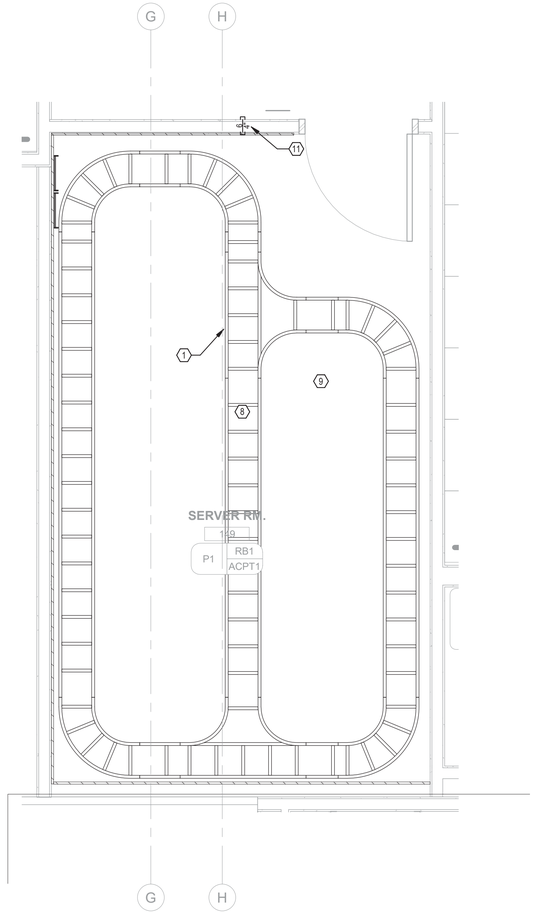
EXHIBIT A AVS & TECHNOLOGY PLANS & DETAILS

KEYED NOTES ⬡:

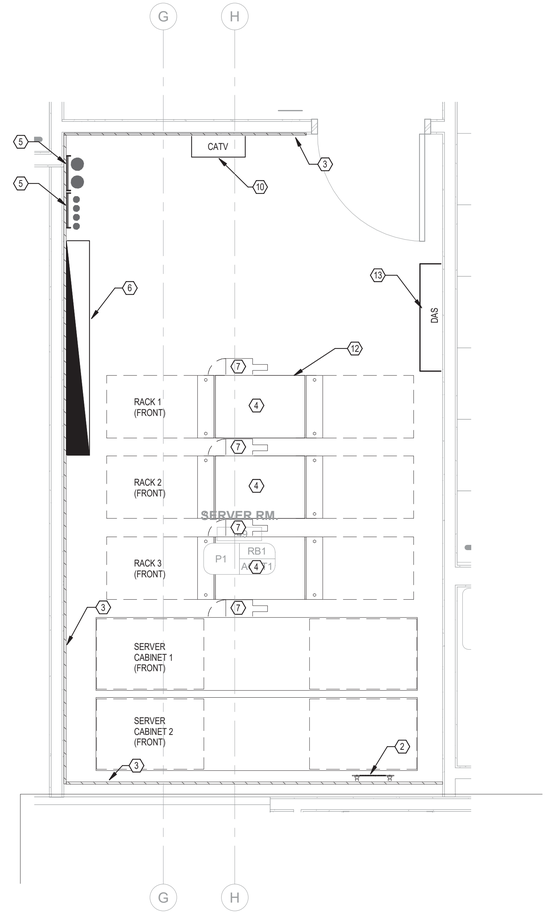
1. PROVIDE 12" TUBULAR CABLE TRAY MOUNTED AT 7'-6" AFF. TYPICAL OF ALL.
2. PROVIDE GROUND BAR.
3. PROVIDE 8' H X 4' W X 3/4" D PLYWOOD BACKBOARD. INSTALL AT 6" TO 8'-6" AFF.
4. PROVIDE 4 POST RACK. SHALL HAVE A MINIMUM CLEARANCE OF 3'-0" ON BOTH SIDES OF RACK.
5. PROVIDE 12" VERTICAL CABLE TRAY TO SUPPORT CABLING INTO HORIZONTAL RUNWAY.
6. PROVIDE ACCESS CONTROL PANELS WITH POWER SUPPLIES.
7. PROVIDE VERTICAL WIRE MANAGER.
8. ROUTE CABLE RUNWAYS OVER PARALLEL DATA RACKS. PROVIDE WATER FALL BRACKETS TO SUPPORT CABLING ROUTED INTO WIRE MANAGEMENT UNITS.
9. COORDINATE BALLAST/DRIVER AND LUMINAIRE LOCATIONS WITH TELECOMMUNICATION ROOM CABLE RUNWAY AND DATA RACKS PRIOR TO INSTALLATION.
10. SPACE DEDICATED FOR CATV HOUSING.
11. (6) 4" THROUGH WALL FITTINGS. FITTINGS ALSO SHOWN ON SHEET T101.
12. RACK DEDICATED FOR VENDOR EQUIPMENT.
13. SPACE DEDICATED FOR WALL MOUNTED DISTRIBUTED ANTENNA SYSTEM (DAS) EQUIPMENT.
14. PROVIDE 1-5/8" UNISTRUT ATTACHED TO FACE OF WALL.
15. PROVIDE DAS ANTENNA
16. PROVIDE 2 PORT ENTRY PANEL WITH RUBBER BOOTS. (COMSCOPE ENTRY PANEL 204673-2A).
17. INSIDE GROUND BAR BONDED TO TELECOMMUNICATIONS MAIN GROUND BAR.
18. WALL OPENING SHALL BE 10"W X 4"H PER MANUFACTURES INSTALLATION INSTRUCTIONS.



DAS ANTENNA FRONT ELEVATION
3 3/8" = 1'-0"



SERVER ROOM 149 - CABLE RUNWAY PLAN
2 1/2" = 1'-0"



SERVER ROOM 149 - ENLARGED PLAN
1 1/2" = 1'-0"

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KEY PLAN

SCALE

REVISIONS

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	AVS/DATA RFP PACKAGE	10/16/19

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CHECKED BY	SB
DATE	06-05-19

TITLE

TECHNOLOGY ENLARGED PLANS

PROJECT NO. 50102099

T401

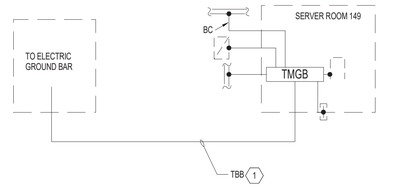
SHEET NO.

6/20/2019 1:45:18 PM

TBB OR GE LENGTH LINEAR M (FT)	TBB/GE SIZE AWG
LESS THAN 4 (13)	6
4-6 (14-20)	4
6-8 (21-26)	3
8-10 (27-33)	2
10-13 (34-41)	1
13-16 (42-52)	1/0
16-20 (53-66)	2/0
GREATER THAN 20 (66)	3/0

ABBREVEATION SCHEDULE

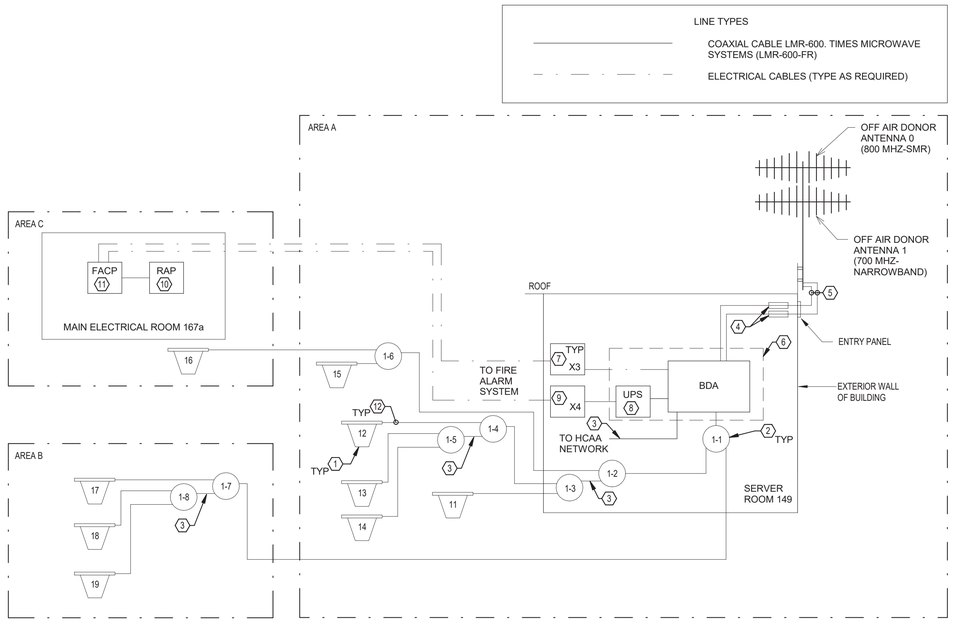
BCT	BONDING CONDUCTOR FOR TELECOMMUNICATIONS.
SEC	SECURITY EQUIPMENT ROOM.
TR	TELECOMMUNICATIONS ROOM.
TEF	TELECOMMUNICATIONS ENTRANCE FACILITY.
TER	TELECOMMUNICATIONS EQUIPMENT ROOM.
TBB	TELECOMMUNICATIONS BONDING BACKBONE.
GE	GROUNDING EQUALIZER.
BC	BONDING CONDUCTOR. SHALL BE #6 AWG. UNLESS OTHERWISE NOTED.
TGB	TELECOMMUNICATIONS GROUNDING BUSBAR.
TMGB	TELECOMMUNICATIONS MAIN GROUNDING BUSBAR.
	RACK CONNECTION.
	PANELBOARD.
	CONDUIT SLEEVES
	CABLE BOND CONNECTIONS MADE W/U.L. LISTED BONDING CONNECTION FASTENERS.
	CABLE TRAY CONNECTION
	METAL FRAME OF BUILDING CONNECTION.



1 TBB CABLE SHALL BE RUN IN CONDUIT AT ALL TIMES IN AREAS OUTSIDE OF TELECOM ROOMS. THESE CONDUITS ARE NOT INDICATED IN THE FLOOR PLANS, BUT ARE REFERENCED IN THIS NOTE. INSTALLER TO SIZE THE CONDUITS ACCORDING TO THE N.E.C. GIVEN THE CONDUCTOR SIZES ESTIMATED BY THE INSTALLER BASED ON THE TABLE ON THIS SHEET.

GROUNDING AND BONDING RISER
No Scale

1



KEYED NOTES⬡ :

1. DAS ANTENNA FOR LIFE SAFETY. REFER TO TECHNOLOGY FLOOR PLAN FOR LOCATIONS, MOUNTING TYPE, AND QUANTITIES.
2. TYPICAL SPLITTER/COUPLER FOR DAS SYSTEM.
3. CAT6 PATCH CORD
4. POLYPHASER SURGE SUPPRESSOR.
5. BONDING STRAP FOR COAXIAL CABLE SHIELD.
6. NEMA 4 METALLIC ENCLOSURE WITH HINGED COVER AND LOCK, PAINTED RED AND MARKED WITH LETTER AS INDICATED BY CODE.
7. MONITORING MODULE TO SUPERVISE DAS SYSTEM.
8. UPS WITH 12 HOURS OF POWER BACKUP AND SUPERVISION BOARD WITH DRY CONTACT CLOSURE RELAYS.
9. TYPICAL FIRE ALARM MONITORING MODULES TO SUPERVISE DAS SYSTEM.
10. REMOTE ANNUNCIATOR PANEL FOR DAS SYSTEM.
11. FIRE ALARM CONTROL PANEL.
13. PROVIDE 2" CONDUIT TO PROTECT THIS CABLE. THESE CONDUITS ARE NOT SHOWN IN FLOOR PLANS.

GENERAL NOTES :

1. THIS IS A PERFORMANCE BASED SYSTEM ONLY. THIS IS NOT A COMPLETE DESIGN. REFER TO SPECIFICATION SECTION 280537 FOR MODE DETAILS
2. THIS SYSTEM SHALL BE COMPLIANT WITH THE PUBLIC SAFETY IN-BUILDING TWO WAY RADIO COMMUNICATIONS ENHACEMENTS SYSTEM REQUIREMENTS, BY CITY OF TAMPA, NOV 11, 2017

2 TECHNOLOGY DAS SYSTEM RISER DIAGRAM
N.T.S.

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KEY PLAN

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REVISIONS

NO.	DESCRIPTION	DATE
	AVS/DATA RFP PACKAGE	10/16/19

DRAWN BY	Author
APPROVED BY	Approver
CHECKED BY	Checker
DATE	06-05-19

TITLE

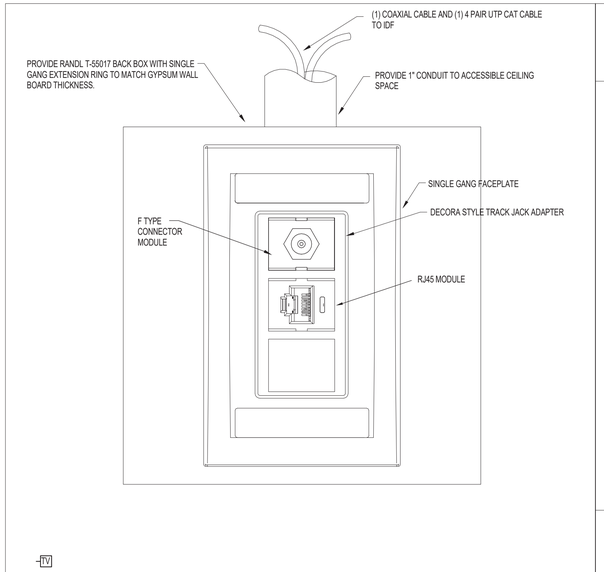
TECHNOLOGY RISER DIAGRAMS

PROJECT NO. 50102099

T501

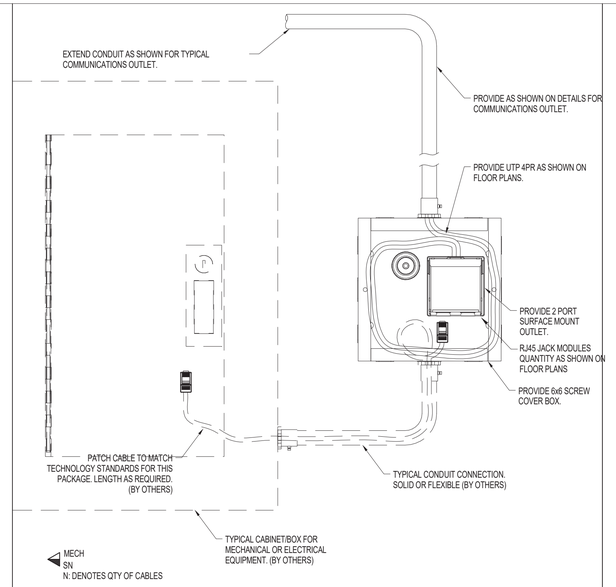
SHEET NO.

6/20/2019 1:45:21 PM



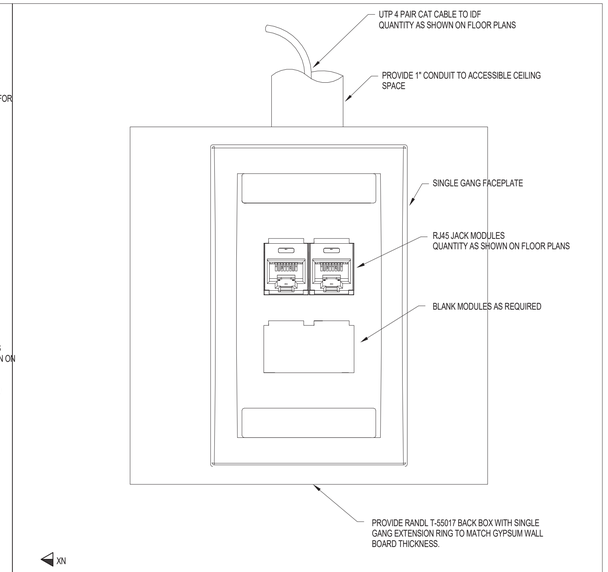
TV OUTLET
No Scale

5



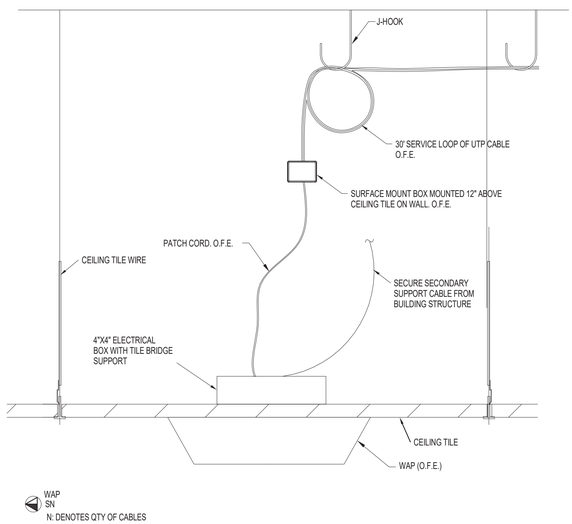
OUTLET FOR MECH/ELEC/ELEV CONNECTION
No Scale

3



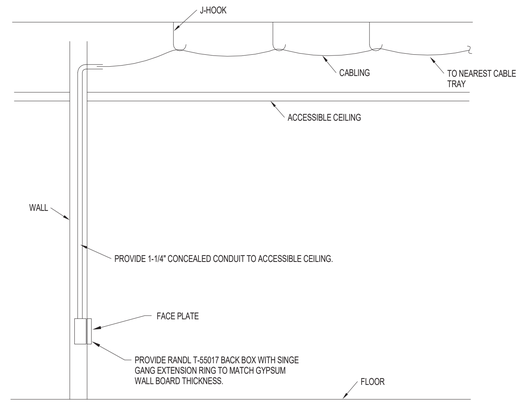
FLUSH MOUNTED OUTLET
No Scale

1



WAP MOUNTED ABOVE CEILING
No Scale

4



FLUSH DATA OR TV OUTLET AND CONDUIT
No Scale

2

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KEY PLAN

SCALE

REVISIONS

NO.	DESCRIPTION	DATE
	AVS/DATA RFP PACKAGE	10/16/19

DRAWN BY	JM
APPROVED BY	SB
CHECKED BY	SB
DATE	06-05-19

TITLE

TECHNOLOGY DETAILS

PROJECT NO. 50102099

T701

SHEET NO.

6/20/2019 1:45:22 PM

EXHIBIT A AVS & TECHNOLOGY PLANS & DETAILS

COVER ASSEMBLY

USE SURFACE MOUNTED COVER ASSEMBLY FOR CARPET FINISHED FLOORS, USE FLUSH STYLE COVER FOR TILE, WOOD OR CONCRETE FINISH. SUBMIT SPECIFIC FINISH COLOR FOR APPROVAL BY ARCHITECT.
PROVIDE RING RFB8E-CTR IN CONCRETE & TERRAZZO FINISHED FLOORS.

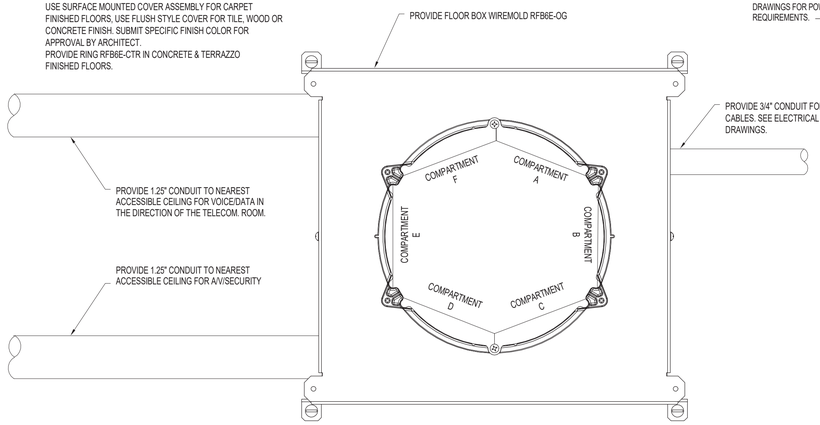


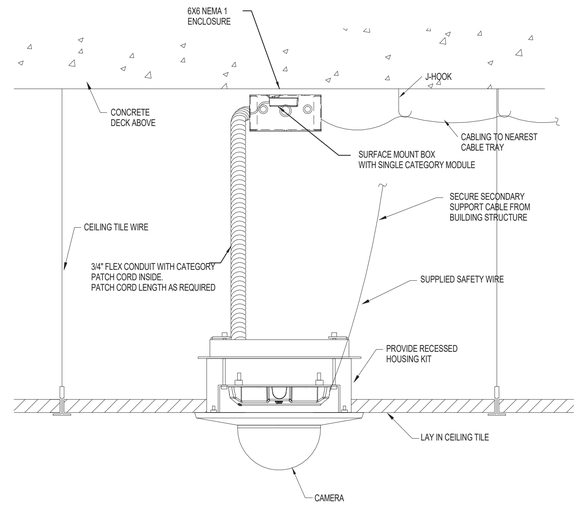
PLATE SCHEDULE

TYPE A:
COMP. A: DUPLEX POWER
COMP. B: DUPLEX POWER
COMP. C: DUPLEX POWER OR NOT USED.
COMP. D: DUPLEX POWER OR NOT USED.
COMP. E: VOICE/DATA
COMP. F: VOICE/DATA

TYPE B:
COMP. A: DUPLEX POWER
COMP. B: DUPLEX POWER
COMP. C: AUDIO/VISUAL
COMP. D: AUDIO/VISUAL
COMP. E: VOICE/DATA
COMP. F: VOICE/DATA

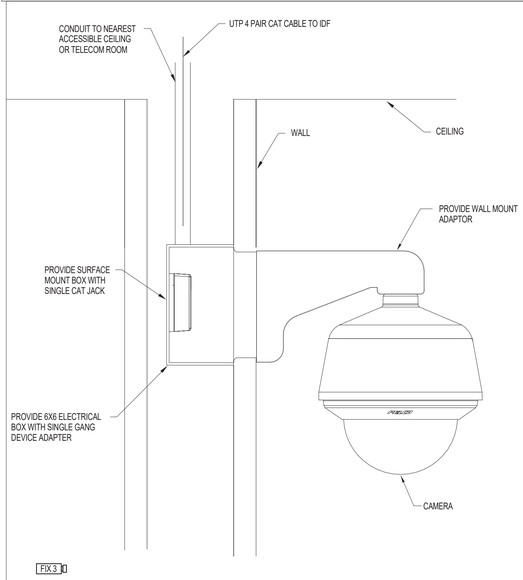
LX
TYPE 1X X: DENOTES PLATE (SEE SCHEDULE)

COMBINATION FLOOR BOX TYPE 1 - ALL PLATES
No Scale — 5



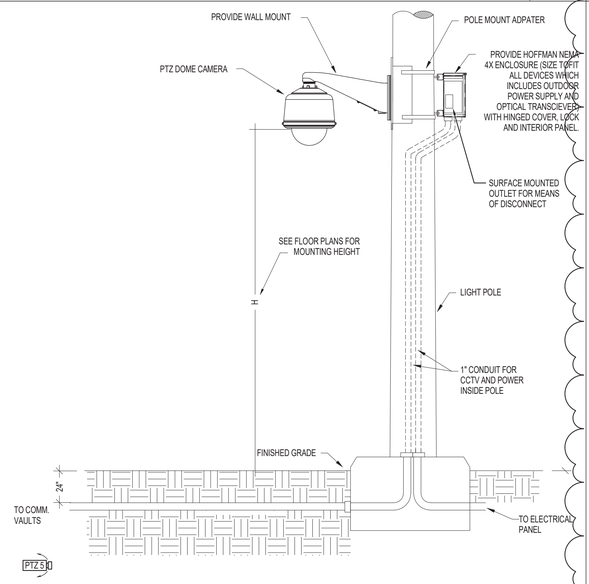
FIX 1

FIXED 1 CAMERA: RECESSED CEILING MOUNTED
No Scale — 1



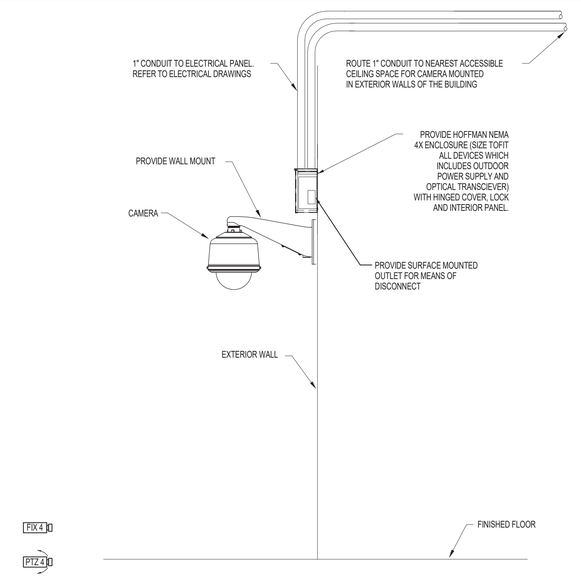
FIX 3

FIXED CAMERA 3: RECESSED WALL MOUNTED DOME
No Scale — 5



PTZ 5

PTZ TYPE 5: EXTERIOR POLE MOUNTED
No Scale — 4



FIX 4
PTZ 4

EXTERIOR WALL MOUNTED CAMERA
No Scale — 2

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KEY PLAN

SCALE

REVISIONS

NO.	DESCRIPTION	DATE
	AVS/DATA RFP PACKAGE	10/16/19
2	ADD 01	04/22/19

DRAWN BY JM
APPROVED BY SB
CHECKED BY SB
DATE 06-05-19

TITLE

TECHNOLOGY DETAILS

PROJECT NO. 50102099

T702

SHEET NO.

EXHIBIT A AVS & TECHNOLOGY PLANS & DETAILS

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SECTION 27 0010 - TECHNOLOGY GENERAL PROVISIONS

PART 1 - GENERAL

1.1 GENERAL CONDITIONS AND DEFINITIONS

A. Scope: This specification section applies to all Division 27 specification sections and all Division 28 specification sections with the exception of Fire Alarm. All systems under the specifications indicated above are referenced also in this contract documents as “technology systems”.

B. Drawings and specifications: The words “drawings” and “specifications” used on this section refer to all contract drawings and specifications describing the scope of work of the technology system.

C. Installer and Contractor: The word “installer” where used on the drawings or specifications without any further description shall reference the installer of the system under reference. The word “contractor” where used on the drawings or specifications without any further description shall reference to the General Contractor (or Construction Manager) holding the prime agreement with the owner for the construction of this project.

D. Provide and Install: The word, "provide" where used on the drawings or specifications shall mean, "furnish, install, mount, connect, test, complete, document and make ready for operation". The word "install" where used on the drawings or specifications shall mean, "mount, connect, test, complete, and make ready for operation".

E. The word Engineer (also referenced as A&E) where used on the drawings or specification refers to the design engineer of the project working for the project architect or the owner. It does not refer to an engineer working for the General contractor, Construction Manager or any of the installers in the project.

F. Complete systems: All technology systems are intended to be complete systems, including all materials, labor and programming to make it an operation system. Refer to attachment 2 of this specification section for “Responsibility Matrix” document outlining the responsibility of each trade on each technology system.

G. Active equipment: Active equipment is defined as equipment composed of electronic component and electric materials, design to work with power applied to it. Cables are not considered active equipment.

1.2 INTERPRETATION OF DRAWINGS AND SPECIFICATIONS

A. Objective: The intent of the design drawings and specifications is to provide the installer of a technology system a scope of work for bidding purposes and to make sure different bids received by the entity holding the bidding for the technology system are at the same level of scope for comparison purposes. The drawings and specifications are not intended to show every single element of the project to produce a buyout list for the installer. In general, for all technology systems, all active components are specifically called out but small wires and small installation materials (such as nut, bolts, washers, termination blocks, clamps, ties, etc) are not indicated in the documents. Guidelines for installation of those systems are provided in the specification to allow the installer to produce the complete buyout list of materials.

B. Accuracy: The Drawings are diagrammatic and are not intended to show exact locations of conduit runs, outlet boxes, junction boxes, pull boxes, etc. The locations of equipment, appliances, fixtures, conduits, outlets, boxes and similar devices shown on the Drawings are approximate only. Exact locations shall be as accepted by the Architect or Engineer during construction. Obtain in the field all information relevant to the placing of technology systems work and in case of interference with other work, proceed as directed by the Architect or Engineer.

C. Distances: Although most drawings have a scale referenced on each sheet, the drawings are a two dimensional representation of the system, so design drawings do not indicate changes in elevation that cause additional lengths and quantities of materials. It is the responsibility of the installer of each technology system to field verify all distances before bidding to properly estimate all cable distances and materials.

D. Discrepancies: Notify the A&E of any discrepancies found during construction of the project and do not proceed with that portion of the project, until a written definitive statement is received providing clear direction. If a conflict exists between the contract documents and any applicable code or standard, the most stringent requirement shall be included for this project. The Engineer shall make the decision regarding questionable areas of conflict.

E. Existing Conditions: All existing conditions might not be indicated in the design drawings. The installer of each system shall check site and existing conditions thoroughly before bidding and advice the Engineer of discrepancies prior to bid.

F. Coordination: Although design technology drawings were intended to be coordinated with other trades, the fact that installer for other non-technology system might have changes to their design drawings, requires the Contractor to produce coordination drawings for a specific space, including all elements of all trades for space planning and coordination purposes.

1.3 ABBREVIATIONS

A. Abbreviations: The following abbreviations or initials may be used:
1. ABV CLG - Above Ceiling
2. AC - Alternating Current
3. ADA - American Disabilities Act
4. AFF - Above Finished Floor
5. AFG - Above Finished Grade
6. AMP - Ampere
7. ANSI - American National Standards Institute
8. AWG - American Wire Gauge
9. BC - Bare Copper
10. CCTV - Closed Circuit Television
11. CATV - Community antenna television
12. CLG - Ceiling
13. COAX - Coaxial Cable
14. CPU - Central Processing Unit
15. DC - Direct Current
16. DEG - Degree
17. EMT – Electrical Metallic Tubing
18. GND - Ground
19. IDF - Intermediate Distribution Frame (Telecom Room)
20. IMC - Intermediate Metallic Conduit
21. IN - Inches
22. IP - Internet Protocol
23. JB - Junction Box

24. KVA - Kilo-Volt-Amps
25. KW - Kilowatts
26. LBS - Pounds
27. LED - Light Emitting Diode
28. MAX - Maximum
29. MDF - Main Distribution Frame (Main Telecom Room)
30. MIC - Microphone
31. MIN - Minimum
32. MTD - Mounted
33. MTG - Mounting
34. NEC - National Electrical Code
35. NECA - National Electrical Contractors Association
36. NEMA - National Electrical Manufacturers Association
37. NFPA - National Fire Protection Association
38. NIC - Not in Contract
39. OFE - Owner furnished equipment
40. OSHA - Occupational Safety and Health Administration
41. PB - Pullbox
42. PWR - Power
43. PVC - Polyvinylchloride
44. EF - Telecommunications Entrance Facility
45. TR - Telecommunications Room
46. TTB - Telephone Terminal Board
47. V - Volt
48. WP - Weatherproof

1.4 CODES AND STANDARDS

A. Application: The codes, standards and practices listed herein generally apply to the entire project and all technology systems. Other codes, standards or practices that are more specific will be referenced within a particular specification.

B. Requirements: All articles, products, materials, fixtures, forms or types of construction covered in the specifications will be required to meet or exceed all applicable standards of manufacturer, testing, performance, capabilities, procedures and installation according to the requirements of ANSI, NEMA, IEEE, NEC, BICSI and TIA referenced documents where indicated and the manufacturer's recommended practices. Requirements indicated on the contract documents which exceed but are not contrary to governing codes shall be followed.

C. Compliance and Certification: The installation shall comply with the governing state and local codes or ordinances. The completed technology system installation shall be inspected and certified by all applicable agencies that it is in compliance with all codes.

D. Applicability: The codes and standards and practices listed herein, and their respective dates are furnished as the minimum latest requirements. List of applicable codes:
   1. State Code: Florida Administrative Code
   2. Building Code: Florida Building Code, current version
   3. Manuals: Accessibility Requirements Manual - Florida Department of Community Affairs.

E. UL Labels: All materials shall be new and free of defects, and shall be U.L. listed, bear the U.L. label or be labeled or listed with an approved, nationally recognized Electrical Testing Agency. No equipment shall be installed if there is no labeling or listing service is available for such equipment.

1.5 MATERIALS ALTERNATES AND SUBSTITUTIONS

A. Definitions:
1. Basis of design: A product or group of products from an identified manufacturer that was used as the basis of systems layouts and installation details, part of the contract documents.
2. Prototype: Is a product or a group of products that are not yet ready for commercial use because they are in the testing phase (Beta testing) of the product development.
3. Alternates: Products or manufacturers listed in the contract documents as acceptable compare to the basis of design. Use of alternates shall follow the same system architecture as the basis of design.
4. Obsolete: A product that has been discontinued by the manufacturer or declared in end of life, and it is no longer being manufactured.
5. Substitution: A product not listed in the contract documents but capable of similar characteristics as the basis of design operating as a direct replacement in the system in reference. The installers can propose a substitution if all requirements are meet as indicated in this specification.
6. Substitutions that create a change in system architecture are products that create a very different system configuration impacting other trades (i.e. change in power/cooling requirements, changes in raceways layout or sizes, changes in equipment space requirements, changes in low voltage wiring layouts, types and quantities, etc) but providing a similar end result as the system/products basis of design.

B. Use of Prototype. Prototypes are not allowed in any technology system.

C. Use of alternates. Alternates are allowed and installer shall follow these requirements:
1. Where several brand names make or manufacturers are listed as acceptable alternates each shall be regarded as equally acceptable, based on the design selection. Where a manufacturer's model number is listed, this model shall set the standard of quality and performance required. Where no brand name is specified, the source and quality shall be subject to Engineer's review and acceptance. Where three or more manufacturers are listed, one of the listed manufacturers shall be submitted for acceptance.
2. The use of alternate products does not allow the change of system architecture with such products.

D. Use of substitutions. Substitutions are only allowed when they meet all the requirements below:
1. Substitutions are only allowed when a particular specification section for a technology system, allows the use of substitutions for that particular system.
2. The performance of all substitutions components must meet or exceed those of the basis of design. Should an installer wish to submit a substitution product or a product set stated in the construction documents as 'acceptable', it shall be the responsibility of the installer to submit to the Engineer an item-for-item CROSS REFERENCE for all specifications of the product, all related specifications and product data sheets, for the proposed substitution. Use the substitution request form indicated in Addendum 1 of this specification.
3. The Engineer has the authority to reject a substitution without cause and the installer shall provide the basis of design and no additional compensation.
4. Substitutions of unnamed manufacturers will not be acceptable.
5. Certification of substitutions: When a basis of design is specified to be in accordance with a trade association or government standard requested by the Engineer, installer shall provide a certificate that the substitution complies with the referenced standard. Upon request of Engineer, Contractor shall submit supporting test data to substantiate compliance.
6. Substitutions that create a change in system architecture are allowed under the following conditions:

a. Substitution request for this type of system requires submitting the overall cost of substitution including the cost of changing other systems affected as well as the re-design cost for such systems. Without this information this type of substitution will not be evaluated at all.

1.6 SHOP DRAWINGS AND SUBMITTALS

A. General: Shop drawings shall be submitted for equipment and material as indicated in the individual specification sections for each system. .

B. Quantity of shop drawings submittals: Follow Division 1 requirements for quantity of shop drawings and submitting requirements. If the project does not have a Division 1 specification, shop drawings shall be submitted in quantity of one (1) for electronic format submittal and quantity of four (4) for hardcopies.

C. Electronic submittals. Submittals in electronic format (PDF) are accepted.

D. When cut sheets of products are submitted and the manufacturer cut sheets indicate several model numbers or variations of the same product, the cut sheet shall be highlighted by the installer to indicate the specific product that will be provided for this project. Submittals received with cut sheets indicating multiple parts numbers and not highlighted will be rejected and not reviewed.

E. Equipment and material quantities are not reviewed by the A&E as part of this submittal process. Equipment quantities are to be provided by the installer as indicated in contract documents. Approved shop drawings indicating any changes in equipment quantities or overall scope of work different from contract documents does not constitute approval by the A&E of those changes. The contract documents and any changes issued by the A&E in the form of Supplemental Information during the construction process are always to be followed for equipment quantities and scope of work.

F. All electronic equipment prone to obsolescence and with lead times less than 3 months shall be submitted for approval no sooner than 12 month before the date set for substantial completion of the project. Electronic equipment prone to obsolescence includes devices like flat panel displays, transceivers, servers, players, workstation and routers

G. Equipment and materials installed not in accordance with the approved shop drawings shall be replaced at installer’s expense.

H. Multiple stages of shop drawings shall be required as indicated in each specification section. For final completion and testing the installer shall provide a submittal with the following information:
1. Detailed course syllabus for each type of training required in the specifications
2. A proposed schedule of training sessions in compliance with the specification sections and indicating place where the training will take place.
3. A copy of all training material to be used during each session.
4. Test result sheets for all testing done by the installer prior to the system acceptance test.

PART 2 - PRODUCTS

2.1 IDENTIFICATION AND LABELING TAGS

A. All conduit, cabinets, cables, wires, wiring forms, terminal blocks, and terminals shall be clearly identified with pre-printed labels or tags.

B. The only approved types of labels for inside premise environments for any technology systems are:
1. Non-laminated thermal transfer labels, printed with a high quality thermal transfer printer.
2. Laminated thermal transfer labels printed with a high quality thermal transfer printer.
3. Thermal transfer polyolefin tape printed with a high quality thermal transfer printer.
4. Self laminated dot-matrix labels, printed with a high quality dot matrix printer.
5. Non-laminated dot-matrix labels, printed with a high quality dot matrix printer.

C. For labeling of cables or equipment in outdoor environments use only marker plates attached to cable or equipment with cable ties. Do not use any labels with adhesive materials. Use different color plates for different cable types. Use only waterproof ink for writing on marker plates.

D. Any type of write-on labels (except for outdoor marker plates), hand writing on cable jackets or directly on equipment, labels made with masking tape or any other type of tape not listed in previous paragraph are not acceptable and shall be corrected with approved labeling methods at no additional cost to the owner.

E. Approved manufacturer:
1. Rhino,
2. Brady,
3. Panduit or
4. approved equal

2.2 TECHNOLOGY EQUIPMENT AND MATERIALS

A. General: Each item of equipment or material shall be manufactured by a company regularly engaged in the manufacturer of the type and size of equipment, shall be suitable for the environment in which it is to be installed, shall be approved for its purpose, environment, and application, and shall bear a label as indicated in paragraph 1.4.E. of this section.

B. Installation Requirements: Each item of equipment or material shall be installed in accordance with instructions and recommendations of the manufacturer and the contract documents.

C. Required Accessories: All equipment specified in the technology systems shall be provided with all required accessories for proper operation and mounting. Typically these accessories are not specifically indicated in the design drawings but shall be provided per this specification section. Such accessories include items such as power supplies, power cords, rack ears, rack rails, bolts, lugs, faceplates, etc.

PART 3 - EXECUTION

3.1 INSTALLATION PRACTICES

A. WORKMANSHIP: The installation of materials and equipment shall be performed in a neat, workmanlike and timely manner by an adequate number of craftsmen knowledgeable of the requirements of the Contract Documents. They shall be skilled in the methods and craftsmanship needed to produce a quality level of workmanship. Personnel who install materials and equipment shall be qualified by training and experience to perform their assigned tasks.

B. STANDARD OF QUALITY: To define good workmanship, all installation practices described in BICSI standards shall be followed.

C. PROTECTION OF EQUIPMENT: Equipment for Technology systems shall at all times during construction be adequately protected against mechanical/chemical damage by the elements or work perform by other trades. Equipment shall be stored in dry permanent shelters. If equipment or materials has been damaged, such equipment shall be replaced at no additional cost or time extension to the Contract. Damaged equipment and materials include the following conditions:
   1. Equipment that has visible scratches, cracks or equipment that has paint or finished surface peeled off.
   2. Equipment with visible indication of rust or water intrusion.
   3. Equipment that has dents on the metal enclosures and are clearly visible to the end user.
   4. Equipment that has been sprayed with paint, fire proofing materials, or other type of chemicals, when the equipment was not intended to have this type of materials applied to it, per contract documents.
   5. Equipment that has been burnt by controlled fires, power surges, power sags or by lightning.
   6. Equipment that has a known damage to any parts, electronic board or component, even if such component or board has no specific use in the project.
   7. Cables that have visible damages to the jackets even if cables are not broken and still provide electrical continuity.
   8. Cables sprayed with paints that affect the warranty of the cable as defined by the cable manufacturer.
   9. Equipment with screws with stripped heads.

D. CLEAN EQUIPMENT: All equipment installed in spaces accessible to the building occupants like in racks, cabinets, wall mounted panels, credenzas, etc. shall be free of dust at the time the space part of the project gets the final Certificate of Occupancy and at the time of the acceptance test by the A&E. A clean equipment is defined as an equipment that if wiped with a finger, in any surface, does not leave visible debris and dust in the finger, also equipment with no visible signs of dust inside the equipment, like in ventilation fans..

E. IDENTIFICATION AND TAGGING: All technology systems items shall be labeled and identified as specified in the Contract Documents. Such identification shall be in addition to the manufacturer's nameplates and shall serve to identify the item's function and the equipment or system which it serves or controls. Refer to Identification Section of the specifications for additional information. All labels of equipment and wiring shall match the labeling used in the shop drawings for the system.

3.2 COORDINATION

A. General: The installer shall compare shop drawings with those of other trades and report any conflicts between them to the A&E. Obtain from the A&E written instructions to make the necessary changes in any of the affected work. All work shall be installed in cooperation with other Trades installing interrelated work.

B. Adjustments: Locations of conduit and equipment shall be adjusted to accommodate the work with interferences anticipated and encountered. Determine the exact routing and location of all systems prior to fabrication or installation.

C. Replacement: All work shall be installed in a way to permit removal (without damage to other parts) of all other system components provided under this Contract requiring periodic replacement or maintenance. All conduits shall be arranged in a manner to clear the openings of swinging overhead access doors as well as ceiling tiles.

3.3 REQUEST OF IP ADDRESSES

A. General: When contract document require the installer of any of the technology systems to use IP addresses for the configuration of such system, inside the owner’s controlled IP network, the installer shall request the owner to provide such IP addresses. The installer shall request such information no less than one (1) month in advance from the moment the installer will be programming the system and by using the form named “Network Connections Programming Plan” indicated in Attachment 3 of this specification. An electronic copy of this form is available upon request from TLC Engineering.

B. Completing the form. The Network Connections Programming plan shall be completed in separate by each trade that requires IP addresses. This form has two parts. The first part indicates all the different device types for a system (i.e. cameras, workstation, servers, controllers, VoIP phones, etc). The second part is a list of all devices required classified by their type and properly indicating location where the device will be used.

C. Request that do not follow this process, or have incomplete information will be ignored and will not be processed.

D. Reprogramming cost of any technology systems due to un-approved addresses used by the installer shall be at the installer’s expense

3.4 TELECOM ROOM/EQUIPMENT ROOM READINESS

A. In any projects where the technology systems require the use of network equipment (switches, routers, firewalls, etc) provided by the owner, the Contractor shall complete all telecom rooms to a point where they are suitable for the owner to deploy such equipment in those rooms. At a minimum the following conditions shall be meet at all rooms in order for the owner to install the equipment:
   1. All power outlets in the telecom rooms shall be fed from the permanent source of power. Temporary power shall not be provided.
   2. Backup power (generator and/or UPS) shall be already operation, tested and connected to the final power distribution system.
   3. The mechanical equipment providing the cooling for the telecom rooms shall be fully operational. Temporary cooling shall not be accepted.
   4. Fire suppression system (sprinkler or gas based system) protecting the telecom rooms shall be fully operational and tested.

5. All light fixtures in the telecom rooms shall be fully operational.
6. All walls to the telecom rooms shall be completed and including the last coat of paint.
7. The ceiling and flooring of the telecom rooms shall be finished.
8. All horizontal and backbone cabling system part of the structured cabling system (SCS) shall be installed, terminated and tested.
9. The final and permanent doors to the telecom rooms shall be installed with a key core different from all other construction cores in the site.
10. Telecom rooms shall be cleared of any materials being stored inside the room.
11. Telecom rooms shall be clean. Clean will be measured as not having any debris left in the room and not having dust in rack, cabinets, or wall mounted panels. If wiping a finger in any of the surfaces of such equipment leaves visible dust residue in the finger, the room will not be considered clean.
12. Hallways and rooms leading into the telecom rooms shall have no more sanding to be done in the walls and the floor shall be completed to avoid dust from these spaces moving into the telecom rooms.
13. Prior to the owner deploying the equipment in these rooms, the Contractor shall provide disposable sticky mats at the entrance of each telecom room to capture dust and/or dirt from people's shoes or boots coming into the room. The sticky mats shall be selected as to cover the width of the door opening. Sticky mats shall contain no less than 60 sheets in each unit. Used sheets of the mats shall be replaced no less than on a daily basis or if worn out before the end of the day. Sticky mats shall be provided until the project receives the final Certificate of Occupancy.

B. In projects where the network equipment is part of the contract documents, the contractor is required to provide all equipment functioning and clean at the end of the project. The contractor is responsible to determine at what point this delicate equipment can be installed in the telecom room. The contractor shall make sure the recommended manufacturer guidelines are applied to the installation of the equipment when it comes to cleanness. It is highly recommended that all steps indicated above are followed even for this type of project.

3.5 SYSTEMS WARRANTY AND SERVICE

A. General: At a minimum all technology system shall include a warranty from the manufacturer and installer of the system for no less than one (1) year with the following exceptions:
1. Structured Cabling system shall have a warranty longer than one year as indicated in that specification section.
2. When specific equipment or software manufacturers include a warranty longer than one year, the manufacturer's warranty shall be transferred to the owner in the same terms as indicated by the manufacturer.

B. Warranty coverage. The warranty for the technology system shall cover the following elements:
1. All equipment parts, cabling and materials.
2. Any software updates/patches issued during the warranty period by the manufacturer.
3. The labor to replace those parts and programming time to re-configure equipment.
4. Shipping and freight charges to send equipment back and forth from the manufacturer and/or site.
5. Tool rentals such as scaffold or lifts to access equipment.
6. The troubleshooting time to detect the faults in the system.
7. All travel time and expenses associated with the service.

C. Start of warranty. The warranty period for the technology systems starts the day the project gets the Certificate of Occupancy (CO), for new construction projects. For retrofit jobs of a particular system, the warranty starts when the project is accepted by A&E. For most equipment/software manufacturer's the warranty period starts when the equipment is shipped from the factory, so it

is the responsibility of the installer of each system to provide additional warranty coverage from the manufacturer to cover the additional time of warranty up to the CO date plus one year.

D. Service calls. During the warranty period the installer shall support the system when called by owner/contractor for service. All equipment/software service shall be done by personnel with the same qualifications as the personnel who installed the system and as indicated in each technology system specification section. Service calls shall be taken during business hours (same time zone as the project) for normal service and twenty (24) hours three hundred and sixty five (365) days in the year for emergency service. Emergency Service shall be defined as the loss or failure of any critical component necessary to maintain the overall integrity and operation of the system. Normal service shall be defined as the loss or failure of a system component that does not compromise the complete operation of the system and allows the owner to operate the system at a minimum of 90% of its capacity. See individual specification sections for delineation on critical components and normal service.

E. Response time for service. The maximum allowed response time after a service call for emergency service shall be four (4) hours and for normal service twenty four (24) hours.

F. Equipment registration. All equipment/software part of the technology system shall be registered to the owner with the manufacturer of the equipment/software for warranty and support. Equipment/software registered with the manufacturer to the name of the Contractor or installer shall be removed from the project and replaced with equal equipment registered to the owner at no additional cost to the owner.

G. Periodic preventive maintenance visits. During the warranty period the installer of the system shall provide no less than two (2) preventive maintenance services. These services shall be provided at 6 months from start of the warranty period and a few weeks before the end of the warranty period. The installer of the system shall coordinate with the owner the precise dates for this type of service. During these visits the following task shall be perform:
   1. Clean up of any active equipment that shows visible accumulation of dirt, dust of debris of any kind.
   2. Replacement of any consumable parts in the system that require replacement per manufacturer’s instructions during the warranty period, such as filters.
   3. Oiling/greasing of any mechanical parts that require period maintenance as per manufacturer’s instructions during the warranty period.
   4. Run manufacturer’s recommended test for each piece of equipment installed. The installer shall provide at the end of the service a report of such test.
   5. Visual observation of all devices in the system to spot any anomalies.
   6. Review of error logs from any system components and analysis of such logs with explanation to owner on the cause of those errors.

H. Extended service agreement. Prior to final acceptance testing, and within thirty 30-days of project completion, the installer of each technology system shall submit to the Owner an option to purchase extended service coverage. This proposal shall provide for the purchase option of 1, 3, or 5, year coverage. Coverage shall include, at a minimum, the same provisions as during the warranty period.

3.6 ENGINEER’S FINAL ACCEPTANCE TEST

A. The technology systems shall be tested during installation by the installer as frequently as required to solve any installation issues and non compliance of system specifications. Technology systems will not be considered delivered to the owner until final acceptance test is passed. The final acceptance test shall be done in presence of the A&E and/or the owner. The installer shall request in writing with 2 weeks in advance the presence of the A&E and/or owner for the final acceptance test.

B. In order for the installer of the system to request final acceptance the following task shall be completed:
   1. All components shall be inspected to ensure they have been properly installed by the installer, securely attached, and remain clean and unmarred
   2. All equipment shall be properly adjusted, clearly labeled, and fully operational.
   3. The installer shall have tested the system previously to ensure the final acceptance test will be successful. Detailed proof of test shall be sent to the A&E with the request for final acceptance
   4. All permanent and final labels as requested in the identification and tagging section of this specification are completed.
   5. No temporary conditions shall be present in the system.
   6. All batteries on all system components shall be connected.
   7. All system programming shall be completed as indicated in the specification for each technology system.

C. All test equipment required for the Final acceptance shall be provided by the installer of the system unless specifically indicated by the A&E.

D. The A&E shall define the scope of the testing but the installer shall be prepared for testing every single component of the system. During the day of the test the A&E will indicate the testing process and procedures for each system. Test could include operation of the system during power outages. The installer of the system shall be available during the complete testing process to answer questions from the Engineer and to demonstrate specific parts of the system. If personnel form the installer or test equipment is not available, the test will be considered and marked as a failure.

E. A punch list of the items to be corrected will be prepared by the A&E during the final acceptance test. The installer shall correct all items and request a second day for verification of all punch-list items by the A&E and Owner. During the second test, no additional punch list items shall be expected, and only the items in the punch list will be tested.

F. If during the testing process the A&E and/or Owner consider that the rate of failure of the test is too high (more than 5 failures or non-compliance with specifications in one hour of test), the test will be cancelled unilaterally by the A&E and/or owner. The installer shall correct all items and re-schedule the final acceptance test again. The new test will start over from the beginning and nothing previously tested will be accepted. The installer shall not be entitled to additional compensation for the additional effort to test the system during this condition. To the contrary, the Contractor/Installer shall reimburse the owner of the project with the cost of the additional hours of testing required to be spent by the A&E and owner's team. The rate to be used for this reimbursement will be $150 per hour per person required by the A&E and Owner to complete the test.

G. Upon successful completion of the final acceptance test the installer of the system will receive a written notice by the A&E and/or Owner acknowledging the acceptance of the test

H. See individual specification sections for system specific requirements for testing.

3.7 TRAINING AND INSTRUCTION

A. Training for each technology system shall be provided as indicated in this specification and in the individual specification section for each system.

B. The following training guidelines shall be followed for all technology system

1. Training shall not be scheduled in a way that no attendee or presenter shall be required to attend more than 6 hours of training per day.
2. Prior to starting all training, the training submittal shall be approved. See section one of this specification for details on the training submittal
3. No training shall be scheduled prior to the system being completed and accepted by the A&E.
4. Training shall be conducted during normal business hours of the client, at a date and time of mutual convenience to the Owner and installer. All training sessions need to be scheduled by the installer at least 2 weeks in advance. The Owner shall be notified in writing by the installer on when are the possible dates for each session.
5. All different types of training shall be videotaped and delivered to the owner as part of the close out information in digital copy. All tapes shall be recorded in hi-quality MPEG2 or HD recorders, and the media turned to the owner shall be in electronic format viewable through QuickTime or Windows Media Player.
6. The installer is responsible for completing list of attendants for each session of training. All these sheets shall be submitted as part of the close out information

3.8 AS BUILT DOCUMENTS

A. Production: During the course of this project the contractor shall maintain record "as-built drawings". One set shall be maintained at the site and at all times and it shall be accurate, clear, and complete, showing the actual location of all equipment as installed. The "As-Built" drawings shall show all technology systems work installed complete to the present stage of progress. These drawings shall be available for review by the A&E's field representatives at all times.

B. Completion: At the completion of the Work, transfer onto the second set of drawings all changes marked in colored and submit to the A&E.

C. Final: Upon installer’s completion of the Engineer's final punch list, transfer all "As-Built" conditions and all requirements by the Engineer to a reproducible set of drawings. Submit full size drawings and one (1) set of CAD/Autodesk Revit© disks for review and acceptance.

D. Additional documents. At project completion, the installer of the technology system shall provide, as part of the as-built documents, updated tables, equipment schedules, configuration worksheets and labeling system used. See individual system specification section for more details on these documents.

E. See individual specification sections for each system for additional requirements for As-Built documents.

3.9 CLOSE OUT DOCUMENTS

A. Closeout information shall be provided to the owner in electronic format at the end of the project. The file shall be organized by each system and shall follow this organization:
   1. PART 1 – OPERATION AND MAINTENANCE MANUALS. Operation and Maintenance manuals as issued by the manufacturer of each system’s component. Such manuals shall include all maintenance procedures required to be done by the owner. Also, when required by each individual specification section, a short form operation guide, prepared by installer) for the system.
   2. PART 2 – INVENTORY OF EQUIPMENT INSTALLED. A detailed list of all relevant active equipment (equipment with electronic components with a market value over $200)

installed in the project including the following information and presented in electronic format (Microsoft Excel):
   a. Make
   b. Model
   c. Serial number
   d. Room location
   e. Warranty period, including manufacturer's extended warranties.

3. PART 3 – PROOF OWNERSHIP, DELIVERY AND ACCEPTANCE. The following letters/documents shall be attached in this part:
   a. Acceptance letter signed by A&E for each of the technology systems installed.
   b. Proof of training by submitting sign in sheets for each training session done
   c. Signed transmittal for all training videos and training material.
   d. Signed transmittal for all spare parts and consumables delivered to the owner.
   e. A list of all the user names and passwords for all the different software programs used by the technology systems and any equipment with password codes. All levels of passwords shall be provided, from the lowest hierarchy to the highest.
   f. At least four (4) copies of all physical keys to different devices part of the technology systems. Each key shall be individually tagged in a key ring. All keys shall be included and organized inside a key ring management enclosure.
   g. A list of all software modules and licenses delivered to the owner. The list shall include part numbers, serial numbers, license certificate of authenticity, hardware key (dongles) numbers and software version. This list shall have a clear signature, name and date on person that received this software by the Owner.
   h. A copy of all official equipment and software registrations with manufacturer.
4. PART 4 – AS BUILT DOCUMENTS. All as-built documents as indicated in this specification section

END OF SECTION 27 0010

ATTACHMENT 1 – SUBSTITUTION REQUEST FORM

Substitution Request Number: _____

PROJECT:_____ DATE: _____

SPECIFICATION SECTION: _____ITEM(S):_____

SPECIFIED MANUFACTURER:_____

SPECIFIED MODEL NO: _____

PROPOSED MANUFACTURER:_____

PROPOSED MODEL NO:_____

REASON(S) FOR NOT PROVIDING SPECIFIED ITEM:_____

_____

Attach product description, drawings, photographs, performance and test data, samples and other information necessary for side-by-side evaluation. Fill in all blanks.

A. Provide substantiated reason for requested substitution.

B. Does the requested substitution affect dimensions, locations or configurations?
No:_____Yes:_____
Explain (attach drawings if necessary):_____
_____
_____

C. What are the differences between the specified item and the requested item:
_____
_____

D. Will the Contractor pay for any changes to the building design, including engineering and detailing costs caused by the approval?
No:_____Yes:_____
Explain (if no, and describe modifications required to install or accommodate the requested change):_____
_____
_____

E. Will approval affect the work of other trades, including the Construction schedule?
No:_____Yes:_____
Explain (if yes):_____
_____
_____

F. Manufacturer's guarantees of the proposed and specified items are:
Same:_____Different:_____
Explain (if different):_____
_____

G. Does the proposed item meet all applicable codes, ordinances and regulations for this specific application?
No:_____Yes:_____
Explain (if no):_____

H. Has proposed item been used locally in similar applications?
No:_____Yes:_____
Explain (give nearest location):_____

I. Will maintenance and service parts be locally available for the requested item?
No:_____Yes:_____
Explain (if no, give nearest location):_____

J. Will the requested item require waiving of any qualifications or other requirements?
No:_____Yes:_____
Explain (if yes):_____

K. Are there any license fees or royalties associated with the requested substitution?
No:_____Yes:_____
Explain (if yes):_____

L. If approved, will the Owner receive a credit for the proposed alternate material?
No:_____Yes:_____
Explain (if no):_____

M. Does the proposed alternate material meet the same applicable standards (ASTM, ANSI, UL, FS) as the specified item?
No:_____Yes:_____
Explain (if no, attach drawings if necessary):_____

N. Identify the recycled materials or components or features that lead to the claims to being “Green”: _

O. Has the required line-by-line comparison been included?
No:_____Yes:_____
Explain (if no):_____

The undersigned agrees to pay for the Designer's review time and for changes to the building design, including review, re-design, engineering, drawings and other costs caused by the requested substitution.

_____

Signature

_____

Print

The following Purchase Order or billing number is to be used for billing the Contractor for costs incurred in evaluating and if applicable accommodating the requested substitution.

_____

The Engineer will not be required to approve any product that is not equal or suitable for the specific application and functionality of this project.

ATTACHMENT 2 – RESPONSIBILITY MATRIX

SCOPES INCLUDED

VENICE POLICE DEPARTMENT					
DESIGN AND CONSTRUCTION RESPONSIBILITIES					
ITEM	SYSTEM	SCOPE	DESIGN RESPONSIBILITY	PROCUREMENT RESPONSIBILITY	CONSTRUCTION RESPONSIBILITY
1.00	**VOICE SYSTEM (TELEPHONE COMM. SYSTEM ALL AREAS/ALL NETWORKS)**				
1.01	RACEWAYS	Conduit, boxes, cable tray, etc.	A&E	CM	CM
1.02	INSIDE PREMISE WIRING	Structured cabling system	OWNER/A&E	OWNER	OWNER
1.03	OUTSIDE PREMISE WIRING IN PRIVATE CAMPUS	Fiber and copper cables inside the site but outside of the building	OWNER	OWNER	OWNER
1.04	OUTSIDE PREMISE WIRING FROM SERVICE PROVIDERS	Fiber and copper for services	OWNER	S.P.	S.P.
1.05	PATCHING OF VOICE LINES	Patching at path panel and work areas	OWNER	N.A.	OWNER
1.06	PHONE SWITCH	Equipment selection, sizing, equipment layout, RFP	OWNER	OWNER	OWNER
2.00	**DATA SYSTEM (COMPUTER NETWORKS ALL AREAS/ALL NETWORKS)**				
2.01	RACEWAYS	Conduit, boxes, cable tray, etc.	A&E	CM	CM
2.02	INSIDE PREMISE WIRING	Structured cabling system	OWNER	OWNER	OWNER
2.03	PATCHING OF DATA LINES	Patching at path panel and work areas	OWNER	OWNER	OWNER
2.04	ACTIVE ELECTRONICS (NETWORKING EQUIPMENT, SWITCHES, ROUTERS, SERVERS AND COMPUTERS)	Equipment selection, sizing, equipment layout, RFP	OWNER	OWNER	OWNER
3.00	**TELECOM ROOM/EQUIPMENT ROOM OUTFIT**				
3.01	PLYWOOD AND WALL SLEEVES	Plywood and sleeves for cables	A&E	CM	CM
3.02	GROUNDING SYSTEM	Ground bar and ground bus	A&E	CM	CM
3.03	RACKS, WIRE MANAGERS AND LADDER TRAY	Racks and all passive elements	A&E	CM	CM
3.04	PDUS, POWER TRANSFERS	Power distribution units and power transfers for all racks	OWNER	OWNER	OWNER
3.05	UPS FOR RACKS	UPS rack mounted in telecom rooms or outside of telecom rooms	OWNER	OWNER	OWNER
3.06	UPS FOR WORKAREAS	Small UPS systems for workareas	OWNER	OWNER	OWNER
4.00	**CATV DISTRIBUTION (CABLE TV FOR ALL AREAS)**				
4.01	RACEWAYS	Conduit, boxes, cable tray, etc.	A&E	CM	CM
4.02	INSIDE PREMISE WIRING	Coaxial cable	OWNER	OWNER	OWNER
4.03	DISTRIBUTION DEVICES	TAPS, amplifiers, splitter, DC	OWNER	OWNER	OWNER
4.04	DISPLAYS/TVS IN OFFICES	TVs not part of an AV system	OWNER	OWNER	OWNER
4.05	DISPLAYS/TVS IN COMMON ROOMS	TVs part of an AV system	OWNER	OWNER	OWNER
4.06	CABLE SET-TOP BOXES	Settop boxes to be able to tune to service provider signal	OWNER	OWNER	OWNER
4.07	MOUNTS FOR ALL TVS/DISPLAYS	Mounts for the TVS	OWNER	OWNER	OWNER
5.00	**AV SYSTEMS**				
5.01	RACEWAYS	Conduit, boxes, cable tray, etc.	A&E	CM	CM
5.02	INSIDE PREMISE WIRING	All AV wiring for systems	OWNER	OWNER	OWNER
5.03	ACTIVE ELECTRONICS AND PROGRAMMING	Projectors, presentation control system, speakers, touchscreens, programming, etc.	OWNER	OWNER	OWNER
5.04	COMPUTERS FOR AV SYSTEMS	AV workstation computers and the basic OS software and antivirus	OWNER	OWNER	OWNER
5.05	NETWORK EQUIPMENT	Switches, routers, firewalls for the use of the AV equipment	OWNER	OWNER	OWNER

VENICE POLICE DEPARTMENT					
DESIGN AND CONSTRUCTION RESPONSIBILITIES					
ITEM	SYSTEM	SCOPE	DESIGN RESPONSIBILITY	PROCUREMENT RESPONSIBILITY	CONSTRUCTION RESPONSIBILITY
6.00	**AV SYSTEMS FOR INTERVIEW ROOMS**				
6.01	RACEWAYS	Conduit, boxes, cable tray, etc.	A&E	CM	CM
6.02	INSIDE PREMISE WIRING	All AV wiring for systems	OWNER	OWNER	OWNER
6.03	ACTIVE ELECTRONICS AND PROGRAMMING	Cameras,microphones, power supplies, recorders, etc	OWNER	OWNER	OWNER
7.00	**SECURITY SYSTEMS, BUILDING CCTV AND ACCESS CONTROL**				
7.01	RACEWAYS	Conduit, boxes, cable tray, etc.	A&E	CM	CM
7.02	INSIDE PREMISE WIRING	Cables for cameras and card access	OWNER	OWNER	OWNER
7.03	ACTIVE ELECTRONICS	Cameras, DVRs, Access control panels, readers, etc	OWNER	OWNER	OWNER
7.04	LOCKING DEVICES	Magnets, electric mortise locks	A&E	CM	CM
7.05	COMPUTERS AND PRINTERS	Security and CCTV workstation computers and the basic OS software and antivirus	OWNER	OWNER	OWNER
7.06	NETWORK EQUIPMENT	Switches, routers, firewalls for the use of the Security system	OWNER	OWNER	OWNER
8.00	**FIRE ALARM AND BUILDING MANAGEMENT SYSTEM**				
8.01	RACEWAYS & WIRING	Conduit, cables, patch panels, cable tray outlets, etc	A&E	CM	CM
8.02	ACTIVE ELECTRONICS	Data gathering panels, sensors, etc	A&E	CM	CM
9.00	**DISTRIBUTED ANTENNA SYSTEM (LIFE SAFETY)**				
9.01	RACEWAYS & WIRING	Conduit, cables, patch panels, cable tray outlets, etc	A&E	CM	CM
9.02	INSIDE PREMISE WIRING	Cable , grounding	A&E	CM	CM
9.01	ACTIVE ELECTRONICS	Head end system and antennas	A&E	CM	CM
10.00	**DISTRIBUTED ANTENNA SYSTEM (CELL PHONES)**				
10.01	RACEWAYS & WIRING	Conduit, cables, patch panels, cable tray outlets, etc	OWNER	OWNER	OWNER
10.02	INSIDE PREMISE WIRING	Cable , grounding	OWNER	OWNER	OWNER
10.01	ACTIVE ELECTRONICS	Head end system and antennas	OWNER	OWNER	OWNER

NOTES: CM: CONSTRUCTION MANAGER
S.P.: SERVICE PROVIDER
A&E: Dewberry Architects and all consultants working under them, including TLC Engineering Solutions

3/18/2019

ATTACHMENT 3 – NETWORK CONNECTIONS PROGRAMMING PLAN

TLC ENGINEERING SOLUTIONS
NETWORK CONNECTIONS PROGRAMMING PLAN

PROJECT NAME	
DATE	

SUBCONTRACTOR	
TRADE	

TYPE OF DEVICES FORM (Fill one column per device type provided)

DEVICES CHARACTERISTICS	DEVICE NAME / DEVICE CODE	A	DEVICE NAME / DEVICE CODE	B	DEVICE NAME / DEVICE CODE	C
Manufacturer						
Part Number						
Firmware version						
Is a fixed address required or can device work with a dynamic address (DHCP)?						
Does device require an address from a DNS server?						
Does device support Layer 3 traffic (IP)?						
Does device needs access to the internet?						
Number of physical network ports per device?						
Does device require IPv6 to work or IPv4?						
Does device support SNMP?						
Does device need specific TCP ports open? Please list						
Is this device connecting to existing network devices (Yes/no) Server/client application						
If yes to above, please describe to what device, located where.						

TLC ENGINEERING SOLUTIONS

NETWORK CONNECTIONS PROGRAMMING PLAN

PROJECT NAME	
DATE	

SUBCONTRACTOR	
TRADE	

LIST OF DEVICES FORM (Fill one entry in form per each device being provided								NETWORK CONNECTION FOR EACH DEVICE				
								NETWORK SWITCH				
DEVICE PHYSICAL LOCATION BUILDING AND ROOM #	DEVICE CODE FROM PREVIOUS FORM	DEVICE NETORK NAME	IP ADDRESS	SUBNET	GATEWAY	DNS SERVER	VLAN NAME	MODEL#	BUILDING NAME	ROOM #	IP ADDRESS	PORT #

Filled out by Network administrator

27 1000 - STRUCTURED CABLING SYSTEM

PART 1 - GENERAL

1.1 SCOPE OF WORK

A. General: Telecommunications Drawings apply to work of this section. The overall and detailed Structured Cabling System (SCS) design shown on the drawings, selected materials, device locations, installation details, mounting details, cabling routing and supporting and all technical specifications if provided on the drawings apply to work of this section.

B. General: Furnish, install, test and certify complete with all accessories an ANSI/TIA 568C SCS with a minimum 25 year performance warranty for the entire system from the manufacturers and a minimum of 3 years warranty for materials and labor from the SCS installer for all components not covered under the manufacturer's 25 year warranty. The goal of the project is to provide an enhanced SCS that shall serve as a vehicle for the transport of voice telephony, data, audio, video, security and low voltage devices for building controls and management, throughout the building and from building to building from designated demarcation points to outlets located at various desk, workstation and other locations as indicated in the contract drawings.

C. Coordination with other trades: It is the responsibility of the installer of the SCS to verify and advice the installer of the raceway infrastructure (conduit, boxes, cable tray, in ground boxes, etc) for this system on raceway routing to minimize the wiring distances to the telecommunication room. When J-hooks are acceptable for the use in structured cabling system, all J-hooks and supports for these devices shall be in the scope of work of the SCS installer.

D. All patching and cross connect to owner provided equipment shall be included under the scope of work of this project.

E. WAP installation. The scope of work includes the installation of the Wireless Access Points (WAPs) provided by the owner. The scope includes the labor and installation materials (supports, anchors, etc.) to properly fasten the WAPs to the structure.

VENDOR WILL INCLUDE COSTS TO COMPLETE A "HEAT MAP" ANALYSIS TO CONFIRM FINAL NUMBER OF WIRELESS ACCESS POINTS REQUIRED FOR FACILITY AND PROVIDE UNIT COSTS TO ADD/REMOVE WAPS.

1.2 RELATED DOCUMENTS

A. General: Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section

B. Supplemental: Refer to the specification sections identified below for additional requirements, which are supplemented by this section:

SECTION	TITLE
270010	TECHNOLOGY GENERAL PROVISIONS
270528	RACEWAYS FOR TECHNOLOGY
270526	GROUNDING & BONDING FOR TELECOMMUNICATIONS SYSTEMS

C. Owner standards: Comply with the document "Requirements for all Communication Cabling at Clients name" prepared by the Clients applicable office.

D. Standards: All work related to the SCS shall be in compliance with the following industry codes and standards latest edition:

1. ANSI/TIA-568.0-D “Generic Telecommunications Cabling for Customer Premises” with addendums and errata.
2. ANSI/TIA-568.1-D, “Commercial Building Telecommunications Cabling Standard” with addendums and errata.
3. ANSI/TIA-568-C.2, “Balanced Twisted- Pair Cabling Components Standard” with addendums and errata.
4. ANSI/TIA-568.3-D, “Optical Fiber Cabling Component Standard” with addendums and errata.
5. ANSI/TIA-569-D, “Telecommunications Pathways and Spaces” with addendums and errata.
6. ANSI/TIA-606-C, “Administration Standard for Telecommunications Infrastructure” with addendum and errata.
7. ANSI/TIA-607-C, “Generic Telecommunications Bonding and Grounding (earthing) for Customer Premises” with addendum and errata.
8. ANSI/NECA/BICSI 607-2011, Standard for Telecommunications Bonding and Grounding Planning and Installation Methods for Commercial Buildings.
9. ANSI/TIA 758-B, “ Customer-Owned Outside Plant Telecommunications Infrastructure Standard” with addendum and errata
10. ANSI/TIA 862-B, “Structured Cabling Infrastructure Standard for Intelligent Building Systems” with addendum and errata.
11. ANSI/TIA-1152-A, “Requirements for Field Test Instruments and Measurement for Balanced Twisted Pair Cabling” with addendum and errata.
12. ANSI/TIA-526-7-A, “Measurement of Optical Power Loss of Installed Single-Mode Fiber Cable Plant”.
13. ANSI/TIA-526-14-C, “Optical Power Loss Measurements of Installed Multimode Fiber Cable Plant”.
14. TIA-598-C, Optical Fiber Cable color coding. .
15. IEC/TR3 61000-5-2 - Ed. 1.0 and amendments. “Electromagnetic compatibility (EMC) - Part 5: Installation and mitigation guidelines - Section 2: Earthing and cabling”
16. ANSI/TIA-942-B , “Telecommunications Infrastructure Standard for Data Centers” with addendum and errata
17. ANSI/BICSI 002-2014, Data Center Design and Implementation Best Practices
18. ANSI/NFPA 70 “National Electrical Code”, CSA C22.1.
19. BICSI Telecommunications Distribution Methods Manual (TDMM)
20. BICSI Telecommunications Cabling Installation Manual (TCIM)
21. BICSI Customer Owned Outside Plant Manual (COOPM)
22. Local County/City Codes, Ordinances and Regulations.
23. Underwriters Laboratories (UL)
24. FCC -Federal Communications Commission
25. ADA Requirements
26. Occupational Safety and Health Regulations (OSHA)
27. National Fire Protection Association (NFPA)
28. ANSI/TIA-1179, Healthcare Facility Telecommunications Infrastructure Standards
29. Florida Statutes and Administrative Rules
30. Manufacturers Product Cabling Catalogs
31. Manufacturers Training Manuals (Design and Installation).

E. General: Installation practices for SCS as describe herein take precedence over any other section in the construction documents set.

1.3 STRUCTURED CABLING SYSTEM INSTALLER QUALIFICATIONS

A. General: The installer selected for the project must be certified by the manufacturers of the products, adhere to the engineering, installation and testing procedures and utilize the authorized manufacturers components and distribution channels in provisioning the Project.

B. General: The installer directly responsible for this work shall be a Structured Cabling System (SCS) Installer who is, and who has been, regularly engaged in the providing and installation of commercial and industrial telecommunications wiring systems of this type and size for at least the immediate past five years. Any other company working for the SCS installer of this system shall have the same training and certification as the SCS installer.

C. Certification: The SCS installer's Project Manager shall possess a current and in Good Standings BICSI Registered Communications Distribution Designer (RCDD®) certificate. All shop drawings submitted by the SCS Installer shall bear the RCDD's stamp.

D. The SCS Installer shall have a (BICSI) RCDD on Staff. Third party RCDD's shall not be acceptable.

E. The Installer team leader assigned for the project shall be BICSI registered Level II installer or proven and qualified equal.

F. Experience: The SCS Installer shall be experienced in all aspects of this work and shall be required to demonstrate direct experience on recent systems of similar type and size. The SCS Installer shall own and maintain tools and equipment necessary for successful installation and testing of SCS and have personnel who are adequately trained in the use of such tools and equipment. The Owner or engineer may elect to request submittal of additional financial, operational and administrative information of the SCS installer to demonstrate the required experience.

G. The SCS Installer shall possess a State of Florida Low Voltage License.

H. The SCS Installer shall maintain a permanent office within 100 miles of the project site.

1.4 MATERIALS ALTERNATES AND SUBSTITUTIONS

A. SCS Installer shall follow all requirements for materials alternates and substitutions indicated in specification section 270010.

1.5 SHOP DRAWINGS AND SUBMITTALS.

A. See additional requirements for shop drawings and submittals in specification section 270010.

B. Proposal Submittals: The SCS Installer shall submit the following information with the proposal to execute the work:
1. A list of five (5) recently completed projects of similar type and size with contact names and telephone numbers for each.
2. A list of test equipment proposed for use in verifying the integrity of the installed SCS. Test equipment list shall include manufacturer part number, serial numbers and a copy of the last calibration report done by the manufacturer of the equipment of the unit, indicating the date when the calibration was done. Calibrations shall not be older than one year. Test equipment includes, cable certifiers, OTDRs, fiber splicers, etc.
3. A technical resume of experience for the installer's engineer/RCDD and on-site foreman who will be assigned to the project, including RCDD license number.
4. Similar documentation for any company working for the SCS Installers who will assist in the performance of this work.
5. A copy of a current and valid Low voltage License for the State of Florida.
6. Location of office from which installation and warranty work will be performed.

C. Construction submittals: Once all proposal submittals have been received and approved by the Architect and Engineer (A&E) of the project, the SCS Installer shall provide all construction submittals. Construction submittals are composed of the following items.
   1. Manufacturer's cut sheets for all proposed equipment as described in Part 2 of this specification section. Cut sheets shall bear the printed logo or trademark of the manufacturer for each type of product being provided. Mark each copy of the cut sheets for the specific product being provided with an identifying mark, arrow, or highlighting.
   2. Faceplate color selection.
   3. Detail explanation of the labeling scheme to be used for all components of the system. This explanation shall include examples of all types of labels to be used, like labels for cables, patch panels, outlet jacks, etc.
   4. Autocad® or Revit drawings in sheets matching the size of the design documents with the following information:
      a. Floor plans with all outlets in the project. All outlets shall have the label to be used during identification and tagging process described in this specification section.
      b. Enlarged telecommunication rooms with all equipment components and rack layouts for each room. All racks shall have the label to be used during identification and tagging process described in this specification section.
      c. Drawings indicating rack elevations for all cabinets or racks in the project, identifying the precise quantity of patch panels, fiber distribution centers and wire managers and accurate RU heights based on equipment selection. All equipment shall have the label to be used during the identification and tagging process described in this specification section.
      d. A spreadsheet indicating all patch cords (fiber and copper) to be provided in the project. The spreadsheet shall indicate the quantity, color of the jacket, cable type, length and connector termination on each side.

D. Construction submittals received before proposal submittals are received or approved will be rejected.

1.6 ABBREVIATIONS

A. General: The following abbreviations are used in this specification section:
   1. A&E - Architect and Engineer. The Architect is the legal entity that holds a contract for the design the project. The Engineer is the consulting engineer firm or engineer of record for the project who prepared this specification.
   2. APC - Angle physical contact connector. Reference to the polish style of the ferrule in fiber optic connectors.
   3. Array connector - a multi-strand fiber connector user for high density applications, such as the MPO connector
   4. BICSI - Building Industry Consultant Services International
   5. CCTV - Close circuit television system (surveillance video system)
   6. FCC - Federal Communications Commission.
   7. FTP - Foiled Twisted pair. One foiled screen around each cable pair.
   8. IDC - Insulation Displacement Connector
   9. NEC - National Electrical Code.®
   10. NEMA - National Electrical Manufacturers Association.
   11. OM1 - ISO 11801 designation for multimode 62.5/125µm glass fiber optics.
   12. OM2 - ISO 11801 designation for multimode 50/125µm glass fiber optics.
   13. OM3 - ISO 11801 designation for multimode laser optimized 50/125µm glass fiber optics.
   14. OM4 - TIA designation for multimode laser optimized 50/125µm glass fiber optics in compliance with TIA-492-AAAD.
   15. OS1 - ISO 11801 designation for single mode 9/125µm glass fiber optics.
   16. OS2 - ISO 11801 designation for single mode 9/125µm glass fiber optic with performance criteria identical to ITU-T G652.

17. OTDR - Optical Time Domain Reflectometer.
18. RU - Rack units. Height dimension for rack mounted equipment. 1 RU equivalent to 1.75”.
19. SCS - Structured Cabling System
20. ScTP - Screened twisted pair. One foiled screen around all cable pairs
21. TIA - Telecommunications Industry Association.
22. TR - Telecommunications Room.
23. UPC - Ultra physical contact connector. Reference to the polish style of the ferrule in fiber optic connectors.
24. UTP - Unshielded twisted Pair
25. UV - Ultra violet
26. VAC - Volts alternating current.

PART 2 - PRODUCTS

2.1 MODULAR SCS JACKS

A. Structured cabling system outlets indicated in design drawings are composed of modular SCS jacks, mounted in a faceplate on an electrical box. Modular SCS jacks shall be 8-pin modules (RJ-45) that meet or exceed the following electrical and mechanical specifications:
   1. Electrical Specifications:
      a. Insulation resistance: 500 MΩ minimum.
      b. Dielectric withstand voltage 1,000 VAC RMS, 60 Hz minimum, contact-to-contact and 1,500 VAC RMS, 60 Hz minimum from any contact to exposed conductive surface.
      c. Contact resistance: 20 M Ω maximum.
      d. Current rating: 1.5 A at 68 º F (20 º C) per IEC publication 512-3, Test 5b
      e. ISO 9001 Certified Manufacturer
      f. UL verified for EIA/TIA electrical performance
      g. Comply with FCC Part 68
      h. Cable termination: IDC type universal T568A or T568B.
   2. Mechanical Performance:
      a. Plug Insertion Life: 750 insertions
      b. Contact Force: 3.5 oz (99.2 g) minimum using FCC-Approved modular plug.
      c. Plug Retention Force: 30 lb (133 N) minimum between modular plug and jack.
      d. Temperature Range: -40º to 150ºF (-40 º to 66 º C)

B. Design selection: modular SCS jacks shall be selected according to the following criteria:
   1. Performance requirement: CAT6A
   2. Style: Rear loading
   3. Mounting orientation: straight mounting
   4. Color: To match faceplate
   5. Dust cover required: No
   6. Shielding: use shielded modular jacks only with ScTP cable.

C. Approved manufacturer: Ortronics, Panduit, Siemon, CommScope, Belden, Leviton or Hubbell.

2.2 FIELD TERMINATABLE 8 POSITION MODULAR PLUG

A. When indicated in the design drawings to use Direct Attach connection for any field devices, field terminatable 8 positions modular plugs shall be used. This devices shall be 8-pin modules (RJ-45) plugs that meet or exceed the following electrical and mechanical specifications:

1. General Specifications:
   a. Shall include an IDC type of termination for the cable. Crimp type terminations not acceptable.
   b. Shall support cable gauges from 22 to 26 AWG
   c. Shall include a rubber boot
2. Electrical Specifications:
   a. ISO 9001 Certified Manufacturer
   b. UL verified for EIA/TIA electrical performance
   c. Comply with FCC Part 68
   d. Cable termination: IDC type universal T568A or T568B.

B. Design selection: modular SCS jacks shall be selected according to the following criteria:
   1. Performance requirement: Match performance of Modular SCS jacks

C. Approved manufacturer: Match selection for modular SCS jacks.

2.3 OTHER MODULAR JACKS

A. Whenever indicated in the design drawings SCS outlets could have terminations for other media types like fiber optic cables, coaxial cables or audio cables. Whenever those type of media are indentified in the drawings, the following specifications shall be meet for modular jacks mounted in SCS outlets:
   1. Style, mounting orientation and color: match design selection for modular SCS jacks.
   2. Broadband distribution system connector: Use modular jack with F connector bulkhead rated at 75Ω.
   3. Fiber optic connectors: use modular jack with adapter plate for LC.

B. Approved manufacturer: Match selection for modular SCS jacks.

2.4 FACEPLATES

A. Faceplates shall be used for all flush mounted telecommunication outlets to house modular jacks. Faceplates shall have the following specifications:
   1. Construction material: High impact thermo Plastic.
   2. Size: use single gang faceplates only unless specifically noted in the design drawings.
   3. Capacity of modular jacks per faceplate: faceplate shall be selected as to accommodate the amount of cables in each telecommunication outlet. No more than one unused opening shall be present on each faceplate.
   4. Color: submit color to A&E for approval.
   5. Labels: faceplate shall have two (2) recesses for labels, top and bottom, and shall have transparent label snap-on covers.
   6. Faceplate style: Direct modular plug rear loading style

B. All faceplates shall have a tamper resistant cover to access the modular jacks

C. Approved manufacturer: Match selection for modular SCS jacks.

2.5 FACEPLATES WITH SUPPORT STUDS

A. Telecommunication outlets indicated in the design drawings as to be wall mounted telephone outlets shall be composed of one modular SCS jack and one faceplate with support studs

mounted on an electric box. Faceplates with support studs shall have the following specifications:

1. Construction material: Stainless Steel.
2. Size: use single gang faceplate with two support studs.
3. Capacity of modular jacks per faceplate: One.
4. Faceplate style: Direct modular plug rear loading style.

B. Approved manufacturer: Match selection for modular SCS jacks.

2.6 SURFACE MOUNTED BOXES

A. Telecommunication outlets indicated in the design drawings as to be surface mounted outlets shall be composed of modular jacks mounted in a surface mounted box inside an electrical enclosure. Surface mounted boxes shall have the following specifications:

1. Construction material: High impact thermo Plastic.
2. Capacity of modular jacks per surface mounted box: size of surface mounted box shall be selected as to accommodate the amount of cables in the surface mounted telecommunication outlet. No more than one unused opening shall be present on each box.
3. Color: White.
4. Labels: surface mounted boxes shall have at least one (1) recess for labels, and shall have transparent label snap-on covers

B. Approved manufacturer: Match selection for modular SCS jacks.

2.7 MOUNTING FRAMES

A. All telecommunication outlets shall be properly mounted in the electrical raceway system provided for the outlet. The SCS installer shall select the proper mounting frame and/or bezel to mount the modular plugs in the raceway system. Raceway systems include furniture systems, floor boxes, poke-thrus, power poles, surface raceways system, etc.

B. Whenever design drawings indicate a telecommunication outlet to be mounted in a furniture system the SCS Installer shall select the proper mounting frame to hold the modular jacks in the furniture system selected by the owner. Color of the mounting frames shall match the color of the furniture system.

C. If owner provided furniture system does not have a raceway system for telecommunication, and design drawings indicate outlet to be mounted in the furniture system, SCS installer shall provide a plastic surface mounted box that allows the mounting of the modular plugs in a standard telecommunication faceplate.

D. SCS installer shall provide all mounting frames and bezels to mount modular jacks inside floor boxes or poke-thrus.

E. All un-used ports in mounting frames shall be covered with blank inserts.

F. Approved manufacturer: Match selection for modular SCS jacks.

2.8 HORIZONTAL 4-PAIR CABLE

A. General: Horizontal 4-pair cables shall be extended between the telecommunications outlet location and its associated equipment inside the TR. The cable shall consist of 4 pair cable solid copper conductors, certified to the specified performance standard. All horizontal 4-pair cables shall be terminated in modular jacks and patch panels with IDC type connectors and shall have the following specifications:
   1. Cable Gauge: minimum 23 AWG
   2. Performance standard: TIA/EIA CAT6A
   3. Cable type: UTP
   4. Performance characterized to: 600 MHz
   5. Time delay skew: Maximum 45 ns/100m
   6. Input impedance (1-100MHz): 100Ω
   7. Cable diameter: ≤ 0.295 inch

B. Cable jacket colors for 4-pair horizontal cables shall be selected according to the following criteria:
   1. Voice cables: Green
   2. Data Cables: Blue
   3. Wireless access points: Yellow
   4. Surveillance cameras: White

C. Performance verification: All performance of horizontal 4-pair cable shall be verified by a Nationally Recognized Testing Laboratory (NRTL) for EIA/TIA electrical performance and comply with FCC Part 68.

D. Jacket: Cable jacket for inside premise cables shall comply with Article 800 NEC for correct use in the environment in which they will be used. If at the moment of the bid the SCS installer does not know the environment, in which cables will be used, the SCS installer shall assume plenum rated is required for the project. At a minimum all cables shall have a flame retardant PVC jacket riser rated.

E. OSP Jackets: All horizontal 4-pair cables run in conduits below the floor slab shall have a water resistant flooding compound and a jacket made of UV resistant polyethylene. Cables with PVC jackets are not acceptable for this application.

F. Jacket marking: All horizontal 4-pair cables shall have at least two types of markings imprinted in the jacket, transmission performance marking and NEC rating for environment to be used.

G. Approved manufacturer: Superior Essex, Belden, Panduit, Siemon, CommScope General Cable, or Berk-Tek.

2.9 PATCH PANELS FOR HORIZONTAL CABLING

A. All 4-pair horizontal cables shall be terminated in rack mounted path panel located in the telecommunication rooms rack. These patch panels shall have the following specifications.
   1. Connector type: 8-position modular plug (RJ-45)
   2. Cable termination: IDC type universal T568A or T568B.
   3. Performance requirement: CAT6A
   4. Maximum connectors per path panel allowed: 48
   5. Patch panel type: factory preloaded panels
   6. Patch panel shape: angled
   7. Permanent marking: All connectors shall be labeled in sequential numbers

8. Field labels: patch panels shall have a space for field labels covered with transparent protectors.
9. Shielding: use shielded patch panels only with ScTP cable.

B. Approved manufacturers. Match selection for modular SCS jacks

2.10 HORIZONTAL WIRE MANAGERS

A. Horizontal wire managers shall be mounted in racks to route cables from patch panels to vertical wire managers and to equipment. Horizontal wire managers shall have the following specification:
1. Style: Finger duct style with hinged cover
2. Sides: front of rack
3. Minimum height: two RU

B. Approved manufacturers. Match selection for modular SCS jacks

2.11 CROSS OVER WIRE MANAGERS

A. Cross over wire managers shall be used to route patch cables from the right vertical wire manager to the left vertical wire manager or between racks. Cross over wire managers shall have the following specification:
1. Style: six port finger spacing with a cover
2. Sides: front of rack
3. Minimum height: Four RU

B. Approved manufacturers. Match selection for modular SCS jacks

2.12 FOUR (4) PAIR PATCH CORDS

A. Four (4) pair patch cords are required at the work area side and at the patch panel side to complete the connectivity path to the equipment. All 4-pair patch cords shall be factory tested and shall have molded boots to the cable jacket. Field made patch cords are not acceptable. Four pair patch cords shall have the following specifications:
1. Connectors: 8-pin modular plugs at both ends
2. Conductors: 4-pair stranded conductors.
3. Wire gauge: 23AWG for patch cords in the field site and 28 AWG for patch cords in the telecom room side with the exception of WAPS.
4. Wiring map: See section 3 of this specification
5. Performance requirement: To match horizontal 4-pair cable performance
6. Cable type: UTP

B. Approved manufacturers. Match selection for modular SCS jacks

2.13 SINGLE STRAND FIBER OPTICS CONNECTORS

A. All fiber optic cables (horizontal or backbone cables) shall be terminated on fiber optic connectors at both ends of the cable with either single strand fiber optic connectors or array connectors. Single strand fiber optic connector shall be compliant with industry standard ANSI/TIA-568-C.3 and the applicable TIA/EIA Fiber Optic Connector Intermateability Standard

(FOCIS) document, TIA/EIA 604 series. Single strand fiber optic connectors shall have the following specification:

1. Physical contact type: use UPC type connector for all applications.
2. Connector type: LC
3. Security level: non-keyed connector
4. Pairing style: simplex
5. Acceptable connector attachment types:
   a. Epoxy type connectors, field polished
   b. Splice on connectors. Fusion spliced connectors with factory polished finish.
   c. Fusion spliced pig tail with factory polished connector. Mechanical splices for pig tails are not acceptable.
6. Fiber type: SCS installer shall select the connector according to the fiber type where connector will be installed. As an example use OM1 connectors only in OM1 fiber optic cables.
7. Fusion spliced pig tails. When using fusion spliced pig tails the SCS installer shall make sure the fiber type of the pig tail and the actual cable have the same optical characteristics, such as back scatter, core diameter, etc.
8. Ferrule construction: use ceramic ferrule connectors only, plastic ferrules are not acceptable.

B. All single strand fiber optic connectors shall include boots to protect the fiber optic cable. The SCS installer shall select the boot according to the fiber optic type selected. As an example use 900µm boots in 900µm coated fiber, use 250µm boots on 250µm coated fiber and use 2mm boots on 2mm jacketed fiber. All boots shall be color coded to identify the type of fiber connector used. Boots shall be beige for OM1 fiber, black for OM2, aqua for OM3 and OM4 or green.

C. Single strand multimode fiber optic connectors shall have the following performance requirements:

1. The maximum insertion loss shall be 0.75 dB (maximum) when installed in accordance with the manufacturer's recommended procedure and tested in accordance with FOTP-171.
2. Connector reflectance shall be less than or equal to -26 dB when installed in accordance with the manufacturer's recommended procedure.
3. Connectors shall sustain a minimum of 500 mating cycles without violating specifications.
4. Connectors shall have an optical axial pull strength of 2.2 N (0.5lbf) at 90º angle, with a maximum 0.5dB increase in attenuation for both tests when tested in accordance with ANSI/EIA/TIA-455-6B.

D. Single strand single mode fiber optic connectors shall have the following performance requirements:

1. Maximum insertion loss shall be 0.75 dB per each mated connector pair when installed in accordance with the manufacturer's recommended procedure and tested in accordance with FOTP-171.
2. Connector reflectance shall be less than or equal to -40 dB (UPC) when installed in accordance with the manufacturer's recommended procedure.
3. Connectors shall sustain a minimum of 500 mating cycles without violating specifications.
4. Connectors shall have an optical axial pull strength of 2.2 N (0.5lbf) at 90º angle, with a maximum 0.5 dB increase in attenuation for both tests when tested in accordance with ANSI/EIA/TIA-455-6B.
5. Connectors shall meet the following performance criteria:

Test	Procedure	Maximum Attenuation Change (dB)
Cable Retention	FOTP-6	0.2 dB
Durability	FOTP-21	0.2 dB
Impact	FOTP-2	0.2 dB
Thermal Shock	FOTP-3	0.2 dB

Humidity	FOTP-5	0.2 dB

E. Approved manufacturers. Ortronics, Corning, Belden, Panduit, Siemon, Leviton, CommScope or 3M

2.14 FIBER OPTICS SPLICES

A. When fiber splicing is required in the project because of the use of pigtails or field splicing, only fusion splicing will be acceptable. Mechanical splices shall not be used unless specifically indicated in the contract documents.

B. All fiber splices shall be terminated with heat shrink sleeves and organized in splice trays. Splice trays sizes shall be selected to match the quantity of fiber strands in the cable bundles. Splice trays shall be organized in Fiber Optics Distribution Centers when inside a telecom room or in outdoor rated splice closures when done outdoors.

C. Fusion splice equipment to be used in this project shall have the following specifications:
1. Alignment system: Automatic Core Detection system (ACD). V-groove splicers are not allowed.
2. Typical splice loss for single mode fibers: 0.02 dB
3. Splice loss result: Estimated (ACD)
4. Unit shall have a fast heat shrink oven, maintenance free electrodes, built in cleaver and graphical user interface to display alignment condition.
5. Cleaver blade type: diamond.

2.15 INSIDE PREMISE FIBER OPTICS HORIZONTAL CABLES

A. Telecommunications outlets could have fiber optic terminations. Whenever design drawings indicate fiber optic terminations, inside premise fiber optic horizontal cables shall be used. The following are the specifications for fiber optic horizontal cables:
1. Strand Count: Two (2) strands
2. Fiber type: OM1 OM2 OM3 OM4 OS1/OS2 as indicated in design drawings
3. Fiber coating: 900µm coating color coded
4. Fiber protection: aramid yarn
5. Jacket type: 2.9mm flame-retardant PVC jacket zip-cord type.
6. Color jacket: jacket shall be orange for OM1 or OM2 fiber, aqua for OM3 or OM4 fiber and yellow for OS1 or OS2 fiber.

B. Jacket: Cable jackets for fiber optic cables shall comply with Article 770 NEC for correct use in the environment in which they will be used. If at the moment of the bid the SCS installer does not know the environment, in which cables will be used, the SCS installer shall assume plenum rated is required for the project. At a minimum all cables shall have a flame retardant PVC jacket riser rated. Rating shall be printed in the cable jacket.

C. OSP Jackets: All fiber optic horizontal cables run in conduits below the floor slab shall have a water resistant flooding compound and a jacket made of UV resistant polyethylene. Cables with PVC jackets are not acceptable with this application.

D. Approved manufacturers. Match selection for horizontal 4-pair cable

2.16 FIBER OPTIC DISTRIBUTION CENTERS

A. All fiber optic cables shall be terminated in fiber optic distribution centers. Inside premises horizontal fiber optic cables shall be terminated in one side (telecommunication room side) in a fiber optics distribution center (FODC). Backbone fiber optic distribution centers shall be terminated at both ends in a FODC. FODC are composed of an enclosure and snap on adapters. These are the specifications of the enclosures for the FODC:
   1. Mounting: Use rack mounted FODC enclosures in all rooms where racks are available or any type of rack rails. Use wall mounted FODC enclosures only when racks are not available like in outdoor enclosures, or other spaces different than telecom rooms.
   2. Size: SCS Installer shall size the FODC based on the amount of fiber strands to be terminated in the FODC.
   3. Front locking doors are required.
   4. Locking door shall be transparent doors and shall have labeling cards.
   5. Whenever fiber splices are indicated in the design drawings next to an FODC, enclosures shall be selected by the SCS installer as to have spaces to hold splice trays. FODCs under these conditions shall be able to hold the amount of splice trays required for the fiber count indicated in the drawings.

B. These are the specifications of the snap on adapters for the FODC:
   1. Style: plate style
   2. Connector type: LC to match fiber types of fiber optic cables
   3. Maximum fiber strands allowed per adapter: 24
   4. Security level: non-keyed connector
   5. Pairing style: duplex

C. Approved manufacturers. Match selection for fiber optic connectors

2.17 FIBER OPTICS PATCH CORDS

A. Fiber optic patch cords shall be required for connections from active equipment to FODCs and/or to telecommunication outlets. Fiber optic patch cords shall be required at both ends of fiber optics backbone cables or horizontal fiber optic cables. Direct connection of backbone cables or horizontal fiber optic cables to active equipment shall not be allowed.

B. Fiber optic patch cords shall be all factory tested. Field made fiber optic patch cords are not acceptable. The specifications of the fiber optic patch cords shall be:
   1. Strand Count: 2 strands
   2. Fiber type: Match fiber type of backbone cable or horizontal cable.
   3. Fiber connector in FODC or outlet side: match connector for each adapter
   4. Fiber connector in active equipment side: the SCS installer shall coordinate with supplier of equipment the type of connector required in this side.
   5. Fiber protection: aramid yarn
   6. Jacket type: 2.9mm flame-retardant PVC jacket zip-cord type.
   7. Color jacket: jacket shall be orange for OM1 or OM2 fiber, aqua for OM3 or OM4 fiber and yellow for OS1 or OS2 fiber.

C. Approved manufacturers. Match selection for fiber optic connectors

2.18 EQUIPMENT CABINETS

A. Whenever indicated in the design drawings equipment cabinets shall be provided as shown. Equipment cabinets shall be made of all welded steel frames and shall have a powder coat finish. Equipment cabinets shall have the following specifications:
   1. Cabinet construction material: Welded and bolted steel frame.
   2. Footprint: 31”x42” ±1”
   3. Height: Equipment cabinet shall provide a usable height between 44 and 45 RU.
   4. Rack rails type: standards EIA 19” square holes with cage nut rail located in the front and back of cabinet. Rack rails shall be adjustable for depth and shall have RU marked and labeled.
   5. Rack screw type: cage nuts clipped to rack rails. Nuts and screws shall be provided for all slots in rack rails and shall be made of steel threaded as #10-32.
   6. Side panels (end of row cabinet sides): solid steel, removable and lockable side panels.
   7. Side panels (between adjacent cabinets): solid steel, removable panels with openings for passing cables, covered with plastic removable caps, rubber caps or brush openings. No less than Eight (8) openings in total area of the side of the cabinet. Each opening shall be no less than 34 sq inches.
   8. Top panel: solid steel with no less than four (4) brush protected openings for cables. Each opening shall be no less than 34 sq inches.
   9. Bottom panel: solid steel with no less than two (2) brush protected openings for cables. Each opening shall be no less than 34 sq inches. For cabinets with top exhaust duct, a bottom air director shall be provided in the back side of the cabinets to force air up towards the exhaust duct.
   10. Door hinge supports shall be provided at both sides of the racks and front and back to be able to reverse doors.
   11. Grounding: Prepared location for ground lug at the top and bottom of the cabinet frame. Door shall include bonding jumper to cabinet.
   12. Weight capacity: UL listed for 2500 lb
   13. Finish: Epoxy-polyester hybrid powder coat paint on frame, rails, panels and metal accessories:
   14. Finish color: White for all parts of the cabinet

B. Equipment cabinets shall be provided with the following accessories:
   1. Front 78% perforated panel hinged door with key lock.
   2. Rear 78% perforated panel split hinged doors with lock.
   3. Locking system: locks for front and rear doors shall be two point latching locks and shall be keyed identically for front and rear lock. All locks for cabinets for each user ground shall be keyed alike but different between user groups.
   4. Leveling feet and any accessories required to be able to bolt the cabinet to the floor with ½” screws or rods.
   5. Vertical wire managers covering the full height of the rack rails. Two in the front. Vertical wire managers shall be selected as recommended by equipment cabinet manufacturer to avoid obstructions to rack rails or doors. Vertical wire managers shall have brush openings to run cables between front and back of cabinet and shall have all openings sealed to avoid air leakage between front and back.
   6. PDU bracket: PDU brackets shall be provided in each cabinet according to the number of vertical PDUs programmed to be installed in each cabinet. See drawings for quantities. These brackets shall be selected by the SCS installer as to match the support holes of the PDU selection for each cabinet.
   7. All cabinets with equipment installed with substantial amount of cables terminating in the rear of the equipment, such as audio/visual systems and security systems shall be provided with enough cable lashing metal brackets to strap all cables to the frame for proper organization and support.

8. Ground bar: all cabinets shall be provided with a copper vertical ground bar covering the complete length of the rack rails. The ground bar shall be 1/8” thick and 1” wide with threated holes 10-32 mounted to the cabinet using nylon insulation washers

C. Required equipment cabinet certifications: Complaint with EIA 310-E and UL 2416 listed

D. Airflow re-director: The manufacturer of the equipment cabinet shall offer an air flow re-director kit for the type of cabinet selected for this project to allow for changing air flow direction of equipment designed for side to side ventilation. The SCS installer shall provide air flow re director kits for all cabinets in the plans with Core switches or network equipment.

E. Field cuts or openings. Any cabinets with field cuts or perforations will be rejected and the SCS installer shall provide a new cabinet to remedy the condition.

F. Approved manufacturer: Panduit, Ortronics, Eaton, Belden, Middle Atlantic Products, Great Lakes, Chatsworth Products Inc. or approved equal.

2.19 QUAD POST RACKS

A. Whenever indicated in the design drawings quad post racks shall be provided as shown. Quad post racks shall be made of aluminum or welded steel frames and shall have a powder coat finish. Quad post racks shall have the following specifications:
1. Depth adjustment: rack rails shall be adjustable from 12.5” to 30” in depth, independent of the structural members allowing racks rails adjustment after racks are anchored.
2. Height: Equipment cabinet shall provide a usable height between 44 and 45 RU.
3. Rack rails type: standards EIA 19” square holes located in the front and back of rack. Rack rails shall have RU marked and labeled.
4. Rack screw type: cage nuts clipped to rack rails. Nuts and screws shall be provided for all slots in rack rails and shall be made of steel threaded as #10-32.
5. Weight capacity: UL listed for 1200 lb or more.

B. Quad post racks shall be provided with the following accessories:
1. Base dust covers that prevent accumulation of dust and debris in rack base.
2. Cable runway mounting brackets to support cable runway installed above racks
3. Isolation pads.
4. Grounding kit.
5. Ground bar: all cabinets shall be provided with a copper vertical ground bar covering the complete length of the rack rails. The ground bar shall be 1/8" thick and 1" wide with threated holes 1032 mounted to the cabinet using nylon insulation washers
6. End panels to support vertical wire managers at the end of each rack row.

C. Front vertical wire managers shall be provided in between all racks and at both ends of rack rows covering from top to bottom of each rack. The specifications of those wire managers shall be:
1. Style: Metal cage with dual hinged door cover
2. Sides: single sided wire manager (front only).
3. Capacity: Usable cross sectional area shall be minimum of: 48 sq-in.
4. Accessories: whenever cable manager supports the use of spools inside the unit, spools shall be provided at all locations in the unit.

D. Rear vertical wire managers shall be provided in between all racks and at both ends of rack rows covering from top to bottom of each rack. The specifications of those wire managers shall be:
1. Style: cage with latches

2. Sides: single sided wire manager (rear only).
3. Capacity: Usable cross sectional area shall be a minimum of: 24 sq-in
4. Accessories: whenever cable manager supports the use of spools inside the unit, spools shall be provided at all locations in the unit.

E. Approved manufacturer: Ortronics Mighty Mo 20 with 24” deep channel.

2.20 POWER DISTRIBUTION UNITS (PDUs)

A. All equipment cabinets or racks in the project shall be provided with at least one PDU. PDUs selection shall be as indicated in design drawings.

B. The following specifications are required for all types of PDUs:
1. PDU MONITORING: Unit level monitoring
2. PDU SWITCHING: Not required
3. MONITORING PARAMETERS: All units shall have monitoring through an IP Ethernet line, unless specifically indicated in the description of each PDU. The monitoring shall include the following parameters:
   a. Current and voltage for each phase available in the unit
   b. Peak Voltage, peak current and power factor for each phase available in the unit
4. MONITORING SPECIFICATIONS:
   a. Unit shall have an LCD display to show all monitoring settings with scrolling capabilities.
   b. All PDUs and power transfer shall be the same brand and they should be monitored with the same DCIM software.
   c. The unit shall be provided with no less than two ports for environmental sensors such as temperature, humidity, etc. Two temperature sensors shall be provided with each unit, to be located one in the front of the rack and one in the back of the rack.
   d. The unit shall be capable of using threshold remote alarms through e-mail, SNMP traps or XML.
5. All devices shall have a continuous operating temperature range of 50 to 113 DEGF.

C. For each equipment cabinets and two for all 3 quad post racks:
1. Power strip capacity: 120/208V 30A
2. Quantity of power outlets: No less than 30
3. Power outlet configuration: Two (2) C19 @ 208V, Twelve (12) C13 @208V and (16) NEMA 5-20R
4. Strip power cord plug: NEMA L14-30
5. Breaker: built in thermal breaker with guard protection. Capacity to match power strip capacity
6. Monitoring: digital display included with readings of amperage and voltage
7. Surge suppression: included and built-in.
8. Listing: UL listed
9. Mounting: vertically mounted, not occupying any rack space, with mounting accessories. The installation of the power strip shall not prevent the removal or installation of equipment in the rack.

2.21 Approved manufacturer: APC, Legrand (Raritan), Eaton or Approved equal

2.22 RACK MOUNTED UNINTERUPTED POWER SUPPLY (UPS)

A. All equipment cabinets or racks in the project shall be provided with one uninterrupted power supply (UPS). UPS selection per rack shall be as indicated in design drawings. The following descriptions apply to each type of UPS:

B. UPS units labeled in drawings as “208V UPS” shall have the following specifications:
1. Output power capacity: 4200 W/ 12kVA scalable up to 16kVA
2. Output voltage: 120V and 208V, using a transformer
3. Efficiency at full load: 95%
4. Output voltage distortion: Less than 5% at full load
5. Output Frequency: (sync to mains) 57 - 63 Hz for 60 Hz nominal
6. Topology: Double Conversion online
7. Waveform Type: Sine wave
8. Output Connections: (4) NEMA 5-20R, (1) NEMA L14-30R and (1) L6-30
9. Nominal Input Voltage 120/208V
10. Input Frequency 50/60 Hz +/- 5 Hz (auto sensing)
11. Input Connections NEMA L14-30
12. Battery Type Maintenance-free sealed Lead-Acid battery with suspended electrolyte, leak-proof.
13. Run time: 9 minutes at full load
14. Communications: RJ-45 10 Base-T Ethernet for web/ SNMP/ Telnet management included.
15. Surge energy rating 1020 Joules
16. Filtering Full time multi-pole noise filtering : 0.3% IEEE surge let-through : zero clamping response time : meets UL 1449
17. Rack Height: no bigger than 7U, including transformer
18. Regulatory Approvals CSA, FCC Part 15 Class A, UL 1778.

C. Approved manufacturers: APC, Tripplite or approved equal

2.23 MEDIA CONVERTERS

A. General. When telecommunications outlets exceed distance limitations to pass testing requirements, the SCS installer shall provide media converters and fiber optics connectivity to overcome this problem. The media converters shall have the following specifications:
1. Power: All power for media converters in the field end (i.e. camera or WAP side) shall be powered from the Telecom room side using a hybrid cable. Local power adapters for media converters are not acceptable in the field end.
2. Cabling: A composite cable shall be used for these devices. This composite cable shall have a minimum of 2 strands of fiber optics and 1 pair of copper cable AWG-12 for the remote end power. The quantity of fiber strands for this cable shall be as required by the type of media converter used. The fiber types shall be as required by the media converter. The cable jack for this composite cable shall be selected as required for the application. Any cables being pulled underground shall have a water blocking jacket.
3. Port count: Media converters with 1 port or 4 ports are acceptable.
4. PoE support: Media converters shall support PoE without the need of an external power adapter and the field end.
5. Fiber connection speed. Media converters shall support 1GB connections in the fiber port.

6. PoE capacity: Media converters shall support PoE+ (30W) for all outdoor cameras and all WAPs. Media converter shall support 15,4 W for all other PoE devices.
7. Power supplies: Media converters shall be provided with the corresponding power supplies at the telecom room.

B. Basis of design; Berk-Tek One Reach solutions or similar.

2.24 CABLE TIES

A. Cable ties shall be used at different locations of the project but with the same goal of producing a neat and organized installation. Cable ties shall be used to support cables to j-hooks (when j-hooks are allowed in the project) to organize cables in ladder trays, D-rings and cable trays, to support cables to wire managers including managers behind patch panels, to bundle cables, organize patch cords, etc.

B. To support and organize all horizontal cabling and inside premise backbone cables, only the following types of cable ties shall be used:
1. Hook and loop style, re-usable with Velcro no smaller than 0.5” width.
2. Pre-perforated rolls of re-usable ties with Velcro no smaller than 0.5” width
3. Straps of other soft materials with cinch rings that allow for re-use of the cable ties in widths no smaller than 0.85”.

C. Nylon based cable ties (re-usable or not) can only be used to support and organize the following types of cables:
1. Outside plant fiber and copper backbone cables.
2. Inside premise fiber optic backbone cables with interlock armors.
3. Grounding conductors

D. Nylon based cable ties shall never be used to support or organize any type of horizontal cables or inside premise fiber optic backbone cable without armor.

E. All cable ties to be used in outdoor environments shall be made of weather resistant Acetal. Outdoor cable ties used for aerial cable lacing shall be in compliance with Telcordia TR-TSY-000789 standard.

F. All cable ties shall be selected in lengths as to properly secure the bundle of cable being supported.

G. All cable ties to be used in air handling spaces, such as above ceiling and under raised floor areas, shall be UL listed for the use in those environments.

H. Approved manufactures: Ortronics, Panduit or approved equal

2.25 IDENTIFICATION AND LABELING TAGS

A. SCS installer shall follow labeling materials indicated in specification section 270010.

PART 3 - EXECUTION

3.1 INSTALLATION PRACTICES.

A. GENERAL. All installation requirements indicated in specification section 270010 shall be followed.

B. WORKMANSHIP. All work shall be completed by the SCS installer in a neat and workmanlike manner. The use of all BICSI standards and recommendations for installation shall be followed as the benchmark for workmanship.

C. CABLE LENGTHS. It is the SCS installer’s responsibility to plan the cable routing in the cable tray and other raceways as to minimize all cable runs to be able to stay under the 90 meter (295 ft) length limitation for Horizontal Cabling. All cable runs exceeding the wiring distance, due to raceways run in not the most efficient way to minimize distance, shall be re-run with horizontal fiber optic cables and with media converters, at no extra cost to the owner.

D. WIRE MAPPING. All terminations of 4-pair horizontal cabling in this project and terminations of all 4-pair patch cords shall be per T568B standard.

E. FIBER OPTICS TERMINATION POLARITY. All fiber optic cables (horizontal or backbone) terminated in duplex style adapter panels shall be connected in a cross-over polarity configuration. As an example, if fibers 1 and 2 are terminated in one end in positions A and B respectively in one side of the cable, the same strands shall be terminated in B and A positions in the other side of the cable.

F. POLARITY FOR FIBER OPTICS ARRAY CONNECTORS. Array connectors and cassettes for this project shall use Method C polarity system as outline in TIA-568.B.1

G. LOCATION OF HORIZONTAL TERMINATIONS. In a multi-story facility with telecommunications room in every floor, all horizontal drops, whether terminated in the wall or in floor boxes shall be terminated in the same floor telecommunications room as the location of the final outlet.

H. CABLE BUNDLES. In suspended ceiling and raised floor areas if duct, cable trays or conduits are shown on the contract drawings, the SCS installer shall bundle, in bundles of 40 or less, horizontal wiring with cable ties snug, but not deforming the cable geometry. The cable bundling shall be supported via "CLIC" fasteners in TR’s and non-plenum areas and J-hooks in ceiling spaces. The SCS installer shall adhere to the manufacturers' requirements for bending radius and pulling tension of all cables.

I. CLIC FASTENERS: Horizontal cables shall be suspended by "CLIC" fasteners with cable inserts in TR’s on the plywood area where ladder tray or rack management is not available per the design documents. Listings: "CLIC" fasteners shall be in accordance with NEC and BICSI standards. Above the plywood area J-hooks or D-rings should be used.

J. FIRE STOP PROTECTION: Sealing of openings between floors, through rated fire and smoke walls, existing or created by the SCS installer for cable pass through shall be the responsibility of the SCS installer. Sealing material and application of this material shall be accomplished in such a manner, which is acceptable to the local fire and building authorities having jurisdiction over this work. Creation of such openings as are necessary for cable passage between locations as shown on the drawings shall be the responsibility of the SCS Installer's work. Any openings created by or for the SCS installer and left unused shall also be sealed as part of this work. Penetration rating shall equal structure rating.

K. NEW MATERIALS: All components, wiring and materials to be used for the installation of the SCS shall be new and free of defects. Used components, wiring and materials shall only be used when specifically indicated in the design drawings.

L. DAMAGE: The SCS Installer shall be responsible for any damage to any surfaces or work disrupted as a result of his work. Repair of surfaces including painting and ceiling tile replacement shall be included as part of this contract.

M. AVODING EMI: To avoid EMI, all pathways shall provide clearances of at least 4 feet (1.2 meters) from motors or transformers; 1 foot (0.3 meter) from conduit and cables used for electrical-power distribution; and 5 inches (12 centimeters) from fluorescent lighting. Pathways shall cross perpendicular to fluorescent lighting and electrical-power cables and conduits. The SCS installer shall not place any distribution cabling alongside power lines, or share the same conduit, channel or sleeve with electrical apparatus.

N. WORK EXTERNAL TO THE BUILDING: Any work external to the confines of this building as shown on the drawings shall be governed by the provisions of this specification.

O. DEMOLITION. Any task part of the installation of the SCS requiring relocation, rerouting and/or demolition shall be done according to the following requirements:
1. Coordination: Prior to any deactivation and relocation or demolition work, arrange a conference with the Architect and the Owner's representative in the field to inspect each of the items to be deactivated, removed or relocated. Care shall be taken to protect all equipment designated to be relocated and reused or to remain in operation and be integrated with the new systems.
2. Provisions: All deactivation, relocation, and temporary tie-ins shall be provided by the SCS installer. All demolition, removal and the legal disposal of demolished materials of system designated to be demolished shall be provided by the SCS installer.
3. All Existing Voice/Data cables and connecting hardware not to be used after the new installation is complete and within the areas where work is required as part of this project shall be removed by the SCS installer. All existing cables to be left for future use if indicated by the owner shall be tagged for that purpose.
4. Owners Salvage: The Owner reserves the right to inspect the material scheduled for removal and salvage any items he deems usable as spare parts.
5. Phasing: The SCS installer shall perform all work in phases as directed by the Architect to suit the project progress schedule, as well as the completion date of the project.

P. ICONS. Faceplates, jacks or patch panels with inserts for icons shall be filled with icons when unit capable of accepting icons. Icons in the work area side (outlet) shall match the color of the faceplate.

Q. BLANK INSERTS AND PANELS. All telecommunications outlets with faceplates or mounting frames with unused terminations shall be plugged with blank inserts or panels. Blank inserts shall match the color of the faceplate or mounting frame. No more than one blank module shall be required for each faceplate. All unused ports in the FODC enclosures for adapter panels shall be filled with blank adapter panels.

R. PATCH PANEL AND FODC SEPARATION: Horizontal cables shall be terminated in separate patch panels according to the use of the cable. Each series of patch panels or FODC for a specific use shall have at least 20% spare capacity of ports. Patch panels of the same use shall be mounted consecutive in the equipment cabinets or racks. The following separation for patch panels and FODCs shall be provided:
1. Cables for Wireless Access Points (WAPS) shall be separated from cables for any other purpose.
2. Cables for surveillance cameras shall be separated from cables for any other purpose.

3. Cables for voice drops shall be separated from cables for data drops.
4. Cables for any other specialty systems like security systems, nurse call systems or others shall all be terminated in separate patch panels from any other cables.
5. Horizontal fiber optic cables shall be terminated in separate FODC from fiber optics backbone cables.
6. Single mode fiber optic backbone cables shall be terminated in separate FODC from multimode fiber optic backbone cables.

S. SUPPORTS FOR REAR OF PATCH PANELS. All patch panels for horizontal cables shall be provided with a rear support bar to hold the cable and to provide strain relief. At a minimum one rear support bars shall be provided for each two rows of 24 connectors.

T. HORIZONTAL WIRE MANAGERS. Horizontal wire managers shall be provided following this criteria:
1. At least one above and below each straight (flat) patch panel.
2. At least one top and bottom of each series of angled or curved patch panels.
3. At least one above and below any network switches.
4. At least one below any rack mounted termination block.

U. CROSS OVER WIRE MANAGERS. Cross over wire managers shall always be used with angled or curved patch panels. One cross over wire manager shall always be installed in the middle of each rack at the same height on every rack.

V. PATCH CORD QUANTITY, COLOR AND LENGTHS. Copper and fiber optics patch cords shall be provided per following chart. All percentage calculations shall be rounded off to the nearest integer number.

TYPE	QTY	COLOR JACKET	LEGTH
4-pair at work area outlet	One for 90% of all 4-pair horizontal cables in the project	Match horizontal cable color jacket	30% 8’, 50% 10’ and 20% 14’
4-pair at WAP location	One for 100% of all 4-pair horizontal cables for WAPS in the project + 10% spare	Match horizontal cable color jacket	The SCS installer shall field verify all lengths to match location of WAPS selected by owner or wireless survey. For pricing purposes use 12’
4-pair at Surveillance camera	One for 100% of all 4-pair horizontal cables for cameras in the project +10%	Match horizontal cable color jacket	The SCS installer shall field verify all lengths to match location of cameras. For pricing purposes use 12’
4-pair at patch panel side (excluding surveillance cameras and WAPS)	One for 90% of all 4-pair horizontal cables in the project	Match horizontal cable color jacket .	For pricing purposes use: 40% 6’, 40% 8’, 20% 12’. SCS installer shall field verify these percentages to provide more accuracy.
4-pair at patch panel side (surveillance cameras and WAPS)	One for 100% of all 4-pair horizontal cables in the project +10%	Match horizontal cable color jacket .	For pricing purposes use: 40% 6’, 40% 8’, 20% 12’. SCS installer shall field verify these percentages to provide more accuracy.
2-strand fiber optics at work area outlet	One for 100% of all 2-strand horizontal fiber cables in the project + 10% spare	Per fiber type	50% 8’ and 50% 10’

2-strand fiber optics at FODC.	One for 100% of all horizontal 2-strand fiber cables and one for 83% of all fiber strands of backbone cables in the project. For example a 24 strand cable shall require 20-2-strand patch cords or 10 for each side of the cable	Per fiber type	For pricing purposes use: 20% 6', 60% 10'. 20% 14' SCS installer shall field verify these percentages to provide more accuracy.

W. CABLE SLACK. Cable slack shall be provided for all cables in the project following this guideline:
1. At each work area outlets, all horizontal cables shall have 12" of slack.
2. At the telecom room side all horizontal cables shall have at least 6' neatly organized on the wall using a figure 8 configuration or a non-loop shaped arrangement with Velcro straps.
3. Backbone cables at termination points shall have at least 15' of slack neatly organized on the wall using a standard loop and Velcro straps.
4. Outside plant backbone cables run through in-ground pull boxes greater than 24"X24" shall include one service loop inside the box.

X. BEND RADIUS. Installation of Fiber Optic Cables shall be in accordance with ANSI/TIA-568C guidelines and cable manufacturer specifications. Bend radius parameters shall be followed for load and no load conditions. Cable installation and terminations that do not comply shall be replaced by the SCS installer. If no recommendation is specified by cable manufacturer, at least the following criteria shall be meet:
1. The bend radius for intrabuilding 2 and 4-fiber horizontal optical fiber cable shall not be less than 25 mm (1 in) under no-load conditions. When under a maximum tensile load of 222 N (50lbf), the bend radius shall not be less than 50 mm (2 in).
2. The bend radius for intrabuilding optical fiber backbone with fiber counts above 4 shall not be less than 10 times the cable outside diameter under no-load conditions and no less than 15 times the cable outside diameter when the cable is under tensile load.
3. The bend radius for interbuilding optical fiber backbone shall not be less than 10 times the cable outside diameter under no-load conditions and no less than 20 times the cable outside diameter when the cable is under tensile load up to the rating of the cable, usually 2670 N (600lbf).

Y. INNERDUCT. Innerduct shall be provided from end to end of a raceway system under the following conditions:
1. Inside underground conduits as indicated in design drawings.
2. For horizontal fiber optic cable or inside premise fiber optics backbone cables without interlocking armor when routed through cable trays, ladder trays or vertical conduit sleeves. This requirement is usually not indicated in the drawings but indicated only in this specification.
3. For backbone fiber optic cable in vertical risers

Z. SCS PROTECTION DURING CONSTRUCTION. The SCS installer shall protect all SCS materials from damage during construction. Racks shall be covered with fabric or plastic after mounting to prevent dust, debris and other foreign materials having contact with SCS devices. The SCS installer shall protect at all times all fiber optic and copper cables from damage during installation. All cables shall maintain the physical integrity as manufactured for testing and delivery to the owner. All damaged cables shall be replaced at no additional cost to the owner.

AA. CABLE BONDING. Shielded cables or cables with metal strength or protection members (like interlocking armor) shall be bonded to the telecommunications grounding system as indicated in specification section 270526.

BB. RACK INSTALATION. All racks shall be installed leveled and plumbed. Four post racks and two post racks shall be anchored to the floor and shall be installed with isolation pads. Equipment cabinets shall be leveled using the leveling feet unless design drawings specifically indicate to leave them on the casters.

CC. RACK BONDING. All equipment cabinets and racks shall be bonded to the telecommunication grounding system as indicated in specification section 270526

3.2 IDENTIFICATION AND TAGGING

A. General: Identification and tagging of SCS components shall be executed by the SCS installer. At a minimum identification and tagging shall be provided for the following components of the system:
1. All horizontal and backbone cables at both ends of the cable in the cable jacket. Labels on each side shall be different indicating the location of the other side of the cable
2. All faceplates indicating all jacks terminated in the faceplate.
3. All patch panels.
4. All racks
5. All termination blocks
6. All telecommunication rooms and outdoor enclosures.
7. All interbuilding backbone cables inside in ground pull boxes outside of the building shall have a visible label in each box they pass through.

B. The SCS installer shall follow the owner provided identification system. If owner does not have any preference or standard the SCS installer shall provide a system for approval of the A&E and the owner as indicated in the submittal paragraph of this specification. The identification system shall follow the TIA/EIA 606-B standard.

3.3 TESTING OF COPPER CABLING

A. General: Horizontal and backbone cabling shall be verified in accordance with ANSI/TIA/EIA-568-C, Cabling Transmission Performance and Test Requirements.

B. For all 4-pair copper cabling terminated for the use of building systems or system provided under the contract, such as surveillance cameras, emergency phones, elevator phones, WAPs, Access control panels and building automation equipment, the required test shall be a Channel style test. This means copper test shall be done with patch cords that will be used for permanent installation of those devices.

C. For all 4-pair copper terminated for the use in work areas such as computers and phones, the test method selected for all 4-pair copper cabling is a permanent link style test. Permanent link test is defined as a test that does not include the patch cords to be used in the project.

D. General: In the event the A&E elects to be present during the tests, provide notification to the engineer two weeks prior to testing.

E. General: The installer’s RCDD shall sign off on all copper and fiber optic cable test results, indicating that he/she was in responsible charge of all cable testing procedures and that all

cables were tested in compliance with the contract documents and met or exceeded the requirements stated herein.

F. Testing Equipment: Tester shall be as manufactured by Agilent, Fluke, IDEAL or Wavetek. Tester shall be 100% Level IIIe compliant with ANSI/EIA/TIA 568C specifications for testing of the CAT6A cabling. No tester will be approved without meeting these requirements.

G. Each jack in each outlet shall be tested at a minimum to the manufacturer's performance of the cable to verify the integrity of all conductors and the correctness of the termination sequence. Testing shall be performed between work-areas and the equipment rack patch panel. Prior to testing UTP runs, the tester shall be calibrated per manufacturer guidelines. The correct cable NVP shall be entered into tester to assure proper length and attenuation readings.

H. Documentation of cable testing shall be required. The SCS installer shall provide the results of all cable tests in electronic format (final results in PDF format and raw data). Each test page shall be separated by standard page break (one test per page). The test results shall include: sweep tests, continuity, polarity checks, wire map, Attenuation, NEXT, PSNEXT, FEXT, PSFEXT, ELFEXT, PSELFEXT, ACR, Return Loss, Delay Skew, and the installed length. Cables not complying with the EIA/TIA 568C tests results shall be identified to the A&E for corrective action which may include replacement at no additional expense to the Owner. All identification names of the cables used in the test shall match the labeling system approved for the project and the corresponding shop drawings.

I. Any Fail, Fail*, Pass* or WARNING test result yields a Fail for the channel or permanent link under test. In order to achieve an overall Pass condition, the result for each individual test parameter must be passed. All test results shall come from a tester with the permanently enabled marginal reporting feature.

J. Test results shall show and comply with the margin claimed by the manufacturers over CAT6A permanent link specifications on all transmission parameters across the entire frequency range as shown on the manufacturer's cut sheets.

K. General: Copper multipair backbone cabling shall be tested for length, continuity, polarity checks and wire map. The SCS Installer shall provide the results of all Copper Riser cable tests in electronic format. The use of pigtails or special harness could be required to properly test these cables.

L. Trained technicians who have successfully attended an appropriate training program and have obtained a certificate as proof thereof shall execute the tests.

M. All 4-pair patch cords shall be factory tested only.

3.4 TESTING OF FIBER OPTICS CABLING

A. General: Horizontal and backbone cabling shall be verified in accordance with ANSI/TIA/EIA-568-C and the addendum for fiber optic testing.

B. General: In the event the Engineer elects to be present during the tests, provide notification to the engineer two (2) weeks prior to testing.

C. Cleanness: All fiber optics connector shall be cleaned properly before any testing and after testing. Proof of cleanness shall be required during the acceptance test for the SCS by the A&E. SCS installer shall have available during this test a 200X microscope or a video probe to demonstrate the cleanness of the randomly selected connectors by the A&E.

D. End to End Attenuation Test: The SCS installer shall perform end-to-end attenuation testing for each multimode fiber at 850 nm and 1300 nm from both directions for each terminated fiber span in accordance with EIA/TIA-526-14A (OFSTP 14) and single-mode fibers at 1310 nm and 1550 nm from both directions for each terminated fiber span in accordance with TIA/EIA-526-7 (OFSTP 7). A one jumper reference shall be used for all testing. For spans greater than 90 meters, each tested span must test to a value less than or equal to the value determined by calculating a link loss budget. For horizontal spans less than or equal to 90 meters, each tested span must be < 2.0 dB. When calculating the link loss budget for spans greater than 90 meters use the values listed below. End to end attenuation shall be done with a Level II meter using a meter and light source equipment (also known as main and remote unit)

ATTENUATION DUE TO	FIBER TYPE	MAX. ATTENUATION
Terminating connectors. Field terminated options	All fiber types	0.75 dB per connector
Terminating connectors, pre-term fibers	All fiber types	No more than 0.2 dB additional to total dB loss measured at the factory in report sent by cable manufacturer.
Splices	All fiber types	0.3 dB per splice
Distance	OM1 (850nm/1300)	3.4 dB /1.0 dB per Km.
Distance	OM2, OM3 and OM4 (850nm/1300)	3.0 dB /1.0 dB per Km.
Distance	OS1 and OS2 (1310 nm/1383 nm/1550 nm)	0.65 dB /0.65 dB/ 0.5 dB per Km.

E. OTDR Test. Additional to end to end attenuation test, all fiber optic cables shall be tested with a Level III OTDR equipment for the following conditions:
1. Each known event (connector/splice) insertion loss at both windows for each fiber type (850/1300 nm for multimode and 1310/1550 nm for single mode). All events shall pass maximum allowed insertion loss for the event type as indicated in table above.
2. Reflective events (connections) shall not exceed:
   a. 0.75 dB in optical loss when bi-directionally averaged
   b. -35 dB Reflectance for multimode connections
   c. -40 dB reflectance for UPC singlemode connections
   d. -55 dB reflectance for APC singlemode connections
3. Non-reflective events (splices) shall not exceed 0.3 dB.
4. Estimated distance for multiple strands of the same cable shall not vary more than 1% between strands.
5. Cable signature in the form of traces along the complete distance of the cable. Unexplained cable reflections shown in the OTDR shall require the installer to submit letter explaining such events and pictures of cable conditions in the locations where the unexplained events are located to demonstrate cable has not been kinked or damaged during installation.

F. OTDR Test conditions. All OTDR testing shall be performed with the following conditions:
1. Use a launch cable and a tail cable in accordance with fiber type being tested and requirements indicated by OTDR equipment manufacturer.
2. Launch and tail cables shall be products sold by testing equipment manufacturer and not field made cables.
3. Launch and tail cables shall be selected according to the type of connector being tested such as APC or UPC type connectors.
4. Use launch compensation mode during the test to subtract the effects of the launch and tail cables.

5. Test from one direction only, unless the presence of “gainers” are spotted during the test. In such case the installer shall test in both directions and adjust the test equipment to average measurements from both directions.
6. The SCS installer shall verify the backscatter coefficient use in the test to make sure it matches the coefficient of the cable being tested.

G. OTDR Testing Equipment used on this project shall have the specifications indicated in this following table:

SPECIFICATION	MULTIMODE	SINGLE MODE
Wavelengths	850 nm ±10 nm 1300 nm +35 / -15 nm.	1310 nm ±25 nm. 1550 nm ±30 nm.
Event Dead Zone. Measured at 1.5 dB below non-saturating reflection peak with the shortest pulse width. Reflection peak < -40 dB for mm and < -50 dB for sm.	850 nm: 0.5m typical 1300 nm: 0.7m typical	1310 nm: 0.6m typical 1550 nm: 0.6m typical
Attenuation Dead Zone. Measured at ± 0.5 dB deviation from backscatter with the shortest pulse width. Reflection peak < -40 dB for mm. and < -50 dB for sm.	850 nm: 2.2m typical 1300 nm: 4.5m typical	1310 nm: 3.6m typical 1550 nm: 3.7m typical
Pulse Widths (nominal)	850 nm: 3, 5, 20, 40, 200 ns. 1300 nm: 3, 5, 20, 40, 200, 1000 ns.	3, 10, 30, 100, 300, 1000, 3000, 10000, 20000 ns
Loss Threshold Setting	0.01 dB to 1.5 dB Adjustable in 0.01 dB increments	0.01 dB to 1.5 dB Adjustable in 0.01 dB increments

H. The Test Report for each fiber strand shall include the following information:
1. Calculated Loss Budget for each optical fiber link (see attenuation table above)
2. Cable/strand ID matching shop drawings labeling system.
3. Name of technicians who performed the test.
4. Date and time the test was performed.
5. Measurement direction (from/to)
6. Jumper reference set up date/time and attenuation value
7. Equipment model and serial number used and calibration date.
8. End to End Attenuation Loss Data for each optical fiber link
9. OTDR Traces, one page per strand. Expand chart to cover most of the page
10. Each event loss data and test limits used, including test limit file date used.

I. For fiber optic cables with factory terminated connectors or pre-terminated pig-tails, The SCS installer shall provide also the test results performed at the factory for fiber optic cables with factory terminated connectors to compare with the field test done by the SCS installer. No significant variation between the factory test results and the field test results shall be encountered.

3.5 SYSTEMS WARRANTY AND SERVICE

A. SCS Installer shall follow all warranty and service requirements indicated in specification section 270010.

B. Warranty: The SCS shall be required to be under the manufacturer's warranty program for a complete channel configuration including cable, jacks, patch cords and patch panels and include cabling specifically approved for the channel configuration with the manufacturer's components. Manufactures shall provide the warranty worst-case performance data for the installed cabling system, and the performance data indicated in the warranty documents/certificate.

C. A twenty five (25) year warranty available for the Structured Cabling System (Fiber optics and copper infrastructure) shall be provided for an end-to-end channel model installation which covers applications assurance, cable, connecting hardware and the labor cost for the repair or replacement thereof.

D. Additional features of the warranty shall include:
   1. That the SCS installed system complies with the margin claimed by the manufacturer above the category 6A channel specifications on all transmission parameters across the entire frequency range of 1-600 MHz as shown on the manufacturers catalogs and literature.

3.6 ENGINEER'S FINAL ACCEPTANCE TEST

A. SCS Installer shall follow all requirements for final acceptance indicated in specification section 270010.

B. The Engineer's final acceptance test will not include testing of structured cabling components, but could include verification of cleanness of fiber optic connectors.

3.7 TRAINING AND INSTRUCTION

A. Training shall only be done after all testing and identification process have been completed and passed as indicated in this specification. Any training done prior to final acceptance will not be accounted for the formal training requested and the SCS installer shall re-do all training after the final acceptance test is passed, at no additional cost to the Owner.

B. SCS Installer shall follow all training requirements indicated in specification section 270010

C. The training for the SCS shall include the following topics:
   1. Detail explanation of the identification system.
   2. A walkthrough of all spaces and locations where terminations have been done in the project.

3.8 AS BUILT DOCUMENTS AND PROJECT CLOSE OUT

A. The SCS shall follow all requirements for as-build and close out documents indicated in specification section 270010

B. The following are additional requirements supplementing the information provided in specification section 270010:
   1. Provide the Warranty certificate issued by the manufacturer of the SCS infrastructure.
   2. The installer's RCDD shall affix his/her stamp to the as-built drawings, indicating that he/she has reviewed and approved the drawings as being complete, accurate, and representative of the system as actually installed.

3. As built drawings inside each telecom room. The SCS installer shall plot all as-built drawings and locate them inside each of the telecom rooms in the project. Each telecom room shall have the as-built drawings of the areas being served from that room. Each drawing shall be placed inside a clear vinyl document protector the size of the actual design drawing and affixed to a wall/plywood in the telecom room. The document protector shall be re-usable and shall allow the owner to replace the drawings as changes are done to the SCS infrastructure in the future. Without this information, substantial use of the system will not be provided to the installer.
4. The SCS installer shall provide Excel software spreadsheet that defines the telecommunications outlet number, location, number of voice, data and special jacks. This database shall also provide the outlet patch panel connection to the riser/inter-floor cable, equipment, and telephone company demarcation circuit pairs as part of the as-built documentation.
5. Electronic copies of all test results (copper and fiber). Electronic copies shall include raw data files and PDF files with results. PDF files shall be organized the following way:
    a. All copper cables for cables terminating in one telecom room in a single PDF files with the name equal to the label used in the shop drawings for the telecom room where the cables are terminated.
    b. All attenuation and OTDR test for all strands of a single cable shall be in one PDF file with the name corresponding to the Cable ID used in the shop drawings.

END OF SECTION 27 1000

SECTION 27 0526 – GROUNDING AND BONDING FOR TELECOMMUNICATIONS SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. General: Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work specified of this section.

B. General: For grounding electrode system and equipment grounding system for Telecommunications refer to specification section 260526. In all cases the applicable electrical codes for grounding and bonding for telecommunications shall be met.

C. Supplemental: Refer to the specification sections identified below for additional requirements, which are supplemented by this section.
1. 270010 Technology General Provisions
2. 270528 Raceways for Technology
3. 271000 Structured Cabling System
4. 260526 Grounding and Bonding for Electrical Systems

D. General. For a bonding diagram for telecommunications refer to T Drawings.

E. General. The bonding approach required herein is intended to work in concert with the cabling topology as specified in Specification section 271000 and installed in accordance with specification section 270528.

F. Reference Standards:
1. TIA-607-C
2. TIA-568.0-D
3. TIA-606-C
4. UL 1863 Communication Circuit Accessories
5. UL-50 & UL-514
6. NFPA 70 – NATIONAL ELECTRIC CODE
7. IEEE Std. 1100-1992, Powering and Grounding Sensitive Electronic Equipment.
8. BICSI TDMM, Telecommunications Distribution Method Manual.
9. UL 1449

1.2 MATERIALS ALTERNATES AND SUBSTITUTIONS

A. General: Substitutions are allowed for all components of the systems under this specification sections as long as all requirements for substitutions indicated in specification section 270010 are followed.

1.3 SHOP DRAWINGS AND SUBMITTALS

A. See additional requirements for shop drawings and submittals in specification section 270010.

B. The installer of the Telecommunications Grounding systems shall provide the following information in the shop drawings phase of the project:

1. Manufacturer's cut sheets for all proposed equipment as described in Part 2 of this specification section. Cut sheets shall bear the printed logo or trademark of the manufacturer for each type of product being provided. Mark each copy of the data sheets for the specific product being provided with an identifying mark, arrow, or highlighting.
2. A spreadsheet indicating telecommunications ground bar information selection for each telecommunications room indicated in the design drawings, including the following information:
   a. Room Name or number
   b. Quantity of ground bars
   c. Height of each ground bar
   d. Length of each ground bar
   e. Number of holes in each ground bar
   f. Label for each ground bar
3. A drawing indicating the following information:
   a. Location of all telecommunications ground bars and routing of all telecommunications grounding backbones.
   b. Wire size charts for all telecommunications grounding backbones in the project.
   c. All labels to be used in telecommunications backbone cables, bonding conductors and telecommunications ground bars.

1.4 ABBREVIATONS

A. General: The following abbreviations are used in this specification section:
   1. TBB - Telecommunications Bonding Backbone
   2. BC - Bonding Conductor
   3. EMT - Electrical Metallic Tubing
   4. RMC - Rigid Metal Conduit

PART 2 - PRODUCTS

2.1 TELECOMMUNICATIONS MAIN GROUNDING BUSBAR (TMGB)

A. The TMGB serves as the dedicated extension of the building grounding electrode system for the telecommunications infrastructure. The TMGB shall be located and provided in the Main Telecommunication Room in each building. The TMGB must also be listed by a nationally recognized testing laboratory (NRTL).

B. The TMGB shall have the following specifications:
   1. Material: Copper with a thin platted finish.
   2. Thickness: ¼" thick
   3. Width: No less than 4"
   4. Length: The installer of the grounding system shall estimate the length of the bar as to have enough pre-drilled holes for all BCs in the room. The bar shall be no less than 14" long. The installer shall follow the following criteria in estimating the amount of pre-drilled holes required in the TMGB:
      a. Two holes required for each TBB termination.
      b. Two holes for each cabinet or rack row in the room
      c. Two holes for each protector block in the room
      d. Two holes for each layer of ladder tray above the rack.
      e. Two holes for each set of conduit sleeves entering the room
      f. 20% of spare capacity shall be available after all terminations are done.

g. If quantity of holes exceeds the maximum available by a manufacturer, multiple bars shall be provided as to match the criteria indicated above.

5. Pre-drilled holes: All pre-drilled holes shall have a diameter of 5/16”
6. Hole spacing: All pre-drilled holes shall have a minimum spacing matching the spacing of the holes in the long barrel ground lugs.

C. The TMGB shall be installed in the wall with stand offs and isolators. Isolators shall be rated at 600V.

D. Approved manufacturers:
1. Panduit,
2. Erico or
3. approved equal.

2.2 FLEX CONDUCTOR, ONE-HOLE, LONG BARREL WITH WINDOW LUG

A. All BCs (different from TBB) shall be terminated in a flex conductor, one hole, long barrel with window lug when a two hole connector is not possible to be used because receiving equipment does not support the two holes. All lugs shall be selected to match the size of the conductor being used. Other types of terminations such as screw type connectors are not accepted

B. The flex conductor, one hole, long barrel with window lug shall have the following specification:
1. Finish: Thin platted
2. Cable types: designed to work with Flexible, Extra-Flexible, and Code Stranded Copper Conductors.
3. Stud hole size: ¼”
4. Barrel type: Long barrel > 1”
5. Termination type: crimp type
6. Angle: straight or angled if installation space is limited.
7. Listing: UL listed and tested to 35 KV and 90ºC

C. Approved manufacturers: Panduit, Thomas & Betts or approved equal.

2.3 FLEX CONDUCTOR, TWO HOLE, LONG BARREL WITH WINDOW LUG

A. Flex conductors, two hole, long barrel with window shall be used with TBB and BCs to provide a good bond. All lugs shall be selected to match the size of the conductor being used. Other types of termination are not accepted.

B. The flex conductor, two hole, long barrel with window lug shall have the following specification:
1. Finish: Thin platted
2. Cable types: designed to work with Flexible, Extra-Flexible, and Code Stranded Copper Conductors.
3. Stud hole size: ¼”
4. Hole spacing: to match spacing of pre-drilled holes in ground bar or equipment.
5. Barrel length: long barrel > 1”
6. Termination type: crimp type
7. Angle: straight or angled if installation space is limited.
8. Listing: UL listed and tested to 35 KV and 90ºC

C. Flex conductors, two hole, long barrel with window shall be used with BCs in the following cases:
1. Bonding two sections of pathways such as sections of tubular runways or cable trays.

2. Bonding a BC or a TBB to a TGB or TMGB
3. Bonding to equipment that requires two holes for bonding.

D. Approved manufacturers:
1. Panduit,
2. Thomas & Betts or
3. approved equal.

2.4 HTAP CONNECTOR

A. When a BC is required to be bonded to another BC of same or different size the only approved method of bonding is with HTAP style crimp connectors. Screw type connectors, wire nuts or any other method are not acceptable. The specifications of the HTAP connectors are:
1. Finish: Thin platted
2. Cable types: designed to work with Flexible, Extra-Flexible, and Code Stranded Copper Conductors.
3. Tap grooves: installer to select HTAP connector based on size of BCs and quantity of BCs to be bonded.
4. Slots: The HTAP connector shall have a lot to support the unit to the bonding conductors with nylon cable ties for initial support before crimping.
5. Termination type: crimp type
6. Listing: UL listed and tested to 600V

B. Approved manufacturers:
1. Panduit,
2. Thomas & Betts or
3. approved equal.

2.5 TELECOMMUNICATIONS BONDING BACKBONE (TBB)

A. Telecommunications bonding backbones shall be provided as indicated in the design documents. TBBs shall be insulated copper stranded conductors with a wire gauge dictated by the length of the cable. The TBB shall be sized at 2 kcmil per linear foot of conductor length up to a maximum of 3/0 AWG. The following table shall be used to estimate the size of the TBBs:

TBB LENGTH LINEAR M (FT)	**TBB SIZE (AWG)**
Less than 4 (13)	6
5- 6 (14 – 20)	4
6 – 8 (21 – 26)	3
8– 10 (27 – 33)	2
10– 13 (34 – 41)	1
13 – 16 (42 – 52)	1/0
16 – 20 (53 – 66)	2/0
Greater than 20 (66)	3/0

B. Once a TBB has been sized with a particular gauge, any extensions of such backbone shall not be done with a wire gauge smaller than the previous run regardless of distance.

2.6 BONDING CONDUCTOR (BC)

A. Boding conductors shall be used to bond equipment and raceways to the telecommunications grounding infrastructure. The specifications of the BC are:
   1. Conductor Size: use the chart above for TBB to estimate the size of the bonding conductor. BC shall be no smaller than an AWG-6.
   2. Material: copper stranded conductors.
   3. Insulation: Use non-insulated conductors only under raised floor spaces. Insulation color shall be green with a yellow stripe.

B. Pre-fabricated BCs or field made BCs are acceptable.

C. Both ends of a BC shall be terminated in long barrel lugs.

2.7 LABELS FOR TELECOMMUNICATIONS GROUNDING INFRASTRUCTURE

A. Installer shall follow labeling materials indicated in specification section 270010.

PART 3 - EXECUTION

3.1 INSTALLATION PRACTICES.

A. General: Specification section 260526 applies to work of this section. Installation requirements specified herein takes precedence over specification section 260526.

B. General: All installation requirements indicated in specification section 270010 shall be followed.

C. PROTECTION. The TBBs and BCs shall be installed and protected from physical and mechanical damage.

D. GALVANIC CONTINUITY. The TBBs and BCs shall be continuous and routed in the shortest possible straight line path.

E. CRIMPING. All lugs shall be crimped with the proper die for the size of lug being used.

F. PAINT REMOVAL. Paint shall be removed before attaching any BC to an equipment with paint in the surface, such as ladder trays and racks, if no ground lug is available in the equipment.

G. SPLICING. The TBBs and BCs shall be installed without splices. Where splices are necessary, the number of splices should be a minimum and they shall be accessible and located within telecommunications spaces. Joined segments of a TBB or BC shall be connected using exothermic welding, irreversible compression-type connectors, or equivalent. All joints shall be adequately supported and protected from damage.

H. BONDING TO ELECTRICAL PANELS. The TGB or TMGB shall be as close to the electrical power panel as is practicable and shall be installed to maintain clearances required by applicable electrical codes. The electrical power panel bus or the panel enclosure feeding telecommunications equipment racks/cabinets shall be bonded to the TGB or TMGB.

I. BONDING TO BUILDING STEEL. All connectors used for bonding to the metal frame of a building shall be listed for the intended purpose.

J. LUG SCREWS. All connections from lugs to ground bars or grounding equipment shall be done with metal screws with nuts and compression washers. Connections made with metal self tapping screws will not be allowed.

K. BONDING PROTECTOR BLOCKS. All primary or secondary building entrance protectors blocks shall be bonded to the nearest TMGB or TGB with a BC. A minimum of 300 mm (1 ft) separation shall be maintained between this insulated conductor and any dc power cables, switchboard cable, or high frequency cables, even when placed in rigid metal conduit or EMT.

L. BONDING OUTSIDE PLANT CABLES. When the outside plant cables in the Telecommunications Entrance Facility room incorporate a cable metallic shield (armor) isolation gap, the cable metallic shield on the building side of the gap shall be bonded to the TMGB or TGB or the rack/cabinet or the rack's vertical ground bar (if available).

M. BONDING BACKBONE CABLES. Where backbone cables (fiber or copper) incorporate a shield (armor) or metallic member, this shield or metallic member shall be bonded to the TMGB or TGB or rack/cabinet or the rack's vertical ground bar (if available).

N. BONDING HORIZONTAL CABLES. When shielded horizontal cable is used and terminated in patch panels, each patch panel needs to be bonded to the telecommunications grounding systems. A BC shall be used between each patch panel and the rack rails of the rack/cabinet or the rack's vertical ground bar (if available).

O. INTENDED USE OF TBB OR BC. The TBB or BC is not intended to serve as the only conductor providing a ground fault current return path. The intended function of the TBB or BC is to equalize potential differences between telecommunications systems.

P. INSTALLATION OF TBBs INSIDE TELECOMMUNICATIONS SPACES. When TBBs are run inside telecommunications spaces they shall be protected from damage by running them inside conduit. Conduit to protect TBBs inside telecommunications spaces can be made of PVC and shall be sized and supported as required by NEC.

Q. INSTALLATION OF TBBs OUTSIDE TELECOMMUNICATIONS SPACES. When TBBs are run outside of telecommunications spaces they shall be protected from damage by running them inside conduit. Conduit to protect TBBs outside telecommunications spaces shall be EMT or RMC. To avoid an electromagnetic choke effect in this conductor, each end of the conduit used to protect the TBB shall be bonded to the TMGB or TGB at each end. Conduit used for protection of TBBs shall be sized and supported as required by NEC.

R. RACK/CABINET BONDING. All racks/cabinets in the project shall be bonded to the nearest TMGB or TGB inside the room. All rows of rack/cabinets shall be bonded together by a single AWG-2 conductor coming from the nearest TMGB or TGB inside the room. This bonding conductor shall be insulated and run above the racks in the side of the cable tray system, going above the racks, supported by a hanger external to the cable tray. At each rack a bonding jumper (AWG-6) shall be provided and terminated to the rack manufacturer's recommended lug for bonding the rack/cabinet. The bonding jumper shall be connected to the AWG-2 conductor by means of an HTAP connector, protected with heat shrink material. This ground bar shall be the termination point for the bonding jumper for each rack and shall also bond the manufacturer's approved grounding lug in the rack/cabinet to the ground bar.

S. RACK/CABINET BONDING OUTSIDE OF TELECOM ROOMS. Racks/cabinets outside of telecom rooms shall be bonded to the nearest electrical ground with a BC.

T. LABELING: All labeling systems for telecommunications grounding infrastructure shall be in compliance with the ANSI/TIA/EIA-606-C standard. At a minimum, the following elements shall be labeled in the telecommunications grounding system:
   1. All TMGB or TGB, with an unique identifier located in the wall near the unit, not on the ground bar.
   2. All TBBs in the project with a unique identifier at each termination point of each TBB. The label in one side of the cable shall indicate the termination location of the other side of the cable.
   3. BC for rows of racks with a unique identifier at both ends of the cable
   4. BC for surge protectors with a unique identifier at both ends of the cable

U. ADDITIONAL LABELING. All BCs boding rows of racks/cabinets and TBBs shall have additional to the identification marker a yellow printed wrap around tag installed close to the bonding point strap to the cable jacket with a flame retardant cable tie. This tag shall have the following wording in green letters: “IF THIS CONNECTOR OR CABLE IS LOOSE OR MUST BE REMOVED, PLEASE CALL THE BUILDING TELECOMMUNICATIONS MANAGER".

3.2 AS BUILT DOCUMENTS AND CLOSE OUT INFORMATION

A. See specification section 270010 for these requirements.

END OF SECTION 27 0526

SECTION 27 0528 - RACEWAYS FOR TECHNOLOGY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. General: Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

B. Section 260533 - Raceway Systems, apply to work of this Section. Specifications described herein take precedence over Section 260533.

C. Supplemental: Refer to the specification sections identified below for additional requirements, which are supplemented by this section.
   1. 270010 Technology General Provisions
   2. 270526 Grounding and Bonding for Telecommunications Systems

1.2 DESCRIPTION

A. General: Furnish and install complete with all accessories a Pathways and Spaces infrastructure for supporting of Structured Cabling System (SCS) and housing of technology equipment. The goal of the project is to provide a reliable architecture of the building that shall serve as a support for transport of data, voice telephony, security and audio/visual cabling throughout the building from designated demarcation points to places located at various wall, floor, ceiling, column, room and other locations as indicated on the contract drawings and described herein.

B. General: For pathways the system shall utilize a combination of conduit, cable tray and supports for vertical and horizontal cabling support. Pathways shall be provided and located as shown and in the quantities indicated on the drawings. Pathways shall terminate in rooms or closets using approved fasteners and termination hardware and bushings and shall be reamed to eliminate sharp edges. All Pathways shall be identified at all locations.

C. All installers should anticipate that all products and installation procedures shall comply with the ANSI/TIA-569-D requirements at a minimum.

D. General: Installation of the raceways for communications shall be a complete system including all supports and hangers as required per contract documents and manufacturer’s installation guidelines.

E. Support: All items shall be supported from the structural portion of the building. Supports and hangers shall be of a type approved by Underwriters' Laboratories. Wire shall not be used as a support. Boxes and conduit shall not be supported or fastened to ceiling suspension wires or to ceiling channels. Do not install any devices supported by ceiling tiles.

F. Installation: The Installer shall layout and provide his work in advance of the laying of floors or walls, and shall provide all sleeves that may be required for openings through floors, walls, etc. Where plans call for conduit to be run exposed, provide all inserts and clamps for the supporting of conduit.

G. Pull Strings: Provide pull strings in all raceways. Pull strings shall be nylon and shall be impervious to moisture. Pull strings installed in one (1) inch and smaller conduits shall have a

tensile strength of not less than 30 lbs. Pull strings installed in conduits larger than one (1) inch shall have a tensile strength not less than 200 lbs.

1.3 INSTALLER QUALIFICATIONS

A. General: The installer selected for the Project must be BICSI certified installer and certified by the manufacturer for the products, adhere to the engineering, installation and testing procedures and utilize the authorized manufacturer components and distribution channels in provisioning the Project.

B. General: The Installer directly responsible for this work shall be a " Pathways and Spaces for Structured Cabling System Installer (PS-SCS) " who is, and who has been, regularly engaged in the providing and installation of commercial and industrial pathways and spaces for telecommunications wiring systems of this type and size for at least the immediate past five years. Any sub-Installer who will assist the PS-SCS installer in performance of this work, shall have the same training and certification as the PS-SCS installer.

C. Certification: The installer's Project Manager shall possess a current and in good standing BICSI Registered Communications Distribution Designer (RCDD) certificate. All shop drawings submitted by the installer shall bear the RCDD's seal.

D. Experience: The Installer shall be experienced in all aspects of this work and shall be required to demonstrate direct experience on recent systems of similar type and size. The Installer shall own and maintain tools and equipment necessary for successful installation and have personnel who are adequately trained in the use of such tools and equipment.

1.4 MATERIALS ALTERNATES AND SUBSTITUTIONS

A. General: Substitutions are allowed for all components of the systems under this specification sections as long as all requirements for substitutions indicated in specification section 270010 are followed.

1.5 SHOP DRAWINGS AND SUBMITTALS

A. See additional requirements for shop drawings and submittals in specification section 270010.

B. General: The PS-SCS installer shall provide no later than 30 days after contract award the following information:
   1. Proof of Installer’s qualifications per paragraph 1.03.
   2. Cut sheets of all products to be used for the project, highlighting in particular the precise product to be used in each case, when multiple devices are indicated in the cut sheet. At a minimum the following devices shall be submitted with this specification section:
      a. Supporting devices (j-hooks) if allowed in the project. See part 3 of this specification.
      b. Cable tray system with accessories
      c. Runway cable tray system with accessories.
      d. Plywood
      e. Trough wall/floor firestop system
      f. Innerduct
      g. Detectable tape
      h. Communications vaults
      i. Conduit waterfalls

j. Fire stop system (for small penetrations)

3. Drawings indicating precise location and type of all support for cable tray or ladder tray systems in all areas where they will be used.
4. For all communication vaults, drawings shall be prepared indicating conduit penetrations on each side of each vault. Vaults shall be labeled to indicate their correct location in the site plan.
5. Pre-cast communications vaults shall be submitted with load calculations signed and sealed by a professional engineer.
6. For any directional boring runs, the installer shall provide a drawing indicating all underground locate surveys and the proposed routing of the conduit as well as proposed depth.

1.6 WORK EXTERNAL TO THE BUILDING

A. General: Any work external to the confines of this building as shown on the drawings shall be governed by provisions of this specification.

PART 2 - PRODUCTS

2.1 CONDUIT

A. All conduits as indicated in Section 26

2.2 TELECOMMUNICATIONS OUTLET BOX

A. Telecommunication outlet electrical boxes shall be used to make terminations to limited energy systems described in Division 27 and Division 28 specifications. Telecommunications outlet boxes shall have the following specifications:
   1. Material: Steel, 0.6858mm. thickness (minimum) with galvanized zinc coating, 0.013mm. (minimum) thickness on both sides of bracket
   2. Construction: Cleanly punched knockouts, welded at 8 points (minimum) with softened edges (no sharp edges).
   3. Size (HXW): 4-11/16” X 4-11/16” or 5”X5”
   4. Depth: 2-1/8” or 2-7/8”
   5. Knock outs: At least one of this dimension: 1”
   6. Listing: UL or ETL

B. Telecommunications outlet electrical boxes shall be provided with the appropriate 1 gang or 2 gang rings selected for the proper thickness of the drywall in all areas. Standard telecommunications outlets shall use 1 gang ring, but design documents might indicate the use of 2 gang rings in selected areas.

C. Knockouts in telecommunications outlet boxes shall not be field punched.

D. Basis of design: Raco, Steel City, Randal Industries Inc,

2.3 WIREWAYS

A. General: Wireway shall be sized as shown on drawings, NEMA 1, lay-in type. Wireway sides and bottom shall contain no knock-outs unless shown otherwise on the drawings. The Installer

shall punch holes required. The cover shall be hinge type with quarter turn fasteners to hold cover shut. Covers and bodies shall be 16 gauge steel. Wireway shall be as manufactured by Hoffman Engineering Company, Square "D" or Steel City.

2.4 SUPPORTING DEVICES

A. Hangers: Hangers shall be made of durable materials suitable for the application involved. Where excessive corrosive conditions are encountered, hanger assemblies shall be protected after fabrication by galvanizing, or approved suitable preservative methods.

B. Non-continuous cable supports (j-hooks) shall provide a bearing surface of sufficient width to comply with required bend radii of high-performance cables; UL Listed.

C. Non-continuous cable supports shall have flared edges to prevent damage while installing cables.

D. Non-continuous cable supports sized 1 5/16” and larger shall have a cable retainer strap to provide containment of cables within the hanger. The cable retainer strap shall be removable and reusable and be suitable for use in air handling spaces.

E. Non-continuous cable supports shall have an electro-galvanized or G60 finish and shall be rated for indoor use in non-corrosive environments.

F. Stainless Steel non-continuous cable supports are intended for indoor and outdoor use in non-corrosive environments or where only mildly corrosive conditions apply.

G. Anchoring: Insert anchors shall be installed on concrete or brick construction, with hex head machine screws. Recessed head screws shall be used in wood construction. An electric or hand drill shall be used for drilling holes for all inserts in concrete or similar construction. Installed inserts, brick, shall be near center of brick, not near edge or in joint. Drilled and tapped, and round head machine screws shall be used where steel members occur. All screws, bolts, washers, etc., used for supporting conduit or outlets shall be fabricated from rust-resisting metal, or accepted substitution. Gunpowder or lead set anchors are not permitted.

H. Accessories: Non-continuous support systems shall be provided with the adequate mounting accessories depending on the location where the support will be installed, like beam clips, flange clips, C and Z purlin clips.

I. Accepted manufactures; Erico or Panduit.

2.5 CABLE TRAY AND FITTINGS (BASKET TYPE) SCOPE DELETED

A. General Description: Basket type cable tray system is to be constructed of welded steel wire mesh with continuous safety edge wire lip. Provide mesh system permitting for continuous ventilation of cables and maximum heat dissipation.

B. Materials: Carbon Steel: Cable management system to be manufactured from high strength minimum 6 gauge steel wires. Wire to be welded and bent prior to surface treatment.

C. Finishes: Electro-plated zinc Galvanizing: Electrodeposited zinc coating applied to an average thickness of 0.7 mils to 0.8 mils.

D. Cable tray dimensions: as shown on the drawings.

E. Fittings: Cable tray fittings to be field manufactured from straight sections through use of hardware and instructions recommended by Manufacturer. Provide drop-off, 90° kits and tees as required using manufacturer fabricated products and installation guidelines.

F. Installation: Cable tray system to be installed using splice connectors, and support components as recommended by the Manufacturer.

G. Loading Cable tray system to be installed and supported per NEMA VE-2 and Manufacturer's suggested span load criteria.

H. The cable tray system shall be UL listed and classified as a continuous bonded tray system providing a continuous grounding path. Cable tray system is required to be tested for grounding adequacy per NFPA 70B, Chapter 18 with a maximum allowable resistance of 1 ohm.

I. Approved Manufacturers: Wiremold, Cablofil, Snake Tray, B-line, WBT or Chatsworth.

2.6 PLYWOOD BOARDS IN TELECOMMUNICATION ROOMS

A. Plywood Backboard: Backboards shall be installed in each TR and the MTR on walls to a height of 8' AFF or as shown on the drawings. Rooms shall have walls covered as shown on the drawings

B. Acceptable options for plywood boards are:
1. ¾" AC Grade plywood painted with two coats of fire retardant paint in both sides and on the edges.
2. Pre-manufactured plywood system for telecommunications such as ReadySpec by Pathways and Spaces Inc.

C. Other specifications:
1. All imperfections and voids shall be filled, sealed and sanded prior to being primed and painted.
2. Fire retardant coating shall be tested to UL723, "Test for surface burning characteristics of building materials."
3. Paint color shall be grey, white or blue.
4. Fire retardant plywood shall be clearly labeled with the name of the Backboard Manufacturer, UL Classification of the Fire Retardant Coating, NFPA 255 Coating Flame Spread Index Class and the APA Grade of the plywood.
5. Plywood shall be installed with best side out.

2.7 THROUGH WALL/FLOOR FITTING FIRE STOP SYSTEM

A. General. These devices covered under this specification are firestop devices for use in through-penetration firestop systems, which are used to maintain the fire rating of the wall or floor, as well as to route and protect power and/or communications cable distribution for commercial, educational, healthcare, government, institutional, industrial and utility needs.

B. Classification and use: The firestop device for use in through-penetration firestop systems shall have been examined and tested by Underwriters Laboratories Inc. to UL1479 (ASTM E 814) and bear the U.S. and Canadian UL Classification Mark. The device shall be classified for use in one-, two-, three-, and four-hour rated gypsum, concrete and block walls and provide a maximum L rating of 3.3 cfm. The device shall be classified for use in one-, two-, and three-hour rated concrete floors having a minimum 4 1/2" (114mm) thick reinforced lightweight or normal

weight (100-150 pcf) (1600-2400 kg/m3). The devices shall also been tested by Underwriters Laboratories Inc. to UL2043 and determined to be suitable for use in air handling spaces.

C. Materials:
1. Box: The fire stop device box shall be constructed of 16 gage G90 steel.
2. Intumescent block: The fire stop device intumescent block shall be constructed of a graphite base material with expansion starting at 375º F and an unrestrained expansion between 6 to 12 times. The intumescent block shall be held securely by the box in order to prevent tampering and damage during installation.
3. Adjustable doors: the fire stop device shall have doors or other system which can be adjusted to prevent materials from penetrating the device if the device is empty or completely full. The doors shall be constructed of 16 gage G90 steel with no. 10-32 screws use to adjust opening size.
4. Heat shield: For retrofit applications where an existing in-wall conduit extends out from the wall more than 7/8" [22mm], a UL listed Heat Shield must be used in order to maintain UL Fire Classification. The firestop device is then installed onto the heat shield
5. Split conduit and wall plate: For retrofit applications where no conduit is installed in the wall to protect existing cables, a split conduit assembly should be used to protect cables. After installing the split conduit within the wall, a wall plate should be installed to cover any irregularly shaped hole cut in the wall. The firestop device is then installed onto the conduit.

D. Sizes: the fire stop device shall be available for two (2) inch and four (4) inch trade size emt conduit.

E. Finish: the fire stop device shall be available in safety yellow or orange powder coat, custom colors and an unpainted galvanized finish.

F. Design selection: Wiremold FlameStopper, STI EZpath or approved equal

2.8 INNERDUCT (REGULAR)

A. Flexible raceway system also referenced in the design documents as regular innerduct or innerduct shall be provided in locations indicated in design drawings. The innerduct type shall be selected according to the environment where it will be installed, use HDPE innerduct only outdoors, use plenum or riser rated innerduct indoors. The installer is responsible for determining the proper selecting of the innerduct when used in air handling spaces. If at the time of bidding the installer is not sure what kind of environment is present in the project, the installer shall price plenum rated materials.

B. For plenum rated applications, the specifications of the innerduct shall be:
1. Material: White or orange Kynar PVDF Resin, a fluoropolymer compound.
2. Listing: Innerduct shall be listed to UL 2024, listing shall be printed in the product.
3. Marking: Footage shall be sequentially marked.
4. Configuration: corrugated type.
5. Pull line: built in 900 lb rated tape.
6. Size: Shall be available in ¾” through 2” diameters.

C. For riser rated applications, the specifications of the innerduct shall be:
1. Material: Orange polyvinyl chloride (PVC).
2. Listing: Innerduct shall be listed to UL 2024, listing shall be printed in the product.
3. Marking: Footage shall be sequentially marked.
4. Configuration: corrugated type.
5. Pull line: built in 900 lb rated tape.
6. Size: Shall be available in ¾” through 2” diameters.

D. For outdoor applications, the specifications of the innerduct shall be:
   1. Material: High Density Polyethylene (HDPE).
   2. Listing: None.
   3. Marking: Footage shall be sequentially marked.
   4. Configuration: corrugated type.
   5. Pull line: built in 1,800 lb rated tape.
   6. Size: Shall be available in ¾" through 2" diameters.

E. All inner ducts shall be provided with couplings and accessories suitable for the environment where they will be installed.

F. Design selection: products by Carlon or approved equal.

2.9 DETECTABLE TAPE

A. A detectable tape shall be installed above all underground conduit at a minimum depth of 18" or as shown on the drawings. The detectable warning tapes shall be constructed with a solid aluminum foil core with a minimum thickness of 5 mils and 3" wide. The detectable warning shall have printed diagonal warning stripes conform to APWA color recommendations and bold, black legends identify what type of utility line is buried below. All detectable tapes used for this shall be labeled "fiber optics buried below".

B. Design selection: Detectable tape from Carlon, Stranco, Ind., Terra Tape or approved equal.

2.10 COMMUNICATIONS VAULT (POLYMER CONCRETE)

A. In ground communication boxes also referenced in this document as communications vaults (polymer concrete) shall have the following specifications:
   1. Construction Material: Precast Polymer Concrete.
   2. Listing: UL listed enclosure, tested to ANSI/SCTE 77
   3. Box vertical design load: 22,500 lbs.
   4. Box vertical test load: 33,750 lbs.
   5. Box lateral design load: 800 lbs/sq. ft.
   6. Box lateral test load: 1,200 lbs/sq. ft.
   7. Box dimensions: as indicated in design drawings.
   8. Box bottom: open bottom
   9. Holes for conduit: holes for conduit shall be cut at the factory and shall not cover more than 25% of the side of the enclosure. All sides of the box shall have holes for conduits, even though conduits might not be shown for all sides in the floor plans. No less than two holes for standard 4" conduit shall be at all sides. All unused holes shall be plug with plastic caps.
   10. Cover ANSI TIER: 22
   11. Cover logo: "Communications"
   12. Cover screws: two (2) tamper resistant penta head screws
   13. Cover accessories: two (2) 7" long cover hooks made of electroplated steel.

B. Design selection: Hubell Quazite PG style box with HH series cover and accessories or approved equal. Approved equals shall comply with all specifications listed above including construction material.

2.11 CONDUIT WATERFALLS

A. All 4" EMT terminations with communication cable entering/exiting the conduit from a cable tray (or tubular runway) system and the vertical separation between raceways is larger than 7” shall be fitted with a device to control the bend radius of the communication cable to a minimum of a 4" radius. The device to control the bend radius shall be called a conduit waterfall and must comply with all National Electrical Code requirements and TIA/EIA Standards. In addition, the product must be RoHS compliant to meet environmental requirements, be UL 94V-0 approved to reduce the spread of flame, and be approved by UL for use in air handling spaces. The device to provide bend radius control must support a static load of 40 lbs. (177.9 N) and have a fastening device that allows for incremental adjustments to conform to variances in conduit diameters.

B. Device quantities are not indicated in the drawings but the PS-SCS shall use all 4” conduits and sleeves indicated in the drawings to estimate the quantities of waterfalls to be used in the project.

C. Basis of design: Panduit CWF 400 or approved equal.

2.12 FIRE STOP SYSTEMS (FOR SMALL PENETRATIONS)

A. General: Fire stop system shall be selected by the PS-SCS installer as to comply with the following requirements:
   1. Selected system shall be UL listed for the condition on which it will be installed. These conditions include: wall/slab type (masonary, drywall, etc), hour rating, and accessibility type.

B. Acceptable systems: caulk based products or firestop grommets by STI or equal.

2.13 EXPANSION FITTINGS

A. Installation: Provide expansion fittings in each conduit run wherever it crosses an expansion joint. Install the fitting on one side of the joint with its sliding sleeve end flush with joint, and with a length of bonding jumper in expansion equal to at least three times the normal width of joints.

B. Location: Provide expansion fittings in each conduit run which is mechanically attached to separate structures to relieve strain caused by shift on one structure in relation to the other.

C. Length: Provide expansion fittings in straight conduit runs above ground which are more than one hundred (100) feet long.

PART 3 - EXECUTION

3.1 INSTALLATION PRACTICES

A. See additional requirements indicated in part 3 of specification section 270010.

3.2 INDOOR CONDUITS BELOW GRADE AND ABOVE GRADE

A. BEND RADIUS. Conduits shall utilize long radius sweeps at all 90 degree transitions. The inside radius of a bend in conduit shall be at least six (6) times the internal diameter. When the conduit size is greater than two (2) inches, the inside radius shall be at least ten (10) times the internal diameter of the conduit. For fiber optic cable, the inside radius of a bend shall always be at least ten (10) times the internal diameter of the conduit

B. MAXIMUM DISTANCE BETWEEN JBOXES. For indoor installation no section of conduit shall be longer than one hundred (100) ft or contain more than two (2) 90 degree bends between pull points or pull boxes are required. For outdoor installation no section of conduit shall be longer than six hundred (600) ft. or contain more than two 90 degree bends between pull points or pull boxes are required.

C. LABELING. All indoor conduits 2” or larger shall be labeled at both ends when these conduit runs are continuous between two rooms and going through multiple walls or slabs. Labeling materials shall be as indicated in specification section 270010. Conduit sleeves 2” or larger penetrating just one wall is not required to be labeled.

D. PULL STRINGS; All conduits for technology systems shall be installed with pull strings.

3.3 UNDERGROUND TELECOMMUNICATIONS DUCT LINES

A. Description: Underground duct lines shall be of individual conduits. Conduits shall be encased in concrete where indicated on the plan drawings and duct bank sections. The conduit shall be of plastic, PVC Schedule 40, unless indicated or specified otherwise. The conduit used shall not be smaller than four (4) inches in diameter, inside, unless otherwise noted on the drawings.

B. Duct lines shall have a continuous slope downward toward communication vaults and away from buildings with a pitch of not less than 0.125 inches per foot. Changes in direction of runs exceeding a total of ten (10) degrees either vertical or horizontal shall be accomplished by long sweep bends having a minimum radius of curvature of twenty five (25) feet, except that manufactured bends may be made up on one or more curved or straightened sections or combinations thereof. Manufactured bends shall have a minimum radius of forty eight (48) inches.

C. Conduits. Conduits shall terminate in end-bells where duct lines enter manholes or communications vaults. Provide four (4) to six (6) inch reducers as required. Separators shall be of pre-cast concrete, high impact polystyrene, steel or any combination of these. The joints of the conduits shall be staggered by rows so as to provide a duct line having the maximum strength. During construction partially complete duct lines shall be protected from the entrance of debris, such as mud, sand and dirt by means of suitable conduit plugs. As the duct line is completed, a testing mandrel not less than 13 inches long with a diameter 1/4 inch less than the size of the stiff bristles shall be drawn through until the conduit is clear of all particles of earth, sand or gravel; conduit plug shall then be immediately installed.

D. Conduit. Plastic conduit, fittings and joints shall not have been stored in the sun or weather, in any excessively heated space, or unevenly supported during storage. Use and installation shall be in accordance with the National Electrical Code requirements for the installation of non-metallic rigid conduit. Plastic conduit shall be protected against the direct rays of the sun prior to installation. Conduit shall be Carlon Type EB, Queen City Plastics, or accepted substitution. Conduit shall be U.L. listed and conform to NEMA Standard TC6 1972.

E. Trench: Trenches for duct banks shall be completely dry before setting conduits or pouring concrete. Well pointing as required shall be provided if necessary to keep trench dry.

F. Excavation: Backfilling shall be in layers not more than eight (8) inches deep, and shall be thoroughly tamped. The first layer shall be earth or sand, free from particles that would be retained on a 1/4 inch sieve. The succeeding layers shall be excavated material having stones no larger than would pass through a four (4) inch ring. The backfill shall be level with adjacent surface, except that in sodded or paved areas, a space equal to the thickness of the sod or paving shall be left.

G. Finish: The surface disturbed during the installation of duct shall be restored to its original elevation and condition if not refinished in connection with site work.

H. Plugging: All unused conduit openings shall be plugged or capped with a suitable device designed for the purpose; caulking compound shall not be used for plugging conduit openings.

I. Stubs: Spare conduit stubs shall be capped and marked in the field and accurately dimensioned on the as-built drawings.

J. Spacers: All conduit run underground, or stubbed above floor shall be separated with plastic interlocking spacers manufactured specifically for this purpose, or shall be strapped to Kindorf channel supported by conduit driven into ground or tied to steel.

K. Minimum burial depth: All underground raceways (with exception of raceways installed under floor slab) shall be installed in accordance with Section 300 5 of the NEC except that the minimum cover for any conduit or duct bank shall be two (2) feet, unless otherwise indicated.

3.4 INSTALLATION OF COMMUNICATIONS VAULTS

A. Excavating and backfilling for vaults. Perform earthwork as specified in Division 2. Provide 6-inch minimum thickness 3/4-inch crushed rock over the full width of the vault base and extend 12 inches beyond the edges of the vault. After repairing the waterproofing, backfill and compact around the vault with structural backfill material. Excavated material may be used for structural backfill provided it conforms to the Standard Specifications for structural backfill material.

B. Installing vaults and risers. Set each concrete vault section or riser plumb on a double layer bed of sealant at least 1/2-inch thick to make a watertight joint with the preceding unit. Point the inside joint and wipe off the excess sealant.

C. Waterproofing. Waterproofing shall be factory applied to all exterior surfaces of vaults and risers. This includes the bottom of the vault to be coated as an exterior surface. Apply two coats at a rate of 65 square feet per gallon per coat. Prior to backfilling, field apply waterproofing material on joints and damaged surfaces. Protect coating from damage during backfilling and compacting.

3.5 CUTTING AND PATCHING

A. Core Drilling: The installer shall be responsible for all core drilling as required for work under this section, but in no case shall the installer cut into or weld onto any structural element of the project without the written approval of the A&E. Any post tension slabs or slabs with embedded electrical raceways shall be X-rayed prior to coring by the installer.

B. Cutting and Patching: All cutting, rough patching and finish patching shall be provided as specified in the contract documents. All cutting and patching shall be performed in a neat and workmanlike manner.

C. Openings and Sleeves: Locate all openings required for work performed under this section. Provide sleeves, guards or other accepted methods to allow passage of items installed under this section.

D. Roof Penetration: All roof penetrations for raceways part of technology systems shall be approved by A&E prior to executing this work. All roof penetrations shall be as accepted by the roof manufacturer.

3.6 IDENTIFICATION OF BOXES

A. Tags: During installation of pull strings all pull strings shall be marked with waterproof vinyl tags indicating where the opposite end may be found.

3.7 BLANK PLATES

A. Plates: Unless otherwise noted all unused outlet boxes shall receive blank plates matching the finish of plates for electrical devices in the same room.

3.8 RACEWAY INSTALLATION

A. SUPPORT. All raceways shall be run in a neat and workmanlike manner and shall be properly supported and in accordance with the latest edition of the NEC code and BICSI guidelines. Supporting conduit and boxes with wire is not acceptable. Exposed raceways where allowed, shall be supported with clamp fasteners with toggle bolt on hollow walls, and with no lead expansion shields on masonry. All conduits shall be securely fastened in place with at least one support per eight foot section. Support within one foot of changes in direction. All required hangers, supports and fastenings shall be provided at each elbow and at no more than one foot from the end of each straight run terminating at a box or cabinet. The use of perforated iron for supporting conduits shall not be permitted. The required strength of the supporting equipment and size and type of anchors shall be based on the combined weight of conduit, hanger and cables. Horizontal and vertical conduit runs may be supported by one-hole malleable straps, clamp-backs, or other accepted devices with suitable bolts, expansion shields (where needed) or beam-clamps for mounting to building structure or special brackets.

B. HANGER INSTALLATION. Where two (2) or more conduits one (1) inch or larger run parallel, trapeze hangers may be used consisting of concrete inserts, threaded solid rods, washers, nuts and galvanized "L" angle iron, or Unistrut cross members. These conduits shall be individually fastened to the cross member of every other trapeze hanger with galvanized cast one hole straps, clamp backs, bolted with proper size cadmium machine bolts, washers and nuts. If adjustable trapeze hangers are used to support groups of parallel conduits, U-bolt type clamps shall be used at the end of a conduit run and at each elbow. J-bolts, or approved clamps, shall be installed on each third intermediate trapeze hanger to fasten each conduit.

C. NON-CONTINUOUS CABLE SUPPORTS INSTALLATION. When j-hooks are allowed in the project by this specification (See USE OF CONDUIT FOR DIFFERENT SYSTEMS) non-continuous cable supports (j-hooks) shall be installed only as recommended by manufacturer not exceeding the load ratings of the devices. Install non-continuous cable supports in spans no longer than 4’. Whenever there are changes in elevation additional supports shall be required to avoid having stress on cable or sharp bends.

D. FIRE STOPPING: For 4” sleeves, the PS-SCS installer shall provide through wall/floor fittings firestop system and for other smaller sleeves or wall penetrations through fire rated partitions

the PS-SCS installer can use the same type of firestop system or a fire stop system for small penetrations in compliance with products described in part 2 of this specification.

E. PENETRATIONS IN FIRE RATED PARTITIONS. Installation of electrical boxes or equipment backboxes in fire rated walls and smoke barriers shall follow the following requirements:
   1. Electrical boxes and or technology system backboxes can be installed in 1 or 2 hour rated walls as long as all requirements indicated in the proper Building Code, National Electrical Code and nationally recognized testing laboratories are met for this type of installation.
   2. As a summary, some of the requirements indicated by the codes listed above are:
      a. Boxes shall be metallic or listed for that purpose
      b. The area of the boxes shall not exceed 16 square inches, provided the aggregate are of the openings through the membrane does not exceed 100 square inches in any 100 square feet of wall area.
      c. The spacing between the wall membrane and the box shall not exceed 1/8 of an inch.
      d. Boxes on opposite sides of the walls shall be separated by no less than 24 inches, or boxes shall be covered by listed putty pads, or a listed material and method used.
   3. Electrical boxes or technology systems backboxes shall not be installed in a 3 or 4 hour fire rated rated walls.

F. ROUTING: Conduits shall be run parallel to building walls wherever possible, exposed or concealed as specified, and shall be grouped in workmanlike fashion. Crisscrossing of conduits shall be minimized.

G. PROTECTION DURING CONSTRUCTION. All raceway runs, whether terminated in boxes or not, shall be capped during the course of construction until wires are pulled in and covers are in place. No conductors shall be pulled into raceways until the raceway system is clean and complete.

H. PROTECTIVE BUSHINGS: All un-terminated conduits shall have an insulated protective bushing to avoid cable damage at the edge of the conduit.

I. AVOIDING EMI: To avoid EMI for Telecommunications cabling and/or conduit containing cabling, all raceways shall provide clearances of at least four (4) feet (1.2 meters) from motors or transformers; one (1) foot (0.3 meter) from conduit and cables used for electrical-power distribution; and five (5) inches (12 centimeters) from fluorescent lighting. Raceways shall cross perpendicular to fluorescent lighting and electrical-power cables and conduits. The Installer shall not place any raceway alongside power lines

J. COORDINATION. All raceways shall be kept clear of mechanical equipment and plumbing fixtures to facilitate future repair or replacement of said fixtures without disturbing wiring. Except where it is necessary for control purposes, all raceways shall be kept away from items producing heat.

K. MASONARY INSTALLATION. All raceway runs in masonry shall be installed at the same time as the masonry so that no face cutting is required, except to accommodate boxes.

L. USE OF CONDUIT IN DIFFERENT AREAS. When low voltage cables (any technology system) have to be run above ground in a space with no type of accessible ceiling (interior or exterior), all cable runs shall be in conduit completely, continuing the raceways all the way to the nearest accessible ceiling (in the direction of the telecom closet) or grouping the raceways into a single larger diameter conduit with the same or larger cross sectional area than the sum of all the conduits coming into it. The use of j-hooks to support low voltage cables in areas with no ceiling or hard ceiling shall not be allowed. This type of condition is usually not indicated in the drawings

because design drawings don't show conduits smaller than 2", nevertheless it shall be provided as indicated herein.

M. USE OF CONDUIT FOR DIFFERENT SYSTEMS: The following paragraphs indicate the design intent for raceways system for all technology systems.
1. For all systems under division 27: Conduit stub up from the outlet to the nearest accessible ceiling, non-continuous support system to the nearest cable tray system or telecommunications room.
2. For all systems under division 28 (with exception of Fire alarm and Security Voice Communication system): Conduit stub up from the outlet to the nearest accessible ceiling, non-continuous support system to the nearest cable tray or telecommunications room.
3. Non-continuous support systems (J-hooks) are allowed in this project as a horizontal support system for cables above ceilings.

3.9 CABLE TRAY INSTALLATION

A. Inspection: Examine area for clearances, to allow proper installation of the tray according to the routing indicated on the drawings. Check existing building steel and other supporting structures to establish the type of tray hangers to be used and at the proper spans.

B. Installation Criteria: Installation shall be in accordance with equipment manufacturer's instructions, and with recognized industry practices to ensure that cable tray equipment comply with requirements of NEC and applicable portions of NFPA 70B. Reference NEMA-VE2 for general cable tray installation guidelines

C. Support: Cable tray support shall be by means of welded angle brackets to structural components, brackets shall be as manufactured by the Cable tray manufacturer. Complete straight section of cable tray shall have at least 1 support at a ¼ of the length of the section. Additional supports are required at tray ends, offsets, bends and changes of elevation.

D. Grounding: All conduits terminating within 12 inches of a cable tray shall be bonded with a grounded in accordance with the National Electric Code.

E. Coordination: Wherever possible, install horizontal cable trays above water and steam piping. Coordinate installation of tray with other trades for clearances, to avoid conflicts. A minimum of 300 mm (12 in) access headroom shall be provided and maintained above the cable tray system or cable runway. A minimum of 150 mm (6 in) access headroom shall be provided and maintained at both sides (one side if tray is supported at the wall. Care shall be taken to ensure that other building components (e.g., air conditioning ducts, pipes, structural elements) do not restrict access. The cable tray must be installed with at least 75mm (3 in) of clear vertical space above the ceiling tiles and support channels (T-bars) to ensure accessibility. When crossing other building components with the cable tray or runway the above specified clearances shall be maintained.

3.10 RUNWAY CABLE TRAY SYSTEM INSTALLATION

A. General. Runway cable tray system shall be installed following manufacturer's recommendations for installation.

B. Support locations: supports shall be provided as recommended by the manufacturer, but as a minimum supports shall be located as follows:
1. Before each 90 deg turn.
2. No continuous section shall have more than 3ft of span without a support..
3. At each 2-post rack or 4-post rack

4. At each change in elevation

C. Support type. When runway cable tray is to be installed against the wall, the only support type to be used is a wall bracket supporting from the bottom of the tray. For sections of runway cable tray to be installed over racks, the preferred support system is to the racks themselves. Trapeze style support brackets shall only be used when no other method of support is possible.

D. Vertical runways. Runway cable tray system shall be installed continuously vertically in all telecommunications rooms in the project from sleeves coming from the ground (or floor below) to the sleeves going to the floor above, whether or not indicated in the drawings. The runway installed shall have the same width as the total width of the sleeves coming into the telecommunications room, although multiple sections installed together are acceptable. If the sleeves from the floor below to the floor above don't line up in a straight line, two vertical sections are accepted, one to the horizontal runway cable tray and one from the horizontal runway cable tray to the sleeves above. Runway cable trays installed vertically shall have supports to the floor, wall and slab above.

E. Cable dropout. At each rack or cabinet that has runway cable tray system running on top of it, a cable dropout shall be installed to protect the bend radii of the cable. This dropout accessory shall have a bend radius of no less than 4".

F. Bonding. Any two continuous sections of runway cable tray system shall be bonded together with a #1 bonding jumper (600A) 15" long. All bonding jumpers shall be made of steel with yellow, zinc-dichromate finish. All fasteners shall be made of steel with zinc-plated finish

G. Protective end caps. All end sections of runway cable tray sections shall be protected with plastic protective end caps.

3.11 INSTALLATION OF INNERDUCT

A. Protect products from the effects of moisture, UV exposure, corrosion and physical damage during construction.

B. When inner duct is laid on a cable tray, it shall be strapped to cable tray with nylon ty-wraps at periodic intervals of no less than 4 ft.

C. When multiple inner duct are in a single conduit, and innerduct are of the same size, they shall be different colors for identification or have different color electrical taped wrapped on the ends to identify them at the end of each conduit.

3.12 AS BUILT DOCUMENTS AND CLOSE OUT INFORMATION

A. See specification section 270010 for as built documents and close out information these requirements.

END OF SECTION 27 0528

SECTION 274100 – AUDIO/VISUAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. General: The General Requirements, Conditions of the Contract, these Specifications, Drawings, Addenda and Contract Modifications (the Contract Documents), and definitions of legal entity (such as Contract, Installer, Engineer, Owner, etc…) shall apply to the work of this specification section.

B. Supplemental: Refer to the specification sections identified below for additional requirements, which are supplemented by this section.
   1. 270010 Technology General Provisions
   2. 270528 Raceways for Technology

1.2 SCOPE OF WORK (SOW)

A. General: Refer to the requirements of the related documents identified in Part 1.1 of this specification, for scope of work requirements, which are supplemented by this section. This shall constitute the basis for the "Scope of Work" for this specification.

B. System: The goal of the project is to provide a finished, complete audiovisual system with the functionality, capacity, and operability, as described in the Contract Drawings and specifications herein. The finished, complete system shall serve as a vehicle for the transport of associated system signals from designated origination points to equipment interfaces and/or identified distribution points per the Contract Documents. The scope of work for the AVS installer shall include, but not limited to the following tasks:
   1. Preparation of shop drawings, submittals, training and as-built information for the system.
   2. Procurement, installation and warranty of all AVS hardware including projectors, flat panel displays, mounts for displays, signal transceivers, players, switchers, servers, etc.
   3. Procurement, installation and warranty of all AVS cabling and wiring, including support system, and fire stopping for all low voltage cabling part of the AVS.
   4. Programming labor of the AVS, including initial software set up, software registration, and initial data input, unless otherwise noted in this specification section.
   5. Attend project plan meetings with the Owner and the Consulting Engineer (A&E) to fine tune data interchange details, network configuration and other user requirements:
   6. Provide training and close out information as indicated in this specification.
   7. Provide all through wall sleeves and fire stop required to run AV cables through walls.

C. It shall be understood by the AVS installers that this is an integrated system where multiple pieces of equipment from different manufacturers are required to be connected/interfaced together to make the AVS operational. To allow for competitive bidding multiple manufacturers are listed in the specifications for many devices and software, but it is the sole responsibility of the AVS installers to verify that their particular equipment and software selection integrate and work seamlessly with other equipment and software from the pool of approved manufacturers. These specifications represent a design guideline and design intent but they are not intended to verify that all possible equipment and software listed in this specification work and integrate seamlessly with any equipment and software form the pool of acceptable manufacturers. Approval of submittals for the AVS by the A&E of the project does not relieve the responsibility for the AVS installers to deliver a working system. Any equipment changes required because of incompatibility between different devices of a particular system, even after the equipment has been approved by the A&E, shall be provided at no additional cost to the owner.

D. The following items are not part of this scope of work:
   1. All power receptacles for the system.
   2. All conduits inside walls and under slab, including floor boxes.
   3. The network switches and network electronics.
   4. Computers and small desktop monitors required for AV system.
   5. Cable boxes or Satellite receivers

E. The following is a list of rooms where Audio Visual system shall be provided:
   1. D.B. Conference room 125, referenced hereinafter as the Conference room system
   2. Community meeting room 106, referenced hereinafter as the Community meeting room system)
   3. Admin Conference room 203, referenced hereinafter as the Conference room system
   4. Briefing room 179, referenced hereinafter as the Briefing room System.
   5. CCC/Training room 167, referenced hereinafter as the Training room System
   6. Rooms 195, 196, 197, 198 and 169. In this rooms the scope consist of one HDMI cable from the desk in the room to the TV outlet. HDMI shall be terminated at both ends on a faceplate.

1.3 INSTALLER QUALIFICATIONS

A. General: The qualifications and requirements herein apply to the specific technology identified by this specification section. Refer to the specification sections identified in Part 1.1 “Related Documents”, of this specification, for additional requirements, which are supplemented by this section.

B. Installer Qualifications: The Installer directly responsible for the work described in this specification section is also referenced as the AVS Installer. The Installer shall be a licensed and registered contractor who is, and who has been, regularly engaged in providing the installation of audiovisual systems of similar size and complexity for at least the immediate past five (5)-years.

C. Project manager requirements: The project manager for each company participating in the installation of the AVS shall be a Certified Technology Specialist (CTS) by AVIXA International. Proof of current certification shall be provided with the submittal

D. Programmer-Installer: The AVS Installer must have a factory-trained programmer/installer, for the provided Project products, in full-time employment, as part of their staff. The AVS installer needs to provide certificates of completion of training for the staff that will be taking part in the execution of this project

E. Qualification Documentation: The Installer shall provide the following documentation with their bid package, as evidence that the requirements for the Installer qualifications have been satisfied:
   1. A list of not less than five (5) references for jobs of similar size and complexity including:
      a. Project Names
      b. Locations
      c. Contact Names
      d. Contact Telephone Numbers
   2. Location (specific street address) of the office from which this installation and warranty work will be performed. It is preferred that the Installer has established and maintains a permanent office within 150 miles of the project site.
   3. Copies of Manufacturer certification certificates. It is required that the Installer possess the following certifications, at a minimum:
      a. Crestron systems certified dealer, installer and programmer.
      b. Crestron NVX certified.
      c. Biamp certified programmer.
   4. Copies of Licensure certificates.
   5. Copies of Insurance and Bonding certificates.

1.4 MATERIALS ALTERNATES AND SUBSTITUTIONS

A. General: See details for alternates and substitution in specification section 270010.

B. Specific equipment: When the design drawings indicate a brand and a model number for a piece of equipment as part of the audio visual system, the AVS Installer needs to provide the same device as indicated. Substitutions for this type of equipment are not acceptable.

C. Non-specific equipment: When the design drawings do not indicate a brand and a model number for a piece of equipment as part of the audio visual system, the AVS installer is free to pick equipment that meets the minimum specifications indicated in this section. The AVS installer needs to submit the selected choice as part of the submittal process

1.5 SHOP DRAWINGS AND SUBMITTALS

A. The AVS installer shall follow all requirements for shop drawings indicated in specification section 270010.

B. Project Start Submittals: A maximum of 60 days after the AVS installer receives a notice to proceed with the project, but no sooner than a year before substantial completion, the following information shall be submitted.
   1. Cut sheets with all specifications of every device, cables and connectors to be used in the project.
   2. One-line diagrams with all devices included in the systems. Each system in a different sheet.
   3. User interface and faceplate color submittal. The AVS installer shall prepare a separate submittal with the shape and color of all user interface plates to be approved by the Architect of the project or the Owner.
   4. Rack elevations of all AV equipment for all rooms in the project.
   5. Conduit rough-in requirements of all wall and ceiling mounted devices for all equipment part of the AVS system.
   6. Detailed layout of the DSP filters to be used in each DSP processor.
   7. Any installation and rigging details for loudspeaker systems or other heavy equipment part of the AV system.

C. Construction Submittals: During the construction process the AVS installer shall submit various documents for approval prior to continuing with the installation process. Here is some of the information the AVS installer needs to submit:
   1. Before starting the programming process the AVS Installer shall provide the following information:
      a. A schematic presentation of the layout of all the user interfaces in the project. The AVS Installer needs to get approval of this submittal before starting any programming. These layouts shall include all graphics with all button sizes, shapes, colors and wording to be used in all user interfaces. All keypads shall include working for engraving in the buttons.
      b. Completely fill out network configuration template provided by TLC Engineering upon request, to explain all network devices to be used in a project and to get IP addresses from the network administrator.
      c. A layout/presentation of any digital audio programming and user interfaces that are part of the project.
      d. Detailed layout of the DSP filters to be used in each DSP processor.
   2. Any design changes whether originated by the Owner, Designer or by the AVS Installer as a VE suggestion need to follow the same submittal process described in the previous paragraph for all equipment involved on the change.

1.6 PROJECT SPECIFIC SOURCE CODE OWNERSHIP

A. Definition of project specific source code: Project specific source code includes all source code created to generate an executable file to be intended to run in any equipment used in the installation of the AVS. Examples of project specific source code include source code used to generate executable files for control processors, DSP processors and touch panels. Project specific source code does not include source code used to create programming tools and compilers or source code used to generate operating systems or application programs running in PC based workstations.

B. Ownership: Any project specific source code used in this project shall remain the exclusive property of the Owner. By accepting the contract to perform the work included in this project, the AVS installer or designer and any other companies working creating project specific code during this project relinquish the right of ownership of this source code, and waive any licensing fees or royalties for the use of source code by the Owner or any company authorized by the owner to perform changes in the source code after the project is substantially completed for an undefined period of time.

PART 2 - PRODUCTS

2.1 SYSTEM FUNCTIONS

A. System Signals for All Systems
1. General: The completed system shall be capable of receiving, processing, routing and distributing the associated signals, noted herein, from and to the respective devices identified under Part 2 of this specification and the Contract Documents.
2. The system shall provide an audio signal response of ±6dB un-equalized (±3dB equalized) from 65Hz to 18KHz, throughout.
3. Analog video signals through the system shall be maintained to the minimum quality requirements as follows:
   a. The system shall provide a signal response of 0.7Vpp (nominal) @ 300Mhz RGB, throughout the system channel, for all visual content.
4. Digital video signals through the system shall be capable of delivering 1920X1080 resolutions at 24 fps from end to end.
5. Control signals through the system shall be maintained to the minimum level established by the control equipment manufacturer for the control protocol utilized. This level shall be correct at all connection points in the system.

2.2 CONFERENCE ROOM SYSTEM

A. General: The AVS Installer shall provide a complete and operable system with the minimum functional requirements noted herein.

B. Input sources: The AVS described for this room shall have multiple audio and video sources. Audio and video sources can be provided by a device part of the AVS or by owner provided equipment through an interface plate. The AVS Installer shall provide all source equipment except when noted in the design documents as provided by Owner or under a different division. Refer to design drawings to determine what and how many signal types will be used for each source. The AVS for this room shall have the following audio and video input sources:
1. HDMI connector in the table.
2. NUC computer for Videoconference and other applications.
3. One (1) CATV cable box
4. One USB camera built in the sound bar

C. Output devices: The AVS described for this room shall have multiple audio and video output devices. Audio and video output devices can be provided by a device part of the AVS or by owner provided equipment through an interface plate. The AVS Installer shall provide all output devices except when noted in the design documents as provided by Owner or under a separate division. Refer to design drawings to determine what and how many signal types will be used for each output device. The AVS for this room shall have the following audio video output devices:
   1. One (1) Projector type D
   2. Soundbar

D. User Interfaces: The Owner shall be able to operate and receive system status information from the AV system through the following user interfaces:
   1. A desk mounted touch screen
   2. The control system for the NUC, will be a wireless keyboard and mouse.

E. User control: The Owner shall be able to use the above mentioned user interfaces to operate the AV system. All user interfaces shall be able to perform all tasks unless otherwise noted in the design drawings or this specification. The Owner shall be able to perform the following tasks and get the following status indication from the user interfaces:
   1. System On-Off with status indication
   2. Individual display device on/off control.
   3. Select and route any audio and video source to any of the available audio and video output devices. Each output device shall provide indication in the user interface of the current source selected for that output.
   4. TV channels selection. TV channel selection shall be provided by the following methods:
      a. Manual entering channel number
      b. Pick from a list of five (5) favorite channels. Favorite channels shall be labeled by the name of the network and the channel number. The owner will provide list of favorite channels for this room.
      c. Channel up and down, by moving up or down in the list of available channels.
   5. Selected audio output device(s) volume control. Volume level should always be set to an acceptable user level during power up. Status indication of volume level shall be provided for each controllable output device.
   6. Selected audio output device(s) volume mute. Mute status indication shall be provided at user interfaces.

F. Special Features: The AVS shall allow the owner to perform certain automated task by means of using the user interfaces. Those task will be available only on the user interfaces mentioned within this paragraph:
   1. Shared processor: The two rooms of this type and the briefing room will share one single control processor.
   2. Shared cable boxes. There is one cable box assigned to each room and one for the briefing room. When the cable boxes are not selected by the users in any of these rooms, the cable boxes shall be available for the users in the Training room. The software should keep track on what system is using each of the cable boxes, and when more users try to access one cable box, it shall prevent the last user from taking control of the cable box, but it should allow for the video to be displayed in the system. So the last user could see the same video as the one in one of the conference rooms, but should not be able to change channels, unless the user in the conference room shuts off the system or no longer uses the cable box.
   3. Room 203, shall have two room scheduling panels to indicate scheduled meetings in the room. This panel shall communicate directly with Microsoft Outlook without the need of any servers or other 3rd party software.

2.3 BRIEFING ROOM SYSTEM

A. General: The AVS Installer shall provide a complete and operable system with the minimum functional requirements noted herein.

B. This room shall operate very similar as the conference room but instead of having a NUC computer for soft codec videoconference it shall have a wireless presentation system in the VPD Wi-Fi, so they can present in this room from mobile devices or laptops. The options for wireless presentation shall be available in the wall mounted touchscreen.

C. See “Conference room system” for the use of the cable box for this room.

2.4 TRAINING ROOM SYSTEM

A. General: The AVS Installer shall provide a complete and operable system with the minimum functional requirements noted herein.

B. Input sources: The AVS described for this room shall have multiple audio and video sources. Audio and video sources can be provided by a device part of the AVS or by owner provided equipment through an interface plate. The AVS Installer shall provide all source equipment except when noted in the design documents as provided by Owner or under a different division. Refer to design drawings to determine what and how many signal types will be used for each source. The AVS for this room shall have the following audio and video input sources:
1. Three (3) Podium connection for HDMI.
2. Four (4) ceiling microphones.
3. Three (3) cable boxes shared with the Briefing room and conference room
4. AV workstation (O.F.E)

C. Output devices: The AVS described for this room shall have multiple audio and video output devices. Audio and video output devices can be provided by a device part of the AVS or by owner provided equipment through an interface plate. The AVS Installer shall provide all output devices except when noted in the design documents as provided by Owner or under a separate division. Refer to design drawings to determine what and how many signal types will be used for each output device. The AVS for this room shall have the following audio video output devices:
1. Two (2) Projector type 1
2. Four (4) Flat panel displays type T (O.F.E.) for local sources and Cable TV only
3. Program speakers as indicated in design drawings.

D. Controllable devices: The AVS described for this room shall have a microprocessor based controller as indicated in the design drawings. This controller shall be capable of managing all input sources, output devices and other devices part of the AVS. Refer to design drawings to determine what and how many signal types will be used for each controllable device. The following is a list of other controllable devices to be provided by this room.
1. Three (3) Electric projection screen.
2. One (1) DSP audio processor.

E. User Interfaces: The Owner shall be able to operate and receive system status information from the AV system through the following user interfaces:
1. Two (2) wall mounted touch screen

F. User control: The Owner shall be able to use the above mentioned user interfaces to operate the AV system. All user interfaces shall be able to perform all tasks unless otherwise noted in the design drawings or this specification. The Owner shall be able to perform the following tasks and get the following status indication from the user interfaces:

1. System On-Off with status indication
2. Individual display device on/off control and video mute.
3. For the four independent displays, all control features such as source selection, volume up/down, mute, channel up and down and all features built in in the TV shall be available at the user interface on a display by display setting. The design intent is to allow the end user to use the displays without the need of the remote control that comes with the unit, even though those displays don't; have any sources tied to this system.
4. Select and route any audio and video source to any of the available audio and video output devices. Each output device shall provide indication in the user interface of the current source selected for that output.
5. TV channels selection. TV channel selection shall be provided by the following methods:
    a. Manual entering channel number
    b. Pick from a list of five (5) favorite channels. Favorite channels shall be labeled by the name of the network and the channel number. The owner will provide list of favorite channels for this room.
    c. Channel up and down, by moving up or down in the list of available channels.
6. Selected audio output device(s) volume control. Volume level should always be set to an acceptable user level during power up. Status indication of volume level shall be provided for each controllable output device.
7. Selected audio output device(s) volume mute. Mute status indication shall be provided at user interfaces.
8. Voice conference control shall include dialing keypad, hang up and off hook buttons and indicators, five (5) number memory buttons, microphone mute and user recording of memory buttons.

G. Special Features: The AVS shall allow the owner to perform certain automated task by means of using the user interfaces. Those task will be available only on the user interfaces mentioned within this paragraph:
1. Room combine: The room combine mode shall allow the owner to select the operation mode of the rooms from the following options:
    a. Each room independently.
    b. Rooms A and B as a single room. (A+B)
2. Once a room combine mode is selected the grouped rooms shall operate as a single room for audio mode.
3. A video combine mode is also required while in room combine mode. In this mode, the owner shall be able to select what source goes to the secondary screen, from the user interfaces. Video combine mode could be turned on and off. While off the second screen will follow the screen where the podium is connected at all time.
4. There are 3 cable boxes shared between this room and the conference room and briefing room. See the functional descriptions of those system.

H. DSP Features: The AVS shall program the DSP audio processor to provide at least the following features, additional to the functionality described above:
1. All inputs and outputs shall be labeled at the physical input/output and by text blocks within the software.
2. If audio or video conferencing are not part of the system, microphones shall be input to a standard mic input. Each microphone channel shall have an adjustable HPF (High Pass Filter), compressor/limiter and a 3-band parametric equalizer in its path.
3. If audio or video conferencing are part of the system, microphones shall be input to an Acoustic Echo Cancellation (AEC) input. Noise reduction shall be enabled for reduction of room background noise. Prior to being fed into an Automatic Mixer (AM) with direct outputs, each microphone channel shall also have an adjustable HPF (High Pass Filter), compressor/limiter and a 3-band parametric equalizer in its path.
4. Program audio: Prior to being fed into a matrix mixer, each program channel shall also have an adjustable HPF (High Pass Filter), compressor/limiter and a 3-band parametric equalizer in its path.

5. All inputs/outputs shall be connected to a matrix mixer, which will allow for flexibility in routing, gain adjustment and presets.

2.5 COMMUNINTY ROOM SYSTEM

A. General: The AVS Installer shall provide a complete and operable system with the minimum functional requirements noted herein.

B. Input sources: The AVS described for this room shall have multiple audio and video sources. Audio and video sources can be provided by a device part of the AVS or by owner provided equipment through an interface plate. The AVS Installer shall provide all source equipment except when noted in the design documents as provided by Owner or under a different division. Refer to design drawings to determine what and how many signal types will be used for each source. The AVS for this room shall have the following audio and video input sources:
1. One (1) podium connection with HDMI.
2. One (1) Cable box.
3. One (1) Media presentation system connected to the Public Wi-Fi

C. Output devices: The AVS described for this room shall have multiple audio and video output devices. Audio and video output devices can be provided by a device part of the AVS or by owner provided equipment through an interface plate. The AVS Installer shall provide all output devices except when noted in the design documents as provided by Owner or under a separate division. Refer to design drawings to determine what and how many signal types will be used for each output device. The AVS for this room shall have the following audio video output devices:
1. Two (2) Flat panel display type D
2. Program speakers as indicated in design drawings.

D. Controllable devices: The AVS described for this room shall have a microprocessor based controller as indicated in the design drawings. This controller shall be capable of managing all input sources, output devices and other devices part of the AVS. Refer to design drawings to determine what and how many signal types will be used for each controllable device. The following is a list of other controllable devices to be provided by this room.
1. One (1) Volume control system

E. User Interfaces: The Owner shall be able to operate and receive system status information from the AV system through the following user interfaces:
1. A wall mounted touch screen

F. User control: The Owner shall be able to use the above mentioned user interfaces to operate the AV system. All user interfaces shall be able to perform all tasks unless otherwise noted in the design drawings or this specification. The Owner shall be able to perform the following tasks and get the following status indication from the user interfaces:
1. System On-Off with status indication
2. Individual display device on/off control and video mute.
3. Select and route any audio and video source to any of the available audio and video output devices. Each output device shall provide indication in the user interface of the current source selected for that output.
4. TV channels selection. TV channel selection shall be provided by the following methods:
    a. Manual entering channel number
    b. Pick from a list of five (5) favorite channels. Favorite channels shall be labeled by the name of the network and the channel number. The owner will provide list of favorite channels for this room.
    c. Channel up and down, by moving up or down in the list of available channels.

5. Selected audio output device(s) volume control. Volume level should always be set to an acceptable user level during power up. Status indication of volume level shall be provided for each controllable output device.
6. Selected audio output device(s) volume mute. Mute status indication shall be provided at user interfaces.
7. Individual control and status indication of all features for all controllable devices

G. Special Features: The AVS shall allow the owner to perform certain automated task by means of using the user interfaces. Those task will be available only on the user interfaces mentioned within this paragraph:
1. This type of room shall have at least one room scheduling panel to indicate scheduled meetings in the room. This panel shall communicate directly with Microsoft Outlook without the need of any servers or other 3rd party software.

2.6 WIRE, CABLE, CONNECTORS, AND ACCESSORIES

A. General: The AVS Installer shall provide the system components and materials necessary to properly install, support, and terminate all audiovisual cabling, in accordance with the related documents identified in Part 1.1 of this specification. Where the Project Electrical Installer has provided a raceway designated for use by this system, the AVS Installer shall coordinate and install all required cables into the provided raceway. The AVS Installer shall also provide and attach all required cable connectors.

B. Cable: The AVS Installer shall provide all cabling associated with, and required to, provide a complete, operable system in accordance with the Contract Documents. All cable provided by the AVS Installer shall be of a manufacture and quality consistent with the design intent, and shall be reviewed by the Engineer prior to installation.

C. Cabling in air handling spaces. The AVS Installer is responsible for determining the rating of the cables to be used for the AVS, as per current version of the National Electrical Code. If, at the bidding point the AVS Installer is not certain about the type of cables to be used in the project, the AVS Installer shall assume that all cables need to be plenum rated cables.

D. Cabling below grade: When cable part of the AVS have to be run in conduits below slab and grade level, the AVS Installer shall use only cables with water-blocking jackets.

E. Cable signals: The following is a list of signal types and the cables to be used for those signals:
1. Line level audio signal cable: Provide one (1) twisted pair cable for mono signals and two (2) twisted pair cables for stereo signals. Twisted pair cables to be 22 AWG stranded (7X30) tinned copper conductors with overall foil shield (100% coverage), with 22 AWG stranded tinned copper drain wire.
2. Microphone level audio signal cable: Provide one (1) twisted pair cable, 20 AWG stranded (7X28) tinned copper conductors, overall foil shield (100% coverage) with a 20 AWG stranded tinned copper drain wire.
3. Analog video, audio and control over twisted pair cable: Provide one (1) 4-pair 24 AWG twisted pairs solid bare copper conductors with polyolefin insulation. Use CAT6 cable.
4. Proprietary Control cable (i.e. Cresnet® Signal): Provide one (1) cable with 1 twisted pair 22 AWG stranded bare copper conductors with overall aluminum/polyester foil (100% coverage) and a 24 AWG tinned copper drain wire, and one (1) unshielded twisted pair, 18 AWG stranded bare copper conductors.
5. Control cable (i.e. RS-232, RS-485 Signal): Provide one (1) cable with 1 or 2 twisted pair 22 AWG stranded bare copper conductors with overall aluminum/polyester foil (100% coverage) and a 24 AWG tinned copper drain wire. Pair count depends on manufacturer's specifications.
6. Digital video, audio and control over twisted pair. Provide one, two or more cables UTP or STP as required by transceiver equipment manufacturer to ensure the digital signal is transported properly up to 328 ft, at maximum resolution indicated in part 2.01 of this specification. If equipment

manufacturer supports the use of standard UTP Category (5e, 6 or 6A) for this application, the AVS installers shall provide CAT6 cables.

7. UTP Category cables. Provide UTP category cables for all Ethernet connection part of the AVS as indicated in design drawings, including horizontal cables, patch cords and station cables. All cables part of the AVS shall have all specifications and shall be included in the same warranty as all cables provided for the rest of the facility section 27100.
8. Speaker Cable: Provide two (2) unshielded bare high conductivity ETP copper 16 AWG stranded conductors, with overall jacket.
9. Component video signal cable: Provide three (3) coaxial 25 AWG solid .018" tinned copper conductors, Gas-injected foam HDPE insulation, Duobond® (100% coverage) plus a tinned copper interlocked serve shield (95% coverage). Cable shall have inner jacket on each coaxial conductor, outer jacket for all conductors and characteristic impedance of 75Ω on each conductor.
10. IR control signal cable. Provide one (1) pair, unshielded twisted pair cable with 22 AWG solid copper conductors.
11. Contact closure signal cable. Provide one (1) or more unshielded twisted pair cable with 22 AWG solid conductors. Quantity of pairs as required by the application.
12. HDMI Cables. All HDMI cables longer than 10 meters (32.8 ft.) must include an adaptive cable equalizer capable of providing not less than +40 dB of cable compensation @ 825 MHz. Such device must be capable of operating automatically without the need for human intervention and must include an external AC to DC power converter that can accept 100-240VAC @ 50/60 Hz. Furthermore, such device must also include I2C correction circuitry to mitigate the effects of long cable runs on the DDC clock and DDC data signals. HDMI cables shall have the following requirements:
    a. Support HDMI v1.3 with resolutions up to 1080P with 12-bit color depth
    b. Support HDMI v1.3 Category 2 data rates (3.4 Gbit/sec.) lengths up to 7.5 meters
    c. Support HDMI v1.3 data rates up to 2.25 Gbit/sec. lengths up to 40 meters
    d. Support PC data rates up to 1.65 Gbit/sec. lengths up to 60 meters
    e. Supports PC resolutions up to 1600x1200 / 60 Hz and 1920x1200 / 60 Hz
    f. Made of AWG-22 gauge wires
    g. Triple shield for noise immunity
    h. Cable jacket shall have dual UL Ratings: UL13 (CL2) and UL758 (AWM20276) for non-plenum spaces. In plenum environments cables shall have a CL2P rating or CMP rating.
    i. RoHS compliant.
    j. Gold plated connectors
13. DVI Cables. All cables carrying DVI signals through conduit, floor slabs or longer than 10 ft. shall be HDMI cables as described in previous section with HDMI to DVI adapters in both ends.

2.7 PROJECTOR TYPE 1

A. General: The projector referenced in this specification section and in the design drawings as type 1 shall have the following specifications:
1. Projector native image format: 16:10.
2. Light source technology: Laser, LED/Laser,
3. Projector technology: DMD or LCD,
4. Brightness: minimum 4700 ANSI Lumens
5. Native resolution: 1920 X 1200
6. Lens: Manual zoom and focus
7. Lens throw distance: as indicated in the drawings
8. Usable resolutions: The unit shall be capable of displaying all resolutions, from 480i to 1080P in all HDMI inputs
9. Video input ports: (1) HDMI HDCP compliant.
10. Control ports: RS-232 in a DB9 connector.
11. Warranty: 3 years, commercial grade unit. Consumer grade units with extended warranties not acceptable.

B. Accessories: This projector shall be supplied with a corresponding lens to achieve the throw distance indicated in the design drawings. Projector mounts shall be provided with all projector. Design selection for the projector mount is Chief Manufacturing Company recommended mount for the projector specified.

C. Accepted manufacturers:
1. Christie Digital,
2. Panasonic,
3. Sharp,
4. Hitachi,
5. NEC,
6. Mitsubishi,
7. Barco,
8. Projection Design,
9. Digital Projection,
10. Epson,
11. Optoma.

2.8 FLAT PANEL DISPLAY TYPE D

A. General: The flat panel display referenced in this specification section and in the design drawings as type D shall have the following specifications:
1. Flat panel display format: 16:9.
2. Flat panel technology: OLED
3. Screen size diagonal: As indicated in design drawings ± 1 inch.
4. Bezel: Bezel around screen shall be no bigger than 0.75”
5. Native resolution: 3840 X 2160
6. ATSC tuner included: No
7. Speakers provided: No
8. Video input ports: (2) HDMI,
9. Audio output ports: One (1) unbalanced stereo output.
10. Control ports: RS-232 in a DB9 connector.
11. Warranty: 3 years, commercial grade unit. Consumer grade units with extended warranties not acceptable

B. Accessories: Use an articulating wall mount with an in-wall storage solution to hold other devices. Design selection for the flat panel mount is Chief Manufacturing Company recommended mount for the display specified.

C. Accepted manufacturers:
1. Mitsubishi,
2. LG Electronics,
3. JVC,
4. Panasonic,
5. NEC,
6. Samsung,
7. Sharp,
8. Sony.

2.9 FLAT PANEL DISPLAY TYPE T

A. General: The flat panel display referenced in this specification section and in the design drawings as type T shall have the following specifications:

1. Flat panel display format: 16:9.
2. Flat panel technology: OLED
3. Screen size diagonal: As indicated in design drawings ± 1 inch.
4. Bezel: Bezel around screen shall be no bigger than 0.75”
5. Native resolution: 3840 X 2160
6. ATSC tuner included: Yes
7. Speakers provided: Yes
8. Video input ports: (2) HDMI
9. Audio output ports: One (1) unbalanced stereo output.
10. Control ports: RS-232 in a DB9 connector.
11. Warranty: 3 years, commercial grade unit. Consumer grade units with extended warranties not acceptable

B. Accessories: Use an articulating wall mount with an in-wall storage solution to hold other devices. Design selection for the flat panel mount is Chief Manufacturing Company recommended mount for the display specified.

C. Accepted manufacturers:
1. Mitsubishi,
2. LG Electronics,
3. JVC,
4. Panasonic,
5. NEC,
6. Samsung,
7. Sharp,
8. Sony.

2.10 ELECTRIC SCREENS

A. General: The Electric screen referenced in this specification section and in the design drawings shall have the following specifications:
1. Screen format: 16:10.
2. Screen dimensions: As shown in the design drawings ± 3 inchs
3. Screen projection type: Front projection
4. Screen case mounting: in-ceiling
5. Tensioned screen: Yes
6. Screen gain: 1
7. Viewing angle: 45°
8. Screen fabric: seamless, flame retardant, mildew resistant vinyl.
9. Motor: oil free, quick reversal, with adjustable limit switches.

B. Accepted manufacturers:
1. Da-Lite,
2. Draper,
3. Stewart.

2.11 NETWORKING EQUIPMENT

A. General: All networking equipment required for the AVS shall be provided by the owner unless otherwise note in the design documents.

2.12 IDENTIFICATION AND LABELING TAGS

A. The AVS installer shall follow labeling materials indicated in specification section 270010.

PART 3 - EXECUTION

3.1 INSTALLATION PRACTICES

A. General: The AVS installer shall follow all installation practices indicated in specification section 270010.

B. Workmanship: The AVS Installer shall adhere to, at a minimum, the following installation practices:
1. Securely mount equipment plumb and square in place. Where equipment is installed in cabinets, provide mounting bolts in all equipment rack fastening holes. All rack mount equipment shall be secured with Rackmount Solutions HTX™ security screws (STAR-TYPE or similar) provided with nylon washers between bolt heads and equipment.
2. Where equipment (such as VHS players, monitors, DA's etc… and other system devices) is packaged by the manufacturer without rack mount ears or braces, as part of a regular manufacture process, the Installer shall provide all required, accessory ears, brackets, and shelves, which are necessary to properly mount the equipment within the designated cabinets and rack locations.
3. Provide appropriate ventilation panels, vents, and/or fans to assure sufficient ventilation for adequate cooling of all equipment.
4. Confirm the polarity and phasing of system components before installation. Connect to maintain uniform polarity and phasing.
5. Insulate all non-insulated, stranded conductors before making termination when connecting to equipment terminals.
6. "Wire", "wing" and "twist" NUT type connections are not permissible for any type of signal connection.
7. All wiring is to be free from grounds loops, shorts, opens, and reversals.
8. Neatly tie all cabling within equipment cabinets, housings, and terminal cabinets with nylon cable ties at not more than 12" intervals for cables different from 4-pair CAT cables. Use Velcro straps to tying all 4-pair CAT cables. Install in accordance with the latest EIA installation standards. Engineer approved wiring trough may be used in lieu of tie-wraps. Cable routing shall not braid or cross with other wires in parallel more than once.
9. Secure all cables in equipment cabinets and terminal cabinets to provide strain relief at all raceway exits in accordance with NFPA 70 including all supplements. All plugs and receptacles are to be the grounding type.
10. Connect all equipment power to surge/noise suppression outlet strips or associated power conditioning devices.
11. Where system cables are extended through an exposed umbilical connection, the Installer shall harness all associated cable within a common, manufactured, flexible, sheath (ex. Snakeskin™).
12. All racks and cabinets shall be bonded to a grounding system as required by NEC.

C. Raceways. All raceways for audio/visual devices shall have the following specifications:
1. Refer to specification section 270528 for all raceways specification.
2. All cables for speaker level signals, regardless of their level shall be run in separate raceways from other low voltage cables.
3. All cables for microphone level signals, regardless of their level shall be run in separate raceways from other low voltage cables.
4. Raceways for AV outlets: Outlets for AV cables shall be composed of electrical boxes (sized for the amount of connectors) and a conduit(s) to the nearest accessible ceiling space. All AV outlet boxes shall be at least 2.5" deep.
5. All indoor rated cables can be supported with j-hooks or cable hangers above accessible ceiling spaces. J-hooks shall be spaced no longer than 4. Ft.

D. Labeling System. The labeling system for all cables shall be a system that allows for unique identifiers for each cable. Each cable has to have an indicator from where it is coming from and an indicator to where it is going to.

E. Engraving: All push buttons interfaces and connection plates part of the AVS shall be engraved with descriptive wording of the use of the button/plate. The AVS Installer shall submit and receive approval for the proposed wording in each button/plate before doing the engraving. Failure to follow this step might cause the AVS installer to replace the buttons in interfaces and/or plates where the Owner is not satisfied with the wording of the label at no additional cost to the Owner. The color of the wording in the engraving shall have high contrast with the background color of the button.

F. Installation of Screens: Whether shown in the drawings or not the AVS installer shall install all projection screens following the following installation practices:
1. All electric screens shall be provided with a low voltage controller to be mounted inside the screen housing.
2. All electric screens shall be provided with a control wall plate mounted at 48" A.F.F.
3. All in-ceiling screens shall be leveled with the ceiling grid.
4. All in-ceiling screens housing shall be plenum rated when installed in plenum spaces.
5. All in-ceiling screens installed in hard ceilings shall include an access panel no smaller than 16"X16" to access the electrical junction box of the screen. Access panel shall be a metal panel, with a hinged door and painted the same color as the finished ceiling.

G. Projector Installation: The Installer shall adhere to, at a minimum, the following installation practices for projectors:
1. Projector shall be provided with corresponding mounting brackets depending on the projector selected.
2. All anchors and supports whether pre-fabricated or customs, required to mount the projector where indicated in the design drawings are in the scope of work of the AVS Installer
3. When electronics are provided next to the projector (receivers, controllers, etc.), provide an enclosure to mount all electronics suitable for the space above the ceiling (plenum, nor plenum)

H. Flat Panel Display Installation: The AVS Installer shall adhere to, at a minimum, the following installation practices for flat panel display devices
1. All anchors and supports whether pre-fabricated or customs, required to mount the displays where indicated in the design drawings are in the scope of work of the AVS installers.
2. All walls where flat panel displays will be installed shall be re-enforced with sheet metal behind the drywall. The extent of the re-enforcing shall be the contour of the flat panel display to be installed.
3. When flat panel displays are installed inside a wall niche, the AVS shall provide a wall mount with adjustable depth that allows the flat panel display to be installed flush with the exterior wall.
4. Power and AV outlets to be installed behind flat panel displays in the in-wall box for the mount
5. For flat panel displays mounted on structures, the installer shall provide anchoring as approved by structure manufacturer.
6. For flat panel displays suspended from the structure above, the installer of this system shall provide all custom brackets and pipes properly secured to the structure to mount the displays

I. Speaker Installation: The Installer shall adhere to, at a minimum, the following installation practices for speakers:
1. All ceiling mounted speaker shall have a support wire tie to the building structure. Ceiling speakers shall not be supported from the ceiling grid.
2. All ceiling mounted speakers shall be installed with a backbox to prevent sound from dispersing into the plenum space and causing noise issues in adjacent rooms.
3. When ceiling speakers are mounted in fire rated partitions, the speakers shall have UL listed speaker back boxes with a fire rating no less than the rating of the partition.
4. All in-wall speakers shall be installed with pre-construction brackets.

J. Millwork Openings: When AV equipment like flip tops and plates will be mounted in millwork provided by the owner or third parties, the AVS installers shall provide cut out dimensions for all the AVS equipment listing location in the millwork where the cuttings need to be done. It is the AVS installer's responsibility to install those devices in the millwork, once the openings have been done. All millwork opening shall be done by the furniture manufacturer.

K. Floor Boxes. Floor boxes used for connection to teaching lecterns, podiums, conference tables, or mixing boards shall have at least the following minimum requirements:
1. Floor boxes shall be large enough to have at least 3 different compartments, one for power one for voice/data cables and one for AV.
2. Each low voltage compartment shall have a separate raceway back to the accessible ceiling space. If speaker wires are run from the lectern, the AV compartment shall have one 1" and one ¾" conduit to the nearest accessible ceiling space. If no speaker wires are run from the lectern, at least one 1" conduit from the AV compartment to the accessible ceiling shall be provided. Additional conduits might be required depending on the application.
3. There shall be no daisy-chaining of AV conduits between adjacent floor boxes. Floor boxes shall also allow to recess the connectors from the umbilical cord tied to the lectern.
4. Floor boxes shall have a recessed compartment to hold connectors. Floor boxes that leave AV connectors flushed with the floor are not desirable since they become tripping hazards and could be easy broken with the lectern when moved.
5. AV compartments shall have termination plates and connectors for all cables coming from the accessible ceiling space. Pass-through cables shall not be allowed in floor boxes. All connectors shall be properly secured to the plates in the floor box. All unused compartments shall have blank plates.

3.2 REQUEST OF IP ADDRESS

A. General: The AVS installer shall follow all requirements indicated in specification section 270010 for the request of IP addresses for devices part of the AVS.

3.3 SOFTWARE PROGRAMMING AND INSTALLER TESTING

A. The software programming and testing of the AVS system will be a multi-step process. The AVS Installer shall provision in the proposal for the time indicated in each of the steps:

B. Briefing Step: A maximum of 45 days after the AVS installer receives the NTP for this project, the AVS installer shall request one or more briefing sessions with the Owner and/or design engineer to go over the expectation of each room and clarify any points that might not be clear to the AVS Installer. Some important notes about this step are:
1. The AVS installer shall allocate at least 8 hours of meeting time
2. Travel time will not be counted as part of the meeting time.
3. The quantity of staff required to attend these meetings by the AVS Installer is sole decision of the AVS Installer.
4. Before the start of this step the AVS installer shall have software programming submittals approved as described in part 1 of this specification section.
5. The AVS Installer shall prepare meeting minutes of the key decisions made during these meetings. The approval of these meeting minutes by the Owner and Design Engineer will be accepted as approval notice of this step.

C. Shop Programming Step: Once the briefing step has been completed and approved, the AVS installer shall allocate off-site programming time to accomplish all the requirements listed in this specification and the clarifications done in the previous step. It is the sole responsibility of the AVS Installer to estimate

how many man hours are required for this step. This step does not require approval by the Owner and/or design Engineer.

D. Field Verification Step: After all AVS equipment has been installed on site and the system has been programmed, the AVS Installer shall request one or more working sessions with the Owner and/or design engineer to verify in the field the functionality of the AVS system. Some important notes about this step are:
   1. The AVS Installer shall allocate at least 10 hours of working sessions.
   2. Travel time will not be counted as part of the working sessions.
   3. The AVS installer shall have different AV media and sources to test all features in the AVS system.
   4. The quantity of staff required to attend these meetings by the AVS Installer is sole decision of the AVS Installer.
   5. Physical installation of all devices will be checked by the Owner and/or the Design Engineer. Any deviations in the installation of the equipment part of the AVS from this specifications and previous meetings will be noted by the Design Engineer in a "punch list". This punch list will be send to the AVS installer within the next 5 days of the meeting for immediate corrective action. One punch list will be prepared for each room with AVS.
   6. The AVS Installer shall prepare meeting minutes of the key decisions made during these meetings that affect the programming sequence. The approval of these meeting minutes by the Owner and Design Engineer will be accepted as approval notice of this step.

E. Final Adjustment Step: Once the previous step has been approved, the AVS Installer shall allocate time to make any corrections to the AVS system on site based on the conclusions of the previous step. It is the sole responsibility of the AVS Installer to estimate how many man hours are required for this step. This step does not require approval by the Owner and/or design Engineer.

F. Signal Adjustment: The AVS Installer shall ensure that the following adjustments, tests and measurements, at a minimum, have been completed:
   1. The system shall be measured and adjusted for optimum signal quality and minimum signal loss, to all audio and video signals, through the system channel, using appropriate test equipment and standardized testing procedures.
   2. The system shall be measured and adjusted for optimum signal-to-noise ratio and maximum headroom in the system electronics.
   3. The system shall be measured and adjusted to eliminate distortions or degradation of signal resulting from, but not limited to, clipping, hum, noise, and RFI interference.
   4. The Installer shall check the quality of each signal, at its source, and compare it against the quality of the signal at various points of its transmission through the system. The Installer shall correct the system for any significant (the lesser of 2dB or the manufacturers throughput requirements) signal distortion or loss.

3.4 SYSTEM WARRANTY AND SERVICE

A. General: The AVS installer shall follow all warranty and service requirements indicated in specification section 270010.

3.5 ENGINEER'S FINAL ACCEPTANCE TEST

A. General: The AVS installer shall follow all test requirements indicated in specification section 270010

B. As part of the Engineer's final acceptance all sources, inputs, outputs and interfaces will be tested. Additional notes about the final acceptance test:

1. It is the sole responsibility of the AVS system installer to estimate the time allocated for this step. It is assume that at this point in time all the features of the AVS system are clear to the Owner and the AVS Installer so this step is just to make sure that all the features are working properly as agreed.
2. The AVS installer shall have different AV media and input signal generators to test all input plates and sources in the AVS system.
3. The quantity of staff required to attend these meetings by the AVS Installer is sole decision of the AVS Installer.
4. Failure to complete one or more of the previously issued punch list items or failure to correct any programming changes previously noted will revoke acceptance of the room or system being tested.
5. Final acceptance will be granted on a room by room basis.

3.6 TRAINING AND INSTRUCTION

A. General: The AVS installer shall follow all training requirements indicated in specification section 270010. The AVS Installer shall provide the owner with different types of training as described herein.

B. System Administration Training. The AVS installer shall provide system administration training at the job site as described below:
1. At least 8 hours of training shall be provided.
2. Travel time will not be counted as part of the training sessions.
3. Training will be broken down to a maximum of 2 sessions in different days.
4. The objective of the system administration training will be to properly operate, trouble shoot, calibration and perform specific field repairs to AVS equipment.
5. Field repair and calibration training will be limited to those repairs notes by the manufacturer of the equipment as field repairs done by non factory trained personnel.
6. Training shall be done at the job site with all the equipment operational after final acceptance.
7. Training will be limited to a maximum of 5 attendees per session.
8. Operation and Maintenance manuals shall be delivered at the beginning of this sessions.

C. User Training. The AVS installer shall provide system administration training at the Job site as described below:
1. At least 10 hours of training shall be provided.
2. Travel time will not be counted as part of the training sessions.
3. Training will be broken down to a maximum of 3 sessions in different days.
4. The objective of the user training will be to properly operate the AVS.
5. Training will be limited to a maximum of 20 attendees per session.
6. User short form guides shall be provided to all attendees of the sessions.
7. Short form guides shall provide the users with quick finding ways to operate the system. If AVS operation is different from one room to the other, one separate short form guide shall be provided for each room.

D. Factory Training: The AVS installer shall provide factory training as described below:
1. List all factory training.

3.7 AS BUILT DOCUMENTS AND CLOSE OUT INFORMATION

A. General: The AVS installer shall follow all as built and close out information requirements indicated in specification section 270010

B. The following information shall be included in the as built drawings:
1. Drawings indicating final floor plan locations of all AV devices
2. One line diagrams with all devices connected in the system.

3. Mounting details
4. Any signed and sealed structural calculations required for the AVS

C. Additional close out information to be delivered by the AVS installer:
1. All programming source code done by the AVS for this project for all pieces of equipment in digital format (no printed copies required).
2. List of all IP addresses assigned to each equipment part of the AVS.
3. Compiled executable files as requested for Computer based user interface.
4. All printed test results.

END OF SECTION 274100

SECTION 27 4134 – BROADBAND DISTRIBUTION SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. General: Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

B. General: Telecommunications Drawings apply to work of this section. The overall and detailed Broadband distribution design shown on the drawings, selected materials, device locations, installation details, mounting details, cabling routing and supporting and all technical specifications if provided on the drawings apply to work of this section.

C. General: Requirements indicated in the following standard apply to the work to be performed under this specification section:
   1. TIA-568-C.4 (July 2011) “Broadband Coaxial Cabling and Components Standard”. Including addendum and errata.

D. Supplemental: Refer to the specification sections identified below for additional requirements, which are supplemented by this section.
   1. 270010 Technology General Provisions
   2. 270528 Raceways for Technology
   3. 270526 Grounding and Bonding for Telecommunications Systems

1.2 DEFINITIONS

A. Agile Receiver: A broadband receiver that can be tuned to any desired channel.

B. Broadband: For the purposes of this Section, wide bandwidth equipment or systems that can carry signals occupying in the frequency range of 54 to 1002 MHz. A broadband communication system can simultaneously accommodate television, voice, data, and many other services.

C. Carrier: A pure-frequency signal that is modulated to carry information. In the process of modulation, it is spread out over a wider band. The carrier frequency is the center frequency on any television channel.

D. CATV: Community antenna television; a communication system that simultaneously distributes several different channels of broadcast programs and other information to customers via a coaxial cable.

E. CCTV: Closed-circuit television.

F. CEA: Consumer Electronics Association.

G. dBmV: Decibels relative to 1 mV across 75 ohms. Zero dBmV is defined as 1 mV across 75 ohms. dBmV = 20 log 10(V1/V2) where V1 is the measurement of voltage at a point having identical impedance to V2 (0.001 V across 75 ohms).

H. DOCSIS. Data Over Cable Service Interface Specification. This is an international telecommunications standard that permits the addition of high-speed data transfer to CATV system.

I. Headend: The control center of the master antenna television system, where incoming signals are amplified, converted, processed, and combined into a common cable along with any locally originated television signals, for transmission to user-interface points. It is also called the "Central Retransmission Facility."

J. MATV: Master antenna television; a small television antenna distribution system usually restricted to one or two buildings.

K. RF: Radio frequency.

1.3 DESCRIPTION

A. Broadband Distribution Systems shall provide distribution of video, television signals to all selected spaces in the buildings. The system design anticipates increasing demands for expanded channel capacity. The system shall include, but not be limited to passive and active infrastructure like distribution amplifiers, directional couplers, taps and splitters as required to achieve a fully functional system.

B. General: Provide, complete with all accessories, a complete distribution system as describe herein and as indicated on the drawings

C. Standards: Distribution system components and overall system performance shall meet or exceed the following standards:
1. Federal Communications Commission Technical Specifications Title 47, Part 76 as applied to cable television systems.
2. TIA – 568-C.4 “Broadband coaxial cabling and components”. July 2011.
3. TIA-606-B (June 2012), “Administration Standard for Telecommunications Infrastructure” with addendum and errata.

D. RFI: Special emphasis shall be placed on radio frequency interference (RFI) integrity as licensed radio services outside the cable system share the same frequencies designated for use within.

E. Distribution of direct broadcast satellite service signals, which includes coordinating with Owner's selected service provider for installation of its dish-type antennas and processing the signals as needed to provide specified services combined into a single-feed point ready for connection into the distribution system. Obtain signal levels, and noise and distortion characteristics from service provider as the point of departure for system layout and final equipment selection.

F. Intent of design drawings: The intent of the design drawings is to indicate the scope of work of the project and to allow the installer to properly bid the project. The design drawings are based on estimated distances between devices. Once all cable are run, the installer shall measure the exact cable footages between equipment locations and shall adjust the calculations of the system to comply with the performance criteria indicated in this specification section. The installer shall change any taps, equalizers or directional couplers to match the modified calculations by the installer, at no additional cost to the owner.

1.4 SERVICES SUPPORTED

A. The system configuration will allow the forward distribution of the following incoming TV signals:
1. Analog channels from Cable provider
2. Digital channels from cable provider
3. High Definition channels from cable provider
4. Digital Satellite TV.

B. The system bandpass shall allow for the following channel loading and forward distribution:
1. One hundred and twenty nine (129) channels from 47 MHz to 860 MHz.

C. The system shall allow for a return path with a loading of 3 channels from 5 MHz to 42 MHz.

1.5 INSTALLER QUALIFICATIONS

A. Qualifications: The CATV installer installing this system shall be experienced in the design, installation, proof of performance testing and maintenance of broadband cable television systems comparable or larger in size and complexity to the system required on this project. Such experience shall be indicated in a list of successfully completed systems with the submittal for this system. Contact names and addresses for all references shall be provided.

B. Equipment: The CATV installer executing this work shall own and maintain at least the following equipment for execution and maintenance of this system;
1. A CATV signal level meter capable of measuring levels between 5 and 1000 megahertz for both digital and analog channels. For example Blonder Tongue BTPPRO-1000.
2. CATV Plant certification meter such as JDSU DSAM Wavetek Series Field Meter Model DSAM 6300
3. A flat noise generator or sweep/marker generator capable of providing a calibrated output between 5 and 1000 megahertz.
4. An oscilloscope with a suitable RF detector for use in sweep testing system response.
5. A return loss bridge and variable termination for on-site cable sweep testing prior to installation.
6. A time domain reflectometer designed for operation into 75-ohm polyethylene dielectric cable for verification of installed cable.
7. Composite test sets, simul-sweep equipment and other test systems capable of providing the required functions shall be considered equivalent to the equipment specified.
8. A stripping/coring tool appropriate for 0.500” hardline cable or larger cables.

C. Resume: A resume of personal cable television experience shall be submitted for the cable foreman, each splicer, each technician, and the system design engineer.

D. Provisions: The CATV installer shall own and maintain all necessary equipment and tooling to properly provide the system in accordance with recommendations set forth by the manufacturers of each item of system equipment.

1.6 MATERIALS ALTERNATES AND SUBSTITUTIONS

A. General: See details for alternates and substitution in specification section 270010.

B. Substitutions are allowed for this system only for active components, as long as they have exactly the same performance as the basis of design.

1.7 SHOP DRAWINGS AND SUBMITTALS

A. The CATV installer shall follow all requirements for shop drawings indicated in specification section 270010.

B. Additional information to be included in the shop drawings
   1. Cut sheet of all devices to be provided as part of this systems. When multiple devices are in the same cut sheet, the installer shall highlight the specific part number to be used. Cut sheets of the following devices shall be provided:
      a. All copper and fiber optic cables
      b. All passive devices
      c. All amplifiers to be used
      d. All connectors
      e. All outlets indicating colors
      f. All surge suppressors
      g. All fiber optics equipment
   2. Proof of installer qualifications per paragraph 1.5
   3. A list of all testing equipment owned by the installer as requested in this specification. The list shall include all make and model number of all devices and the last time they were calibrated.
   4. Drawings indicating all outlets in the project, with cable distances included, types of cables and how they are connected to the backbone system. The drawings shall include all pad and equalization calculations to the input of all amplifiers in the system.

1.8 GENERAL SYSTEM PARAMETERS

A. Devices and products described below may or may not be required for the overall design. If such devices are required in the course of this project to achieve the design distribution parameter, the installer shall provide such devices as a part of their design solution and said devices shall be included as part of the installers package in the bid. These items would include those listed below as well as splitters, taps, couplers and pads.

B. The CATV installer shall be familiar with the ANSI/SCTE standards and shall follow those standards during the installation process.

C. Amplifiers: In most cases, the output from the amplifier shall be adequate for building distribution. However in larger building distribution systems, additional amplifiers will possibly be required. If such is the case, Input pad and equalizers shall be provided to compensate for short spacing and cable slope, respectively. Outputs shall be adjusted to the rated sloped output of the amplifier selection (typically 36 dBmv to 44 dBmv or rated output by equipment manufacturer) at the selected frequency range indicated in this specification section.

D. Output: All outlets shall provide a minimum output of between +3 dBmv and +10dBmv for the complete frequency range specified in this section.

E. Minimum acceptable distribution system performance at all outlets shall be as follows:
   1. RF Video Carrier Level: Between 3 and 12 dBmV.
   2. Relative Video Carrier Level: Within 3 dB to adjacent channel.
   3. Carrier Level Stability, Short Term: Level shall not change more than 0.5 dB during a 60-minute period.
   4. Carrier Level Stability, Long Term: Level shall not change more than 2 dB during a 24-hour period.
   5. Channel Frequency Response: Across any 6-MHz channel in 54- to 220-MHz frequency range, referenced to video, signal amplitude shall be plus or minus 1 dB, maximum.

6. Carrier-to-Noise Ratio: 45 dB or more.
7. RF Visual Signal-to-Noise Ratio: 43 dB or more.
8. Cross Modulation: Less than minus 50 dB.
9. Carrier-to-Echo Ratio: More than 40 dB.
10. Composite Triple Beat: Less than minus 53 dB.
11. Second Order Beat: Less than minus 60 dB.
12. Terminal Isolation from Television to Television: 25 dB, minimum.
13. Terminal Isolation between Television and FM: 35 dB, minimum.
14. Hum Modulation: 2 percent, maximum.
15. RF FM Carrier Level: 13 to 17 dB below video carrier level.
16. FM Frequency Response: More than the 88- to 108-MHz frequency range, signal amplitude is plus or minus 0.75 dB, maximum.
17. FM Carrier-to-Noise Ratio: More than 24 dB.

F. RF Leakage: Radio frequency leakage into the system shall be in compliance of all FCC rulings and regulations.

G. Delay: Combined reverse and forward path chroma delay, as measured at the most distant bridged port, to the headend and or main distribution point in the building and back, shall not exceed 28 nanoseconds.

H. The complete CATV distribution system shall be certified form compliance with DOCSIS 3.1.

PART 2 - PRODUCTS

2.1 DISTRIBUTION AMPLIFIERS (NOT AT HEAD END)

A. This amplifier shall be used only in the distribution system and shall have the following specifications:
1. Frequency Range: As stated in paragraph 1.4. B of this section
2. Forward gain: 43dB
3. Gain Control Range: Greater or equal to10dB
4. Slope Control Range: Greater or equal to 8dB
5. Input Return Loss: Greater or equal to 16dB
6. Noise Figure: Greater or equal to 7dB
7. Required output Level: 36/44 dBmV,
8. Hybrid technology: Power doubling
9. Input/Output Test Point Level: -30dB

B. Design Selection: Blonder Tongue BIDA 5900 series, or approved equal with required pads and equalizers.

2.2 PASSIVE DEVICES

A. All passive devices shall have a minimum bandwidth of 5 to 1000 MHz.

B. Splitters for drops or backbones designed with RG-6 or RG-11 lines: Splitters shall be Blonder Tongue SXRS-2, 3, 4, 6 & 8 as required by the system configuration.

C. Directional Couplers fro drops or backbones designed with RG-6 or RG-11 lines: shall be Blonder Tongue SRT series, with dB TAP setting as required by the system configuration.

D. Splitters for backbones designed with PIII-500 or bigger diameter cable: shall be Toner TLP-SP series as required by the system configuration.

E. Directional couplers for backbones designed with PIII-500 or bigger diameter cable: Shall be Toner TLP-DC series as required for the system configuration

F. Multi-taps shall be Toner Total tap with 3 or 6 tap housings as indicated by the system configuration. Tap values and quantity of tap ports as indicated in system configuration

G. Equalizer. Equalizer shall be mounted in the tap housings and shall be a Toner TXMT plate. Equalizers could be mounted also inside distribution amplifiers. The value to equalize shall be as indicated in system configuration.

2.3 OUTLETS

A. The television outlet shall provide (1) "F" type barrel connector mounted alone or with other structured wiring connectors on a common face plate. Outlets shall be mounted as indicated on the documents, or as otherwise indicated and directly inline with the proposed television location. Coordinate final location based upon provided drawings and coordination with the Owner. A three wire grounded, 120 VAC power outlet shall be located adjacent to the television outlet and be provided by owner selected Division 26 Installer. Coaxial cable shall be provided by the CATV installer to each outlet location indicated on the drawings. Conduit and boxes shall also be provided according to specifications section 270528. Coordinate location with electrical installer if not already provided at time of installation of this work.

B. Design selection: F- connector with a single barrel connector to match (faceplate style and color) de design selection of the structured wiring system as described in specification section 271000.

2.4 VIDEO DISTRIBUTION CABLE

A. Structural Return Loss Testing: All cable shall be 100% swept tested. Return loss shall not be less than 23dB at any given frequency between 5MhZ and 1000MhZ.

B. Construction: Cable shall be constructed of a copper clad steel or solid copper center conductor, gas expanded cellular polyethylene dielectric, multiple aluminum braided shields, and an overall jacket. All cables shall have characteristic impedance of 75 Ohms.

C. Attenuation: Attenuation characteristics in decibels per 100 feet at 20oC shall not deviate more than 10% from the following values:

FREQUENCY (MHz)	RG-6	RG-11	PIII-500
5	0.57	0.36	0.16
55	1.5	0.95	0.54
211	2.87	1.81	1.09
300	3.43	2.17	1.31
400	4.0	2.53	1.53
450	4.28	2.69	1.63
550	4.76	3.01	1.82
750	5.62	3.58	2.16
870	6.09	3.9	2.35

1000	6.54	4.23	2.53

D. RG-6 Cable: No 18 AWG solid bare copper conductor. Four layers of shield, two aluminum foil-polyester tape aluminum foil, one 60% aluminum braid and one 40% aluminum braid. NEC article 820 compliant jacket suitable for the environment being installed.

E. RG-11 Cable: No 14 AWG solid bare copper center conductor. Two layers of shield, one aluminum foil-polyester tape aluminum foil and one 60% aluminum braid. NEC article 820 compliant jacket suitable for the environment being installed.

F. PIII-500: 0.109” diameter copper clad center conductor. Solid aluminum tube swaged onto a high compression micro-cellular foam dielectric core. NEC article 820 compliant jacket suitable for the environment being installed.

G. Indoor Cables: The following table indicates the design selection for all CATV cables. Cables shall be selected according to the environment in which they will be installed:

CABLE TYPE	GENERAL (CM)	RISER RATED	PLENUM RATED
RG-6	Belden 5339Q5	Use plenum rated cable	Belden 6339Q8
RG-11	Belden 1617A	Use plenum rated cable	Belden1617AP
PIII-500	Use riser rated cable	Commscope P3 500 JCAR	Commscope P3 500 JCAP

H. Outdoor Cables: When coaxial cables are to be installed outdoors, or underground in conduit, they need to have a jacket with a water blocking compound.

I. RG-59 cable shall never be used for the distribution system.

J. For all fiber optic cables and connector for broadband distribution see specification section 271000. All connector for fiber optic cables shall be APC (Angled polished connectors) type connectors.

2.5 CONNECTORS AND ADAPTER

A. Site Cable Connectors: All connector shall be as recommended by the Cable manufacturer for the cable size and jacket of the cable.

B. Connectors for RG-6 cables. All connectors for RG-6 cable shall be one piece compression connectors with color coded sleeve. Design selection: Belden part number SNS1P6QS or equivalent.

C. Connectors for RG-11 cables. All connectors for RG-11 cable shall be one piece compression connectors with color coded sleeve. Design selection: Belden part number SNS1P11 or equivalent.

D. Connectors for PIII-500 cables. All connectors for PIII-500 cable shall use a 5/8” 3 pin type connector. Design selection: Amphenol ACC-500-CHT10 or equivalent.

E. Adapters. The installer shall provide all adapters to connect all different cables listed above to an F type connector or a to a 5/8” 3 pin connector, as required in the design to make complete connections. Design selection: Amphenol ACC series or equivalent.

F. Crimping: All connectors shall be installed using the connector manufacturer's recommended cutting, coring and pin crimping tools.

2.6 IDENTIFICATION AND LABELING TAGS

A. The CATV installer shall follow labeling materials indicated in specification section 270010.

PART 3 - EXECUTION

3.1 INSTALLATION PRACTICES

A. The CATV installer shall follow all installation practices indicated in specification section 270010

B. In Raceway: All cables shall be installed in raceways without kinks, dents, or abrasions. Specified pulling strength of cable shall not be exceeded.

C. All indoor cables shall have no splices at any points.

D. Terminal Locations: Cables at terminal locations shall be neatly formed using a bending form to prevent kinks or other discontinuities. Cables showing evidence of abuse or physical damage shall be replaced at the installer's expense.

E. It is envisioned that television service will migrate into the overall telecommunications scheme for a given facility, therefore television distribution shall be accomplished via the following methods. In general, television distribution points shall be located throughout the facility such and all wiring shall be run back to the Telecommunication closet where the connection to the Broadband distribution backbone will take place.

F. The facility contains telecommunications rooms or associated closets, which shall be used for amplification & distribution equipment as well as all TRUNK/FEEDER & DROP cable terminations. Cabling used shall conform to the specifications as previously outlined, with the addition of CMP type cables for use in plenum rated areas if applicable, and environmental air circulation spaces, if required by the facility air distribution system.

G. All unused outputs of splitters, directional couples or distribution taps shall have a 75 ohm termination installed.

H. All unused cavities of the Toner Total Tap housing shall be filled with blank plates

I. All equipment with a grounding lug shall be grounded as recommended by the equipment manufacturer to an acceptable grounding point as described by the NEC.

J. All amplifiers shall be used at the rated output. The installer shall provide the required equalization and attenuation pads for all amplifiers to operate at the rated output at only 80% of the maximum gain control of the unit.

K. Cable and equipment identifiers shall be provided and shall follow a standard labeling system like TIA/EIA-606. The identification system chosen by the CATV installer shall be submitted for approval to the A&E.

L. The installer shall use attenuator or adjustment for fiber optic equipment to ensure proper budget levels are getting to each receiver.

3.2 INSTALLATION OF CONNECTORS

A. Provisions: All connectors shall be installed in strict accordance with the manufacturers' instructions.

B. Residue Removal: All dielectric residues shall be removed from surfaces of center conductors to insure proper electrical contact.

C. Preparation: Semi-rigid cables shall have jacket removed to a length of 2" from the cable end to allow proper seating of connectors without scoring of the aluminum sheath. A tubing cutter shall not be used for this purpose. All flooding compound shall be removed from the connector location with a suitable solvent.

D. Connections: All connections including terminations and connections on flexible cables shall be wrench tightened to insure RFI integrity. Connectors at manhole or exterior pedestal tap locations and antennas shall be filled with Dow Corning #5 compound prior to wrench tightening.

E. Tooling: Cables shall be prepared to accept connectors using the manufacturer's recommended tooling.

F. Crimp Connections: Crimp type connections on flexible cables in manholes shall be made with a Hex crimp tool and encapsulated with flooded heat shrink tubing.

G. Heat Shrink Boot: All cables containing flooding compound shall be provided with a heat shrink boot at all termination points which covers the housing connector boss, body of the connector and extends not less than 12" along the cable jacket. Heat shrink boot shall be of the filled type.

H. Splices: Cable splices below grade or in other locations shall be made according to manufacturers' recommendations, tested, and covered with a filled heat shrink boot approximately 30" in length. Boot shall contain a resilient compound which melts as heat is applied and fills all voids between the shrink tube and cable jacket. Resin casts shall not be acceptable.

3.3 EQUIPMENT MOUNTING

A. Mounting: All remote terminal equipment (amplifiers, taps, couplers etc.) shall be neatly arranged and securely mounted. When installed above the ceiling all devices need to be in accessible places. All accessories required for wall mounting equipment shall be provided when equipment is to be wall mounted.

B. Integrity: All equipment housing hardware including amplifiers shall be wrench tightened to insure full RFI integrity.

3.4 SYSTEM ADJUSTMENTS

A. Installation: System design drawings are based on estimated distances between devices. The installer shall measure the exact cable footages between equipment locations and submit a revised drawing to the engineer for review containing the following;

1. Exact footage of each cable
2. Revised coupler and tap values
3. Revised equalizer and pad values.

3.5 SYSTEM PERFORMANCE

A. General: Upon completion the system shall be adjusted, tested, and left in perfect operating condition.

B. Provisions: The system shall not exhibit any audible or visible components of hum, noise, or distortion.

C. Before the system acceptance test, the installer shall test all outlets in the system and document the result in a spreadsheet or an automated test print out from the test equipment. This report is called TEST RESULT REPORT (TRR). The TRR report shall include the following information:
   1. Project name and location
   2. Day test was done (if done in different days, the report shall be broken in sections by days the tests were done).
   3. Name of the installer that performed the test
   4. Serial number of the tester used.
   5. For each outlet in the project the report shall include:
      a. Room number:
      b. Room name:
      c. Outlet number (with permanent label matching as-built drawings)
      d. Lowest channel - signal level (in dBmV)
      e. Mid bandwith channel – signal level (in dBmV)
      f. Highest channel (as identified in part 1 of this specification) – signal level (in dBmV)
   6. For each amplifier in the system the report shall include:
      a. Room number:
      b. Room name:
      c. Lowest channel - signal level (in dBmV, measured @ test port)
      d. Mid bandwith channel – signal level (in dBmV, measured @ test port)
      e. Highest channel (as identified in part 1 of this specification) – signal level (in dBmV, measured @ test port)

3.6 SYSTEMS WARRANTY AND SERVICE

A. General: The CATV installer shall follow all warranty and service requirements indicated in specification section 270010.

3.7 ENGINEER’S FINAL ACCEPTANCE TEST

A. General: The CATV installer shall follow all test requirements indicated in specification section 270010

B. General: The Installer shall demonstrate the operation of the system to the Architect & Engineer (A&E) during the final inspection in the following manner:
   1. Measure signal levels with a calibrated field strength meter at outlets and or amplifiers selected by the A&E. At a minimum 5% of all outlets will be tested. The readings of the meter shall be between 1.5 dBmV of the value documented in the TRR
   2. Observe picture quality at outlets selected by the Engineer using a television receiver.

C. If at least one measurement fails, the A&E can request to the installer to test more outlets (beyond the 5% indicated previously) until the A&E is satisfied with the results. Any failures shall be corrected by the installer at no additional cost to the owner.

3.8 TEST EQUIPMENT REQUIRED

A. At a minimum during the acceptance test to the A&E the installer shall have the following equipment:
   1. TV Receiver: 17" minimum diagonal screen size color receiver in good working order.
   2. Signal Meter: This signal meter needs to be the same tester used during the TRR

B. Age and Calibration: Test equipment used in demonstrating system performance shall be less than 6 months old or bear the calibration seal of a recognized lab which is dated within 6 months of the date of acceptance test.

3.9 TRAINING AND INSTRUCTION

A. General: The CATV installer shall follow all training requirements indicated in specification section 270010.

B. The training shall include the following topics:
   1. How to make connectors part of this system with the provided tools.
   2. How to balance the system with amplifiers at rated output
   3. A walk-through of the facility pointing out the location of all active and passive equipment part of this system and showing to the owner the as-built drawings with matching labels for those pieces of equipment.
   4. A complete training on the use of the test tool provided.

3.10 AS BUILT DOCUMENTS AND CLOSE-OUT INFORMATION

A. General: The CATV installer shall follow all as built and close out information requirements indicated in specification section 270010.

B. General: As built drawings shall include the following information:
   1. A block diagram of the entire system indicating all cable routing and lengths
   2. Revised coupler and tap values for each cable drop
   3. All cable types, active components, and passive components.
   4. All equalizing and attenuating pads used for each amplifier.
   5. All system settings.
   6. All brands and part number of all devices shall be indicated in the drawings.
   7. Location of each outlet and the unique label identifier of each outlet.
   8. High/low signal level measured at each amplifier test port.

C. Additional information to be provided by the CATV installer, as part of the close out information:
   1. A copy of the TRR signed approved by the A&E.

END OF SECTION 27 4134

ATTACHMENT B-1

SAFETY POLICY

A. POLICY

It is the policy of Ajax Building Corporation ("Ajax") to comply with and, in certain circumstances detailed below, exceed Occupational Safety and Health Act (OSHA) standards in order to ensure the safety and health of all personnel on our projects. A copy of the OSHA Safety and Health Standards 1926/1910 are provided for your use and reference. This Standard shall be available in the Project Office at all times. Compliance with this policy and all items contained therein is mandatory for all personnel on Ajax projects.

B. RESPONSIBILITIES

The authorization and responsibility for enforcement has been given primarily to the Job Superintendent. The Project Manager, Safety Director, Safety Coordinator, Subcontractor Superintendents, Foreman and other project personnel share in this responsibility as well, as detailed below.

Project Manager:
The project manager is responsible for maintaining safety and health reports and documents required by OSHA, federal, state and local government rules and regulations.

Project Superintendent:
The superintendent has day to day responsibility for safety compliance on the project. He conducts continuous jobsite safety inspections and initiates corrective action for any violation observed. He maintains all recordkeeping and the OSHA log. He gives direction to the Subcontractor Superintendents and foremen on an as needed basis and works closely with the safety director / coordinator on all safety and health matters. He investigates and reports all accidents to the safety director.

Safety Director:
The safety director has overall responsibility throughout Ajax for ensuring compliance with all OSHA, federal, state and local government rules and regulations. He conducts periodic jobsite safety inspections and updates the project team on any changes to the rules and regulations. He reviews all accident/incident reports and implements corrective action to prevent reoccurrence.

Safety Coordinator:
The safety coordinator is responsible for monitoring compliance with all OSHA, federal, state and local government rules and regulations. He conducts frequent and regular jobsite safety inspections, prepares reports, and initiates corrective action for any violation observed. He updates the project team on any changes to the rules and regulations and assists with daily safety compliance efforts. He assists the project superintendent in accident / incident investigations and conducts safety training as necessary.

Subcontractor Superintendents:
Superintendents for subcontractors are responsible for day-to-day OSHA regulatory compliance for their respective companies and any subcontractors working under them including accident investigations and the OSHA log. Subcontractors shall comply with all Ajax, federal, state, and local governmental regulations. They are required to notify Ajax of any injury and/or illness that occurs on this jobsite.

All Personnel:
All personnel on the jobsite are required to conduct themselves in a manner that is consistent with the Ajax safety rules and policies. To fulfill this duty, each employee shall do the following:

- Attend and participate in all weekly safety meetings.
- Report all unsafe conditions or hazards to their supervisor.
- Comply with all safety rules, policy and procedures.
- Comply with all safe work practices as stated by equipment manufactures.
- Report all workplace accidents, injuries, illnesses, and near-miss incidents to their supervisor.

C. APPLICABILITY

This policy applies to all employees, subcontractors, and lower tiered subcontractors on an Ajax project regardless of position with the company. The safety rules apply to anyone who is on an Ajax jobsite. It is the responsibility of Ajax Building Corporation subcontractors to notify their sub-subcontractors of the requirements of this policy and to enforce all aspects therein.

D. IMPLEMENTATION

Ajax Building Corporation's safety policy has been designed in accordance with our overall Construction Safety Management Program, which incorporates the following essential elements:

1. Management's Commitment / Employee Involvement
2. Worksite Analysis
3. Hazard Prevention and Control
4. Training

E. ADMINISTRATION

The Safety Program will be carried out according to guidelines established and published in the Operations Department Manual. Specific instructions and assistance will be provided by the Safety Director. Each Supervisor will be responsible for meeting all requirements of the Safety Program and for maintaining an effective accident prevention effort within his area of responsibility.

F. REPORTING OF INJURIES

Subcontractors shall report any accident / incident which resulted in, or could have resulted in, injury, fatality, and/or property damage to Ajax Building Corporation immediately. They shall assist in completing the accident investigation including completing the appropriate forms, obtaining witness statements, photographs, etc. A copy of all First Notice of Injury forms shall be provided to Ajax within 24 hours.

All employees will be held accountable for failing to report a job injury immediately. (Immediately, meaning at or near the time of the injury and on the same day of the injury). Employees must report the injury to their Supervisor (i.e. Foreman, Superintendent, Project Manager, etc.). A casual mentioning of the injury will not be sufficient. The employee must let their Supervisor know: 1) How they think they hurt themselves, 2) What they were doing at the time, 3) Who they were working with at the time, 4) When and where it happened, and 5) Other pertinent information that will aid in the Supervisor's investigation of the accident. In the event of an accident involving personal injury or damage to property, the personnel involved in any way may be required to submit themselves for drug testing.

Anyone failing to report an injury immediately (meaning at or near the time of injury and on the same day of the injury) is in violation of Ajax Building Corporation's Safety Policy and may be subject to immediate termination or removal from the jobsite as applicable.

G. TRAINING

Each subcontractor shall train their employees in hazards associated with their work and safe work practices implemented to control those hazards. All personnel working onsite are required to attend Ajax Building Corporation's Safety Orientation training program prior to beginning work onsite. Ajax Building Corporation will conduct weekly safety meetings. All personnel on the jobsite are required to attend and sign the Ajax safety meeting form as proof of attendance.

H. BASIC SAFETY RULES

Ajax Building Corporation has developed the following safety rules as a general guideline to protect all personnel on our projects. It should be clear that these rules do not constitute all the safety requirements at a jobsite. All established safety rules and practices will be uniformly applied and enforced by Ajax Building Corporation.

Disregard of safety rules may result in the immediate and permanent dismissal from the project and/or termination as applicable.

1. **Conduct work in a safe manner. Horseplay is strictly prohibited. Running on the jobsite is allowed only in extreme emergencies.**
2. **Follow all posted safety rules described in the Ajax Building Corporation's safety manual as well as OSHA standards.**
3. **Stop Work:** All personnel on the jobsite must report any unsafe condition or hazard immediately to the project superintendent or their supervisor. All personnel have a right and duty to take necessary precautions to stop a process or job task which could cause bodily harm to themselves and others.
4. **Safety Data Sheets (SDS):** All personnel on the jobsite have the right to know about hazards associated with materials or chemicals they are working with or around. Subcontractors must submit a list of all hazardous

materials and/or chemicals brought onto the jobsite along with an SDS for each item / product. Ajax Building Corporation will maintain an SDS for all hazardous material on the jobsite in the project office.

5. **Alcoholic Beverages and Illegal Drugs:** Alcoholic beverages and illegal drugs are prohibited on the jobsite. The use and possession of alcoholic beverages and illegal drugs on the jobsite will result in immediate dismissal from the project and/or termination as applicable.
6. **Drug Testing:** In the event of an accident involving personal injury or damage to property, the persons involved will be required to submit to drug testing. Any personnel suspected of being under the influence of alcohol or illegal drugs will be required to submit to drug testing. Any persons refusing will be immediately removed from the jobsite and/or terminated as applicable.
7. **Cameras, firearms, alcoholic beverages or illegal drugs are not allowed on site.** Drugs prescribed by a physician must be registered with the safety department for approval. The use or possession of firearms, illegal drugs, and/or alcoholic beverages on the jobsite will result in immediate termination or permanent removal from the jobsite as applicable.
8. **Housekeeping shall be an integral part of every job.** Supervisors and employees are responsible for keeping their work areas clean and hazard free. Clean up is required every day, when a task is completed, if conditions warrant, and as directed by an Ajax supervisor. Nails in scrap lumber shall be removed or bent over. Debris shall not be allowed to accumulate in doorways or at access / egress points of a structure.
9. **Clothing:** Clothing must provide adequate protection to the body.
    - **Shirts –** Must be full length and have at least a 6" T-sleeve. Tank tops are prohibited on the jobsite.
    - **Pants –** Only long pants in good condition shall be worn on the jobsite. Shorts and sweatpants are prohibited.
    - **Shoes –** Sturdy work boots with rigid, slip resistant soles, and leather uppers which give adequate protection to the feet and ankles, are required. Sneakers, sandals, and other lightweight footwear are prohibited on the jobsite.
    - **Loose or hanging clothing, jewelry, or long hair is not permitted around moving machines and parts.**
10. **Welding and Cutting:** The appropriate fire extinguishing equipment shall be in the immediate vicinity of any "hot work". Burning and cutting equipment shall be inspected daily before use. At the end of each day or prior to storage, all gas shall be shut off, hoses and regulators removed, and caps replaced on cylinders. Hoses shall be protected from damage. Flashback arrestors shall be installed on all oxygen / acetylene outfits at both ends of the hoses. Compressed gas cylinders shall be secured at all times to prevent them from falling or being tipped over. Regulators and gauges shall be in proper working condition. Welding hoods, cutting goggles, and other appropriate PPE shall be worn. A "fire watch" shall be used as needed. Welding screens shall be used to the fullest extent possible.
11. **Drinking Water:** Drinking water containers are for drinking water and ice only. Tampering with or placing items such as drinks, etc., in the water cooler will result in immediate termination or permanent removal from the jobsite as applicable. The "common drinking cup" is not allowed. Each water cooler shall be equipped with a disposable cup holder and cups. Glass bottles or containers are not permitted on the jobsite.
12. **Tools, Hand and Power:** All tools, whether company or personal, shall be inspected prior to use and must be in good working condition. Tools must be used as intended (screwdrivers are not chisels). Guards shall be installed and cords shall be in good condition. Defective tools shall not be used. Examples: chisels with mushroomed heads, hammers with loose or split handles, guards missing on saws or grinders, etc.
13. **Personal Protective Equipment:** Personal protective equipment (PPE) is the last line of defense for employees exposed to hazards. All personnel must follow the PPE requirements as a condition of employment.
    - **Hardhats –** ANSI approved hardhats must be worn by all personnel on the jobsite at all times. The bill of the hardhat must be worn in the front at all times. Baseball or other style caps may not be worn under a hardhat. Alterations of the hardhat or liner are prohibited.
    - **Safety Glasses –** ANSI approved safety glasses shall be worn by all personnel on the jobsite at all times. Additional eye and face protection such as goggles or face shields is required for such operations as grinding, cutting, chipping, or handling of chemicals, acid or other caustic materials. When welding or cutting, the appropriate goggles or welding hoods are required.
    - **Hearing Protection:** Hearing protection must be worn as conditions warrant.

- **Respiratory Protection:** Each subcontractor must submit a written respiratory protection program for review prior to any task, which may expose its employees to silica or other contaminates. This program must include information concerning engineering controls that will be taken to reduce the exposure level as well as permissible exposure limit testing and employee training documentation. The primary method to control airborne contaminates shall be through the utilization of engineering controls.
- **High Visibility Clothing / Apparel:** All personnel, when exposed to public vehicular traffic and/or when working in close proximity of mobile equipment on the jobsite, shall wear high visibility vests or other suitable apparel marked with or made of reflectorized or high visibility material.
- **Other PPE:** Other personal protective equipment, such as but not limited to, gloves and welding jackets must be worn as conditions warrant.

14. **Speed Limit:** Jobsite speed limit is 10 MPH. No one is permitted to ride standing up in the bed of a pickup truck. Sitting on the outside edges is prohibited. You must be down inside the truck.
15. **First Aid:** Each subcontractor shall have and maintain throughout the course of the project the appropriate first aid supplies for its crew. It shall be readily available in the event of an emergency.
16. **Fire Protection:** Adequate precautions shall be taken to protect personnel and equipment from fires. A fire extinguisher sized appropriately for the condition must be in the immediate vicinity of any "Hot Work". Flammable liquids shall be stored in approved metal safety containers. Plastic gas cans are prohibited anywhere on the jobsite. Flammable storage is permitted only in designated areas of the jobsite. Smoking is allowed only in designated areas. Open fires are prohibited.
17. **Scaffolds:** All scaffolding must be erected, dismantled, or altered in accordance with OSHA standards and under the direct supervision of a competent person. All scaffolds shall be inspected by the competent person prior to use by employees. Footings for scaffold must be adequate and firm to support the scaffold without settlement or displacement. Mudsills shall be used on all scaffolds setup on dirt, asphalt, or other surfaces, which may settle. Base plates, screw jacks, or casters must be installed on all scaffolding as appropriate. Scaffolding shall be fully braced, each working level shall be fully decked, and an access ladder shall be provided to each working level. All work platforms six (6) feet or more above a lower level shall have guardrails installed along each open side and end of the platform. Baker / Drywall type scaffolding shall have guardrails installed on platforms four (4) feet or more above a lower level. Toe boards shall be installed on each open side and end of work platforms. All scaffolding with a height to base width ration of 3:1 or greater shall be restrained from tipping.
18. **Ladders:** All ladders shall be inspected prior to use. Damaged ladders such as those with broken or missing rungs, missing or bent braces, split rails, etc. shall be removed from the jobsite. All ladders shall have at least a two hundred fifty pounds (250lbs) duty rating. The top or top step of stepladders shall not be used. Stepladders shall be used only in the open position. Extension ladders shall not be taken apart and used as two separate ladders. Ladders used for access to an elevated area shall be secured at the top and bottom and extend at least three feet above the walking surface being accessed. Aluminum ladders shall not be used on the jobsite. Fall protection is required when employees are exposed to falls below the supporting level of the ladder.
19. **Stairways:** A stair rail system and handrail shall be installed along each open side of stairways. Metal pan stairs shall be barricaded to prevent use unless treads and landings have been filled in with concrete or other temporary material. Material, equipment, tools, and debris shall be kept clear from stairways.
20. **Fall Protection:** Fall protection is required on any walking/working surface six (6) feet or more above a lower level. Fall protection may include guardrails, safety nets, warning lines, safety monitoring systems, and/or personal fall arrest equipment as the situation dictates. All fall protection systems shall be inspected daily or more often as necessary.
    - Roofers – Shall submit a written site-specific fall protection plan for review prior to beginning work. On low slope roofs 4:12 or less with unprotected sides or edges six (6) or more above lower levels roofers may use a combination of warning line and safety monitor systems. On roofs with a slope greater than 4:12, roofers shall use personal fall arrest equipment, guardrails, or safety nets.
    - Structural Steel Erectors – Shall submit a written site-specific fall protection plan for review prior to beginning work. Any employee engaged in steel erection activities on a walking/working surface 15 feet or more above a lower level shall be protected from falling. No exceptions. Controlled Decking Zone (CDZ), A CDZ shall be established in the area of the structure 15 feet or more above a lower level where metal decking is initially being installed and forms a leading edge. Any employee engaged

in decking activities shall be tied off at all times when working 15 feet or more above a lower level inside a CDZ. Employees behind the CDZ do not have to be tied off provided there is perimeter and floor opening protection installed.

- Floor and roof openings - All floor and roof openings, including but not limited to skylights, shall be guarded or covered. Covers shall be secured and marked with the word "hole" or "cover."

Each subcontractor is responsible for ensuring employees have the appropriate fall protection equipment and for training their employees in recognition and avoidance of fall hazards. Any personnel in violation of fall protection safety rules will be permanently removed from the project.

21. **Barricades:** Warning signs, barricades, and tags will be used to the fullest extent and shall be obeyed. Entry to red "Do Not Enter" barricaded areas is prohibited unless granted by the individual/subcontractor that barricaded the area. All warning signs, barricades, and tags shall be removed when a hazard no longer exists.
22. **Cranes:** All cranes shall have a current annual certification sticker. An independent crane certification company shall perform crane certifications. Subcontractors shall conduct and document daily crane inspections. Inspection reports shall be maintained on the jobsite for the duration of time that the crane is on site. All cranes shall have an anti-two block device installed. Pads for outriggers shall provide a solid surface for the outrigger float to sit on and be capable of supporting the crane without bending, settling, crushing, or otherwise deflecting. Plywood or similar material is prohibited. The swing radius shall be barricaded. All rigging shall be inspected prior to use. Any damaged or defective rigging shall be removed from service. See Attachment B-2 for Ajax Building Corporation's Crane Management Program.
23. **Trenching and Excavations:** All trenches and excavations shall be in accordance with OSHA standards and work shall be completed under the direct supervision of a competent person. No personnel are to enter a trench or excavation without permission from the competent person. Cave-in protection shall be provided in any trench or excavation five feet or more in depth and in shallower trenches and excavations if a cave-in hazard is present. All material, equipment, and spoil piles shall be kept at least two (2) feet from the edge of the excavation. A ladder for access and egress shall be within twenty five (25) feet of employees in the trench or excavation. Underground utilities shall be located prior to trenching or excavating. Surface encumbrances shall be secured or removed to prevent displacement by excavation activities. Employees shall not work under suspended loads. Employees shall not work in any trench or excavation in which water is present. All trenches shall be barricaded on all sides. Any personnel in violation of trench safety rules will be terminated.
24. **Using cell phones on the jobsite is strictly prohibited except for supervisors not performing work or in the case of an emergency.**
25. **Electrical:** All temporary electric power for the jobsite shall be installed per OSHA standards. All temporary receptacles shall be the Ground Fault Circuit Interrupter (GFCI) type. All temporary panels shall have dead fronts installed and all openings shall be effectively closed. Duct tape is prohibited. All branch circuits shall be labeled. Extension cords shall be the 3 wire type and minimum 12ga wires. Job built and/or makeshift electrical cords are not permitted on site. Damaged or defective cords found onsite shall be destroyed. All lamps for temporary lighting shall be protected from accidental contact or breakage. Lamp sockets shall be not be left unused or open. Working on "live" energized electrical equipment is strictly prohibited unless the subcontractor can demonstrate that de-energizing introduces additional or increased hazards. For example: de-energizing would result in the interruption of life support equipment at a hospital, would cause the deactivation of emergency alarms, or the shutdown of emergency ventilation equipment. In the event work must be performed on "live" energized electrical equipment the subcontractor shall submit a written safe work plan to the safety director for review prior to the work being performed.
26. **Equipment:** Each subcontractor is responsible for training their employees on the type of equipment they will be operating. Riding as a passenger on equipment is prohibited. All equipment shall have a functional audible back up alarm. Operators shall wear seatbelts at all times while operating equipment. Motors shall be turned off when refueling.
27. **Aerial Lifts:** All aerial lifts shall be inspected prior to use. Warning labels and operating instructions shall be legible. Employees shall not climb on rails or use objects inside the lift to increase working height. Safety chains at lift access points shall be secured. Employees are required to wear a harness and tie off to the basket when working in an aerial lift. Each subcontractor is responsible for providing employees with the proper training prior to operation of aerial lifts.
28. **Concrete and Masonry:** All rebar and other impalement hazards shall be guarded with steel reinforced protective caps or wooden troughs. Mushroom style rebar caps are prohibited. All appropriate engineering

controls shall be utilized to reduce employee exposure to silica when cutting, grinding, chipping, or otherwise manipulating concrete and masonry. Dry cutting concrete and masonry is strictly prohibited.

29. **Confined Space:** A confined space is any space having a limited means of egress and which can gather toxic or flammable gasses, vapors, or has oxygen deficient air. Examples of confined space include but are not limited to storage tanks, sewers, manholes, tunnels, underground utility vaults, and some excavations. Subcontractors shall submit a confined space entry program for review prior to personnel entering a confined space. Any employee or subcontractor entering a confined space prior to approval of the above referenced program shall be immediately terminated.
30. **Gas Powered Tools and Equipment:** Gas powered generators, pumps, paint sprayers, etc shall not be used in an enclosed space that lacks adequate ventilation for exhaust fumes.
31. **Pre-Construction Safety Planning:** All subcontractors engaged in activities that require fall protection, scaffolding, steel erection, and/or excavations shall submit a hazard analysis for review by Ajax and/or attend a pre-construction safety meeting prior to beginning work.

I. COMPLIANCE ENFORCEMENT

Safety violation notices shall be issued to any Ajax employee, subcontractor, or anyone on an Ajax jobsite violating the safety rules or regulations. Issuance of safety violation notices shall be by foreman and above including the safety director.

- Any violation of safety rules can result in suspension or immediate termination.
- Any employee receiving three (3) written general violations within a six (6) month period shall be terminated or permanently removed from the project as applicable.
- Any subcontractor receiving three (3) written violations over the course of a project will be required to attend a safety orientation course a second time.
- Any subcontractor that receives five (5) written violations over the course of a project will be required to provide a written plan of corrective action that will be taken to prevent further violations or their insurance provider will be notified of the unsafe work practices.

Issuance of a safety violation notice for failure to use fall protection or for failure to report a job injury (at the time of the injury) will result in immediate termination. It is understood that Ajax is not restricting itself to the above rules and regulations. Additional rules and regulations as dictated by the job will be issued and posted as needed.

"NO JOB IS SO IMPORTANT AND NO SERVICE IS SO URGENT THAT WE CANNOT TAKE TIME TO PERFORM OUR WORK SAFELY"

J. JOB SAFETY CHECK LIST

The following Job Safety Check List has been condensed and edited from the Occupational Safety and Health Administration Part 1926 Construction Safety and Health Regulations. The Job Safety Check List is made part of the safety rules.

1. Record Keeping.

a. OSHA poster "Safety and Health Protection on the Job" posted.
b. OSHA "Log of Occupational Injuries and Illnesses" posted February 1st to April 30th only.
c. Insurance poster "Notice of Employees" indicating State Worker's Compensation coverage posted.
d. Telephone number of Police, Fire, Ambulance, Hospital and Doctor posted.
e. Safety signs posted.
f. Weekly safety meetings followed by written report by all Ajax Superintendents and a copy to Safety Director.

2. Housekeeping and Sanitation.

a. General neatness.
b. Daily disposal of trash.
c. Passageway, driveways and walkways clear.
d. Adequate lighting (see OSHA 1926.56).
e. Oil and grease removed.
f. Waste containers provided and used.
g. Adequate supply of drinking water (see OSHA 1926.51).

h. Sanitary facilities adequate and clean (see OSHA 1926.51).
i. Adequate ventilation (see OSHA 1926.57).

3. First Aid (see OSHA 1926-Subpart C).
a. First aid station with supplies and equipment.
b. Trained first aid men (see OSHA 1926.50).
c. Injuries promptly and properly reported.

4. Personal Protective Equipment (see OSHA 1926-Subpart E).
a. Hard Hats (see OSHA 1926.100).
b. Hearing protections (see OSHA 1926-101).
c. Eye and face protection (see OSHA 1926.102).
- Goggles where flying particles exist.
- Face shields for dust.
- Welding masks for welder and helper.

d. Respiratory Protection (see OSHA 1926.103).
e. Safety Harnesses and Lifelines (see OSHA 1926.104).
f. Gloves where required.

5. Fire Protection (see OSHA 1926-Subpart F).
a. Fire safety introduction to employees.
b. Fire extinguishers – charged and identified.
c. No smoking areas posted.
d. Flammable and combustible material storage are (see OSHA 1926.152).
e. Safety gasoline containers.

6. Hand and power tools (see OSHA 1926-Subpart I).
a. Inspect all tools for the proper operating condition.
b. All tools stored properly and neatly.
c. All power tools properly grounded.
d. Inspect all tools for proper safety guards.

7. Welding and Cutting (see OSHA 1926-Subpart J).
a. Gas and oxygen cylinders secured in a vertical position.
b. Hoses inspected regularly.
c. Cylinders, caps, valves, couplings, regulators and hoses kept free of oil and grease.
d. Cylinder caps shall be in place whenever cylinder is not being used.
e. Maintain gauge pressures – oxygen 30-40 pounds, acetylene 5-10 pounds, when in use, small tip uses less.
f. Two (2) sets of flash arresters (for oxyacetylene outfits). One (1) set at torch handle and one (1) set at regulators.

8. Electrical (see OSHA 1926-Subpart K).
a. All portable tools and cords will be properly grounded.
b. Daily visual inspection of caps, ends, and cords for deformed or missing pins, insulation damage and internal damage.
c. Test of cords, tools, and equipment for continuity and correct attachment of the equipment grounding connector to the proper terminal shall be made every three (3) months and:
- Prior to first use.
- Prior to return to service after repairs.
- Prior to return to service after incident which may have caused damage to cord or equipment.

d. Cords and equipment which do not meet requirements shall be removed from service until repairs have been made. Repairs must meet original specifications (electrical tape and/or duct tape is not allowed).

9. Ladders and stairs (see OSHA 1926-Subpart X).
a. Inspect at regular intervals.
b. No broken or missing rungs or steps.
c. No broken or split side rails.
d. Extend at least 36" above landing and secure.
e. Proper guardrail and toe boards.

10. Guardrails, handrails, and covers (see OSHA 1926-Subpart M).

a. Guardrails, handrails, and covers shall be installed wherever there is danger of employees or materials falling through floor, roof, or wall openings and shall be guarded on all exposed sides.
b. Posts shall be of at least 2x4 stock spaced not more than 8 feet apart.
c. Top rail shall be 42" above the floor and 2x4 stock.
d. The intermediate rail shall be 21" above the floor and of 1x4 stock.
e. Guardrail assemblies around floor openings and edges shall be equipped with toe boards. The toe boards shall be 4" minimum and shall not have more than ¼" clearance above the floor level, if there are employees below and conditions dictate.
f. Guardrails must be capable of supporting 200 pounds in any direction.

11. Cranes, Derricks, Hoist, Elevators, and Conveyors (see OSHA 1926-Subparts N & CC).

a. Inspect at regular intervals as required by the Ajax Crane Management Program.
b. Operating rules shall be posted at operator's station.
c. "No rider" signs posted at all stations.
d. All entrances shall be properly protected.
e. All entrance bars and grates shall be painted with diagonal contrasting stripes.
f. Have experienced operator.
g. Current crane, derrick, and elevator certification inspection sticker and papers on site. The use of a crane or derrick to hoist employees on a personnel platform is prohibited, except when no safe alternative is possible. Crane must be equipped with an anti-two blocking device. See Ajax Building Corporation's Crane Management Plan.

12. Motor Vehicles and Mechanized Equipment (see OSHA 1926-Subpart O).

a. Inspect all lights brakes, ties, horn, etc. at regular intervals.
b. Do not overload vehicles.
c. Trash trucks shall have covers.
d. No riding on edge of pickup truck bed.
e. No riding on concrete trucks, loaders, backhoes, etc.
f. Back-up alarms on loaders, tractors, backhoes, etc.

13. Material Storage, Handling, Use, and Disposal (see OSHA 1926-Subpart H).

a. Designate material storage area.
b. Do not store flammables and oxidizers together.
c. All material must be properly stacked or secured to prevent collapse.
d. Aisles, passageways, and stairs shall be kept clear of debris and material.
e. An enclosed chute must be used whenever material is dropped more than 20 feet.
f. Containment systems shall be provided for all chemicals stored on site.

14. Masonry, Concrete, Concrete Forms and Shoring (see OSHA 1926-Subpart Q).

a. Employees tying rebar more than 6 feet above adjacent working surface shall use safety harnesses.
b. Trowel machines shall have automatic shut off switch.
c. No riding on concrete buckets or flying forms.
d. All forms properly shored.
e. Single post shores shall be braced horizontally.
f. Limited access zones shall be established per OSHA regulations whenever a masonry wall is being constructed.
g. All masonry walls over 8 feet in height shall be adequately braced until permanent supporting elements of the structure are in place.

15. Scaffolds (see OSHA 1926-Subpart L).

a. Guardrails and toeboards must be installed on all scaffolds 6 feet or more in height or at lower levels if other hazards exist.
b. Scaffold planks shall be scaffold grade or equivalent, secured, and cleated.
c. Scaffolds shall be capable of supporting at least 4 times the maximum intended load.
d. C.M.U. shall not be used as scaffold foundation or counter balance.
e. Erection, maintenance, and dismantling shall be supervised by the competent person.
f. All scaffold work/walk platforms must be fully planked.
g. Base plates must be used on all scaffolding.
h. Casters may not be used on stairs or other uneven surfaces.

16. Excavations (see OSHA 1926-subpart P).

a. Keep material at least 2 feet from the edge of the excavation.
b. Control water.
c. Inspected frequently by the competent person.
d. Proper cave in protection in accordance with OSHA standards must be in place prior to personnel entering the trench.
e. Proper access must be provided.

K. EMERGENCY PHONE NUMBERS

Each subcontractor shall submit a list of emergency contacts to the project superintendent upon mobilization. The project superintendent shall post and maintain a complete emergency contact list throughout the course of the project.

EXHIBIT C AJAX/TANDEM SITE REQUIREMENTS

ATTACHMENT B-2

CRANES AND RIGGING

I. INTRODUCTION

Cranes are often the largest and most expensive piece of equipment on a construction site. Because of this crane accidents are often the most costly, in terms of lives lost and damage to property. Proper pre-planning, setup, and rigging are crucial for safe crane operation.

These policies and procedures are provided to ensure a safe work environment for crane operators and site personnel. These criteria are the minimum standards that must be met in all crane operations on all Ajax Building Corporation projects. This crane safety procedure manual does not purport to restate all of these regulations, but should be used for clarification and additional criteria to be adhered to while operating crane equipment on Ajax Building Corporation projects.

The purpose of this policy and procedure is to provide a safe working environment for crane operators and all site personnel. In addition, surveys of the crane equipment and the operation of the crane have proven to be advantageous to the flow and expediency of work performed during any crane operation on construction sites.

II. APPLICATION

These crane procedures shall be followed on all Ajax Building Corporation projects by all Ajax Building Corporation employees, subcontractors, subcontractor's employees, crane rental companies, crane operators, crane users, and any other persons, organizations, or contractors entering or operating crane equipment on any Ajax Building Corporation job site.

All cranes shall be operated in accordance with all applicable regulations during use on Ajax Building Corporation projects. The criteria and standards for the safe operation of cranes shall include the following:

1. Manufacturers' recommendations and requirements
2. American National Standards Institute (ANSI)
3. American Society of Mechanical Engineers (ASME)
4. Occupational Safety and Health Administration (OSHA)

It should be recognized that it is not feasible to address every possible issue, situation, and circumstance that may arise or be encountered on a project. Therefore, if there are conflicts or an unsafe condition that occurs which is not addressed in this manual for a particular crane operation, the Ajax Building Corporation safety director shall be contacted immediately prior to commencement of the crane operation. These procedures should assist the subcontractor and crane company in maintaining a safe working environment when cranes are used on Ajax Building Corporation projects.

III. RESPONSIBILITIES:

Superintendent:

1. Comply with the requirements of the crane and rigging program
2. Immediately address/correct any violations of the crane and rigging program observed
3. Ensure all cranes have a current annual inspection certificate prior to being used on site
4. Schedule meetings with the subcontractor, crane operator, Ajax safety department, and other personnel as this program requires
5. Review ground conditions with the crane operator prior to set up
6. Maintain copies of daily crane inspection reports
7. Select option for maintaining clearances from energized power lines
8. Schedule crane survey if required

9. Monitor operations, rigging, signaling, and work area controls

Subcontractor:

1. Submit declaration with proposal that all crane equipment utilized will meet the criteria required by this program
2. Complete the Pre-Erection Hazard Analysis form
3. Review ground conditions with the project superintendent and the crane operator
4. Provide / designate an Assembly / Disassembly Director as required
5. Provide / designate a qualified rigger and signal person(s). Documentation of training shall be submitted to Ajax
6. When an onsite survey is required, correct any deficiencies noted by the surveyor prior to operation
7. Inspect all crane and rigging equipment as required by this program

Crane Operator:

1. When there is concern as to safety, stop operations and refuse to handle loads until a qualified person has determined that safety has been assured.
2. Conduct and document daily inspections as required by this program
3. Review ground conditions with the project superintendent prior to beginning operations
4. Maintain clearances from overhead power lines
5. Comply with all operation requirements of the crane manufacturer and of this program

Qualified Rigger:

1. Inspect rigging equipment prior to each shift
2. Select the proper rigging equipment for each lift
3. Remove damaged / defective rigging from the work area

II. PROCEDURES:

Bid Procedures:

Each subcontractor shall submit in its proposal, a declaration that all crane equipment utilized on Ajax Building Corporation projects will meet the criteria required for safe crane operations.

Survey:

All cranes operating on Ajax Building Corporation jobsites shall have a current annual inspection certificate. All jobsite erected cranes shall have a post erection survey conducted by a 3rd party qualified person approved by Ajax Building Corporation prior to the crane being used. Furthermore, Ajax Building Corporation may require any crane to be subject to this requirement at its discretion.

Subcontractor Start-up Meeting:

Each subcontractor, along with a representative of the crane provider and the crane operator, shall attend a pre-job safety meeting with the Pre-Erection Hazard Analysis form (attached) completed and a copy of the annual certification. This meeting shall be conducted at least 72 hours prior to the crane arriving on site.

III. CRANE SAFETY REQUIREMENTS:

Ground Conditions:

A crane shall not be assembled, set up, or used unless ground conditions are firm, drained, and graded to a sufficient extent for the equipment to meet the manufacturer's specifications for adequate support and degree of level.
Ajax Building Corporation shall inform the user and operator of the location of known hazards below the equipment (such as tanks, voids, and utilities). The project superintendent shall review all site drawings, as-builts, and soils reports with the user and operator. If necessary, the location of these hazards will be marked in the field to provide the operator with a visual reference of their location.

Assembly/Disassembly:

The subcontractor / crane supplier shall designate an Assembly / Disassembly (A/D) Director who meets the criteria for both a qualified and a competent person to supervise the assembly and disassembly of the equipment.

Immediately prior to assembly / disassembly operations commencing, the A/D Director shall review all applicable procedures and review these procedures, hazardous tasks, hazard locations, and any other applicable information with the crew members.

Inspections:

Initial / Post Assembly Inspections

Subcontractors utilizing cranes on an Ajax Building Corporation project shall notify the project superintendent at least 72 hours in advance of a scheduled crane arrival. The notification shall include the following information:

1. Crane type (hydraulic, conventional, crawler, etc.)
2. Crane capacity
3. Arrival time for crane assembly
4. Crane owner / rental company name
5. Type of work to be performed (tilt walls, steel erection, set roof top equipment, etc.)

Prior to set-up/assembly, the subcontractor shall provide a current copy of the annual inspection certification to the project superintendent. No crane shall operate on an Ajax Building Corporation jobsite without a current annual inspection certificate.

Prior to operation of hydraulic truck mounted type cranes, which require no jobsite assembly, the operator shall conduct and document an initial inspection at least equivalent to the daily crane inspections detailed below. Note: installation of jibs on hydraulic cranes does not require 3rd party inspections.

All cranes which require jobsite assembly shall be surveyed by a 3rd party independent qualified crane inspector in accordance with the following: Note: The crane inspector shall utilize Ajax Building Corporations Crane Operation Safety Survey form (attached) or a similar pre-approved form.

1. Upon the subcontractor's 72 hour notification of a crane arriving on site, the project superintendent shall schedule the crane surveyor for arrival at the jobsite concurrent with the arrival time of the crane equipment.
2. Each survey shall commence at "build up" of the crane.
3. Upon arrival at the jobsite, the crane surveyor shall report to the Ajax Building Corporation project superintendent and then proceed to the crane assembly area.
4. The crane surveyor shall introduce himself / herself to the assembly / disassembly director and give a brief explanation of the survey procedures.
5. Where a deficiency requires repairs, replacement of equipment, or additional testing which may result in down time and additional expenses, the crane owner shall be afforded the opportunity to determine the method of correction which is acceptable to Ajax Building Corporation, the crane surveyor, and the subcontractor.
6. The crane survey shall include the inspection of the crane, accessory equipment to be used on the project, and below-the-hook lifting devices that will be used for lifts on the project.
7. The surveyor shall record all information required on the Crane Operation Safety Survey form and identify any safety deficiencies noted as follows:
    a. Note deficiency on report along with plan of action for correction (crane crew corrected, crane company replacing component, etc.)
    b. Report deficiency to the assembly/disassembly director or crane operator for initial correction.

c. Where a deficiency cannot be corrected prior to scheduled work time, a verbal and written report shall be provided to the Ajax Building Corporation Project Superintendent which includes the following information:

- Persons notified of deficiency (operator, A/D director, subcontractor, etc.).
- Severity of deficiency.
- Recommended plan of action.

8. The crane surveyor shall view the setup of the crane and operation of the crane in order to evaluate the safe operation and use of the crane equipment.
9. Upon surveying the assembly, set up, and operation of the crane equipment, the survey report, along with all deficiencies noted and recommended plans of action shall be provided to the Ajax Building Corporation Project Superintendent.
10. Under most circumstances, the survey is completed on site between 1 and 3 hours.
    a. If on site time is expected to exceed 4 hours, the surveyor should notify the Project Superintendent.
    b. If on site time is expected to exceed 8 hours, the surveyor should notify the Ajax Building Corporation Safety Director.

Daily Inspections

The crane operator must conduct a visual inspection of the equipment prior to each shift. The operator shall complete the Crane Inspection form and submit it to the project superintendent prior to crane operations beginning. The project superintendent shall maintain the forms on the jobsite for the duration of the project.

At a minimum, the daily inspection must include the following:

1. Control mechanisms for maladjustments interfering with proper operation
2. Control and drive mechanisms for apparent excessive wear of components or contamination by lubricants, water, or other foreign matter
3. Air, hydraulic, and other pressurized lines for deterioration or leakage, particularly those which flex in normal operation
4. Hydraulic systems for proper fluid level
5. Hooks and latches for deformation, cracks, excessive wear, or damage such as from chemicals or heat
6. Wire rope reeving for compliance with the manufacturer's specifications
7. Wire rope in accordance with OSHA Standard 1926.1413(a)
8. Electrical apparatus for malfunctioning, signs of apparent excessive deterioration, dirt or moisture accumulation
9. Tires (when in use) for proper inflation and condition
10. Ground conditions, outriggers, and blocking for proper support
11. The equipment for level position
12. Operator cab windows for significant cracks, breaks, or other deficiencies that would hamper the operators view
13. Safety devices and operational aids listed below for proper operation
14. Clearly legible load chart provided by the crane manufacturer securely fixed in a location clearly visible to the operator

If any deficiency is identified, an immediate determination must be made by the competent person as to whether the deficiency constitutes a safety hazard. If the deficiency is determined to constitute a safety hazard, the equipment must be taken out of service until it is corrected.

Safety Devices and Operation Aids:

The following safety devices are required on all cranes operating on Ajax Building Corporation jobsites:

1. Crane Level Indicator
2. Boom Stops (except for hydraulic booms)
3. Jib Stops (if jib is attached)
4. Horn
5. Cranes with foot pedal brakes must have locks
6. Hydraulic outrigger jacks must have an integral holding device/check valve
7. Anti-Two-Blocking Device
8. Boom Hoist Limiting Device or Boom Angle Indicator (if crane is equipped with a luffing jib it must have a luffing jib limiting device)
9. Jib Angle Indicator (if equipped with a luffing jib)
10. Boom Length Indicator (for telescopic booms)
11. Load weighing device, load moment indicator, or load moment limiter.

Operations must not begin unless each underlined safety device or operational aid is in proper working order. In the event the non-underlined devices are malfunctioning, manufacturer specified alternative measures may be followed temporarily until the device is repaired. If a device stops functioning properly during operations, the crane operator must safely stop operations until the device is functioning properly or temporary alternative measures are implemented.

Power Line Safety: (up to 350kv)

Prior to assembly, disassembly, or equipment operations, the project superintendent, subcontractor, and operator must define and identify the work zone 360 degrees around the equipment, up to the equipment's maximum working radius. They then shall assess the site to determine if any part of the equipment, load line, rigging, or load could get closer than 20' to an overhead power line. If so, the project superintendent / subcontractor shall institute one of the following options:

No crane operations shall take place within 20' of an energized overhead power line without review and approval of the Ajax Building Corporation Safety Director.

1. Option 1 – Deenergize and Ground
   - Confirm with the utility owner / operator that the power line has been deenergized and visibly grounded at the worksite.

2. Option 2 – Maintain 20' clearance by implementing the following:
   - The project superintendent shall conduct a planning meeting with the crane operator and other workers in the area of the equipment or load to review the location of the power line(s) and steps that will be taken to prevent encroachment / electrocution.
   - If tag lines are used they must be non-conductive.
   - Erect and maintain a highly visible elevated warning line or barricade visible to the operator 20' from the power line. If the operator is unable to see the elevated warning line, a dedicated spotter must be used in addition to the barricade.
   - The crane must be equipped with a proximity alarm, a range control device, or an insulating link/device.

Note: For any crane operations adjacent to overhead power lines which exceed 350kv up to 1000kv the minimum clearance distance is 50'.

Operation:

Prior to operation, any crane equipment on an Ajax Building Corporation jobsite the subcontractor / crane operator shall submit proof of the operator's qualifications/certifications to operate the equipment. Certification must be by an accredited crane operator testing organization or by an audited employer program.

Whenever there is a concern as to safety, the crane operator has full authority to stop and to refuse to handle loads until a qualified person has determined that safety has been assured.

The operator must comply with all manufacturer procedures applicable to the operational functions of equipment and attachments. The procedures applicable to the operation of the equipment, including load charts, recommended operating speeds, special hazard warnings, instructions, and operators manual must be readily available in the cab at all times for use by the operator.

The operator shall not engage in any activity that diverts his / her attention while operating the equipment, such as the use of cell phones.

The operator shall remain at the controls whenever a load is lifted.

If the crane is taken out of service, a tag shall be placed in the cab stating it is out of service and shall not be used.

When localized storm conditions are present in the vicinity of the jobsite, the project superintendent and crane operator must determine whether it is necessary to implement manufacturers' recommendations for securing the equipment. No lifts shall be made if the wind speed exceeds 25mph.

Prior to making a lift, the weight of the load shall be determined with a load weighing device, load moment indicator, or from an industry recognized source such as the loads manufacturer or by a calculation method recognized by the industry. If the load exceeds 75% of the maximum rated capacity at the longest radius that will be used during the lift operation, the procedures for Critical Lifts shall be followed.

The equipment must not be used to pull or drag loads sideways.

When traveling with a load, the operation must be supervised by a competent person and conducted in accordance with the manufacturer's requirements.

Signaling:

A signal person must be used in each of the following situations:

1. The load travel area or load placement area is not in full view of the operator
2. When the equipment is traveling and/or the view in the direction of travel is obstructed
3. Due to site specific safety concerns, either the operator or the person handling the load determines it is necessary

The subcontractor must ensure the signal person meets the qualification requirements of OSHA Standard 1926.1428. They shall provide the Ajax Building Corporation Project Superintendent documentation that the signal person meets these qualifications prior to beginning work on site.

Rigging:

The subcontractor must ensure that the rigging work is done by a qualified rigger who meets the qualification requirements of OSHA Standard 1926.1401. They shall provide the Ajax Building Corporation Project Superintendent documentation that the rigger meets these qualifications prior to beginning work on site.

Inspections

Rigging equipment for material handling shall be inspected prior to use on each shift and as necessary during its use to ensure that it is safe. Defective rigging shall be immediately removed from service.

Alloy Steel Chains

Chains are commonly used because of their strength and ability to adapt to the shape of the load. As with any sling, misuse of chain slings could damage the sling, resulting in sling failure and possible injury to an employee.

When inspecting chain slings, pay special attention to any stretching, wear in excess of the allowances made by the manufacturer, and nicks or gouges. These signs indicate that the sling may be unsafe and must be removed from service.

Welded alloy steel chain slings shall have permanently affixed durable identification stating size, grade, rated capacity, and sling manufacturer.

Subcontractors using alloy steel chain slings shall make and maintain a record of inspections for each sling and must be available for examination.

Wire Rope

Wire rope is a complex machine with many different designs. This makes it difficult to have precise rules to determine exactly when a wire rope sling should be replaced. There are many variables and all must be considered.

Wire rope slings shall have permanently affixed durable identification stating size, grade, rated capacity, and sling manufacturer. Slings without this identification shall not be used.

Regulations specify that wire rope slings shall be removed from service immediately if ANY of the following conditions are present:

1. Broken Wires: *See OSHA standard 1926.251(c)(4)(iv)*
2. Metal Loss
3. Distortion: *Excessive Kinking, bird caging, crushing, or other damage*
4. Heat Damage
5. Damaged End Attachments
6. Metal Corrosion

Synthetic Slings

Synthetic slings shall have a permanently affixed durable identification tag stating the name of the manufacture, the rated capacity for the type of hitch, and the type of material.

Synthetic slings shall be immediately removed from service if:

1. The identification tag is missing or illegible
2. The sling has acid or caustic burns
3. The sling is melted or charred
4. The sling has snags, punctures, tears, or cuts
5. The sling has broken or worn stitches

Synthetic slings must be protected from abrasive and sharp edges that could cause a reduction of the slings rated capacity.

Work Area Control:

The swing radius on the crane shall be marked with control lines, warning lines, or railings to warn personnel and to keep them away from hazards created by the rotating superstructure of the equipment.

Before an employee goes into a location in the hazard area out of the operators view, the employee must ensure that the operator is informed that he/she is going into that location.

Whenever possible, hoisting routes shall be used that eliminate the potential for personnel below to be struck by falling objects. If due to site constraints, loads must be hoisted and swung over other personnel, then the project shall institute a warning system such as a worker blowing whistle to warn personnel in the fall zone that there is an overhead hazard.

While the operator is not moving a suspended load, no employee shall be in the fall zone except for employees:

1. Engaged in hooking, unhooking, or guiding the load
2. Engaged in the initial attachment of the load to a component or structure; or
3. Operating a concrete hopper or bucket

Only employees needed to receive a load are permitted to be within the fall zone when a load is being landed.

During tilt up operations, no employee must be directly under the load and only employees essential to the operation are permitted in the fall zone.

Critical Lifts:

A critical lift is defined as any lift in which one of the following conditions are present:

1. Where in the cranes current configuration at any point during the lift, the gross load weight exceeds 75% of the capacity of the crane, or 85% of the capacity of the crane where tilt panels are being erected.
2. A single lift in which two or more cranes are being used. (tandem lifts)
3. Lifts made within 20’ of energized power lines.
4. Hoisting personnel in suspended work platforms.
5. Lifts involving specialized material/equipment or unique and complex rigging equipment.
6. Static tower crane erection and dismantlement.

Where a critical lift will be performed, a written critical lift plan shall be submitted to Ajax Building Corporation prior to commencing with the lift. A written plan shall include the following:

1. Crane manufacturer, capacity, and all specifications for the configuration to be used for the lift.
2. Load chart data for the crane to be used to make the lift.
3. Total calculated weight of the load to be lifted including all rigging and other deductions consistent with the manufacturers load chart.
4. Diagrams of the lift that provides geometrical conditions of the load, rigging, and all crane positions during the lift. The drawing shall provide the following:
    a. Locations of all components to be lifted prior, during, and after the lift is completed.
    b. Radius points.
    c. Swing patterns.
    d. In the event that the lift must be aborted, positions where the load may be safely landed.
    e. Areas where any personnel, public, and vehicles must be evacuated during the lift.
5. Potential ground loading for each point of contact by the crane in selected locations in which the crane will perform the critical lift.
6. Soil and subsurface data and information pertaining to the location on which the crane used for the critical lift will be positioned. This information shall be procured from an authoritative source such as a professional civil engineer registered in the state in which the project is located. *This information may be available from Ajax Building Corporation for selected locations on some projects.*
7. An engineer shall use the data provided in #5 and # 6 above to verify and confirm the following:
    a. The soil and subsurface conditions are capable of supporting all loads imposed during the critical lift.
    b. That the designs of cribbing and other supports used under the crane load points are appropriate to safely transfer the load.
8. Signature and stamp on the plan by a registered professional engineer licensed in the state in which the project is located, evidencing review of the plan as meeting the requirements set forth in this manual and that all loads and load information and calculations contained in the plan are approved, acceptable, and safe to perform.

9. Crane operator qualifications and personnel involved in the lift and their duties in respect to the lift.
10. Method by which communication will be provided to the crane operator. (designated signal person, two-way radio, etc)
11. A critical lift hazard analysis which identifies the particular hazards associated with the lift and the means and methods to reduce, mitigate, or eliminate the hazards.
12. Emergency action plan.

The written critical lift plan shall be submitted for review and approval to Ajax Building Corporation at least 72 hours prior to any critical lift. No critical lifts shall be conducted prior to such approval.

Prior to any critical lift being made, a pre-lift meeting must be held to review the applicable safety requirements. The equipment operator, signal persons, rigging persons, personnel to be lifted (as applicable), subcontractors' superintendent, Ajax superintendent, and Ajax safety director must attend.

Hoisting Personnel:

The use of cranes to hoist personnel is prohibited except where it can be demonstrated that the erection, use, and dismantling of conventional means of reaching the work area, such as a personnel hoist, ladder, stairway, aerial lift, or scaffolding, would be more hazardous, or is not possible because of the projects structural design or worksite conditions.

When using cranes to hoist employees, the employees must be in a personnel platform that meets the following requirements:

1. The personnel platform and attachment / suspension system must be designed by a qualified person.
2. The system used to connect the personnel platform to the equipment must allow the platform to remain within 10 degs of level, regardless of boom angle.
3. The suspension system must be designed to minimize tipping of the platform due to the movement of employees occupying the platform
4. The platform must be capable of supporting its own weight and at least five times the maximum intended load.
5. The personnel platform must be equipped with a guardrail system and a grab rail inside the entire perimeter.
6. Access gates must not swing outwards and they must be equipped with a device that prevents accidental opening.
7. The weight of the platform and its rated capacity must be conspicuously posted on the platform with a plate or other permanent marking.
8. Personnel platforms must be used only for employees, their tools, and the materials necessary to do their work. Platforms must not be loaded in excess of its rated capacity.
9. Prior to lifting personnel, a trial lift with the unoccupied platform loaded to at least to the anticipated lift weight must be made in accordance the OSHA requirements.
10. Personnel shall not be hoisted when wind speeds (sustained or gusts) exceed 20 mph or during inclement weather.
11. Personnel being hoisted must wear fall protection equipment and be attached to a structural member of the platform.
12. Hoisting personnel near power lines (within 20' of a line up to 350kv) is prohibited.

EXHIBIT C AJAX/TANDEM SITE REQUIREMENTS

AJAX BUILDING CORPORATION

CRANE PRE-ERECTION HAZARD ANALYSIS

➔Required 72 Hours Prior to Crane Arrival←

Subcontractor: _____

Contact: _____ Phone: _____ Date: _____

Project Name: _____ Job #: _____

Project Location: _____

I have read and understand the Ajax Building Corporation Crane Safety Policies and Procedures. ☐ **Yes** ☐ **No**

CRANE EQUIPMENT			
Type Of Work:	☐ Tilt – Up Panel	☐ Steel Erection	☐ Other:
Crane Capacity:		Boom Length:	
Maximum Pick Radius on this Project:		Maximum Pick Weight on this Project:	
Crane Type:	☐ Telescoping Boom	☐ Lattice Boom	☐ Rough Terrain
	☐ Truck Mounted	☐ Crawler Mounted	☐ Other:
Accessory Gear:	☐ Jib	☐ Other:	

LIFT ANALYSIS			
Will any lifts exceed 75% of the crane's rated capacity?	☐ Yes	☐ No	☐ N/A
If yes, have you submitted a written critical lift plan?	☐ Yes	☐ No	☐ N/A
Will any lifts require on rubber pick and carry operation?	☐ Yes	☐ No	☐ N/A

PRE-ERECTION HAZARD ANALYSIS			
A. Access For Cranes, Trucks, And Other Erection Equipment:			
1. Haul road for cranes and trucks	☐ OK	☐ N/A	☐ See Notes
2. Adequate entrance into and out of project	☐ OK	☐ N/A	☐ See Notes
3. Use of public access requiring traffic control or permits	☐ OK	☐ N/A	☐ See Notes
4. Adequate area for crane assembly	☐ OK	☐ N/A	☐ See Notes
5. Adequate area for crane disassembly	☐ OK	☐ N/A	☐ See Notes
6. Existing structures on site	☐ OK	☐ N/A	☐ See Notes
7. Truck staging area available	☐ OK	☐ N/A	☐ See Notes
8. Access outside of structure	☐ OK	☐ N/A	☐ See Notes
B. Ground Conditions			
1. Level	☐ OK	☐ N/A	☐ See Notes
2. Compaction to support crane loads	☐ OK	☐ N/A	☐ See Notes
3. Crane restrictions (excavations, shoring, underground structures)	☐ OK	☐ N/A	☐ See Notes
4. Slab thickness will support crane	☐ OK	☐ N/A	☐ See Notes
C. Utilities			
1. Overhead wires (provide method used to maintain clearance in notes section)	☐ OK	☐ N/A	☐ See Notes
2. Underground vaults, sewer, gas, fiber optics, etc.	☐ OK	☐ N/A	☐ See Notes
3. Airport clearance	☐ OK	☐ N/A	☐ See Notes
4. Airport flag or light	☐ OK	☐ N/A	☐ See Notes
D. Other Condition Not Addressed Above:	☐ OK	☐ N/A	☐ See Notes

Information provided by:

_____ _____

Print Name *Signature*

Notes:

Items Noted by:

_____	_____
Print Name	*Signature*

AJAX BUILDING CORPORATION

CRANE OPERATION SAFETY SURVEY

***Attention*: Survey is based on the condition of crane at the time of survey. Corrections and changes made as a result of this survey shall be written on the Survey Notes form.**

SUBCONTRACTOR:
CONTACT NAME:
PHONE NUMBER:
CRANE OWNER NAME:
CRANE OWNER PHONE:
PROJECT NAME:
PROJECT LOCATION:
AJAX PROJECT NUMBER:
SUPERINTENDENT:
ASSEMBLY / DISASSEMBLY DIRECTOR:

CRANE IDENTIFICATION

Crane Configuration at Time of Survey:

Crane Configuration Upon Surveyor's Arrival: ☐ Crane Assembled ☐ Crane Disassembled

Manufacturer:	Unit #:
Model #:	Serial #:

Boom Length:	Jib Length:	Crane Capacity:

Boom Section Identification Numbers:

Base	Tip	Mid	Insert 1	Insert 2	Insert 3	Insert 4	Insert 5	Insert 6	Jib	Jib

Crane Type: ☐ Telescoping Boom ☐ Lattice Boom ☐ Rough Terrain

☐ Truck Mounted ☐ Crawler Mounted ☐ Mobile Tower

Accessory Gear: ☐ Jib Jib Configuration:

Counter Weight Configuration:

CRANE EVALUATION

1.0 Documentation			
1.1 Annual certification (attach copy)	☐ YES		☐ See Notes
1.2 Daily / Monthly crane inspection forms reviewed with the operator	☐ YES		☐ See Notes
1.3 Manufacture's load chart accessible on the crane to the operator	☐ YES		☐ See Notes
1.4 Operator's manual on the crane	☐ YES		☐ See Notes
1.5 Pre-Erection Hazard Analysis completed (attach copy)	☐ YES		☐ See Notes
1.6 Other:	☐ YES	☐ N/A	☐ See Notes
2.0 Safety Devices			
2.1 Load moment indicator is functioning and accurate	☐ YES		☐ See Notes
2.2 Anti two-block device is functioning and operational	☐ YES		☐ See Notes
2.3 Boom angle indicator is functioning and accurate	☐ YES		☐ See Notes
2.4 Crane level indicator is functioning and accurate	☐ YES		☐ See Notes
2.5 Boom hoist limiting device	☐ YES		☐ See Notes
2.6 Boom length indicator (if equipment has a telescoping boom)	☐ YES	☐ N/A	☐ See Notes
2.7 Boom Stops (except for hydraulic booms)	☐ YES	☐ N/A	☐ See Notes
2.8 Jib Stops (if a jib is attached)	☐ YES	☐ N/A	☐ See Notes
2.9 Horn is functioning	☐ YES		☐ See Notes
3.0 Structural Integrity			
3.1 Boom sections	☐ YES		☐ See Notes
3.2 Jib assembly	☐ YES	☐ N/A	☐ See Notes
3.3 Outrigger supports	☐ YES	☐ N/A	☐ See Notes
3.4 Main frame	☐ YES		☐ See Notes
3.5 Other:	☐ YES	☐ N/A	☐ See Notes
4.0 General Components			
4.1 Main load line	☐ YES	☐ N/A	☐ See Notes
4.2 Auxiliary load line	☐ YES	☐ N/A	☐ See Notes
4.3 Boom hoist line	☐ YES	☐ N/A	☐ See Notes
4.4 Outriggers extend and deploy	☐ YES	☐ N/A	☐ See Notes
4.5 Manufacturer counter weights installed in accordance with the load chart	☐ YES	☐ N/A	☐ See Notes
4.6 Sheaves and drums checked for excessive wear and damage	☐ YES	☐ N/A	☐ See Notes
4.7 Tire condition for on rubber picks	☐ YES	☐ N/A	☐ See Notes
4.8 Other:	☐ YES	☐ N/A	☐ See Notes

OPERATOR, RIGGER & SIGNAL PERSON HISTORY

5.0 Operator

Name:	**Emergency contact person:**			
	Emergency phone number:			
5.1 How many years' experience operating on this type of crane?		**Years:**		
5.2 How many years of experience with the type of lifts on this Job? (tilt-up panel work, steel erection, etc)		**Years:**		
5.3 Has the operator received a copy of General Contractor's crane safety policy and procedures?		☐ **YES**	☐ **See Notes**	
5.4 Does the operator use and understand the load-rating chart on this crane?		☐ **YES**	☐ **See Notes**	
5.5 Has the operator been instructed that he should not continue with any lift that creates an unsafe condition?		☐ **YES**	☐ **See Notes**	
5.6 Does the operator have the Certified Crane Operator's (C.C.O.) certificate?		☐ **YES**	☐ **See Notes**	
5.6.1 C.C.O. Number:	**Issued:**	**Expires:**		
5.7 Does the operator have any other crane operator's certificates?	☐ **YES**	☐ **N/A**	☐ **See Notes**	
5.8 Number of certificates:	**Issued By:**	**Issue Date:**	**Expires:**	

6.0 Qualified Rigger

Name:	**Emergency contact person:**		
	Emergency phone number:		
6.1 How many years' experience rigging?		**Years:**	
6.2 How many years of experience with the type of rigging for this Job? (tilt-up panel work, steel erection, etc)		**Years:**	
6.3 Has the qualified rigger received a copy of General Contractor's crane safety policy and procedures?		☐ **YES**	☐ **See Notes**
6.4 Does the qualified rigger have documented proof of training? (attached)		☐ **YES**	☐ **See Notes**
6.5 Has the qualified rigger been informed that he should notify the operator of any unsafe condition?		☐ **YES**	☐ **See Notes**

7.0 Qualified Signal Person

Name:	**Emergency contact person:**		
	Emergency phone number:		
7.1 How many years' experience signaling?		**Years:**	
7.2 Does the qualified signal person have documented proof of training? (attached)		☐ **YES**	☐ **See Notes**
7.3 Has the qualified signal person received a copy of General Contractor's crane safety policy and procedures?		☐ **YES**	☐ **See Notes**

BELOW-THE-HOOK LIFTING DEVICES

8.0 Lifting Beams (ANSI B30.20)

8.1 Manufacture's name permanently marked on bar	☐ YES	☐ N/A	☐ See Notes
8.2 Serial Number (ID #) permanently marked on bar	☐ YES	☐ N/A	☐ See Notes
8.3 Weight of bar (if over 100 lbs.) permanently marked on bar	☐ YES	☐ N/A	☐ See Notes
8.4 Rated load capacity permanently marked on bar	☐ YES	☐ N/A	☐ See Notes
8.5 Proof of rated load test not exceeding 125% capacity of the bar	☐ YES	☐ N/A	☐ See Notes
8.6 Other:	☐ YES	☐ N/A	☐ See Notes

SET UP AND OPERATION

9.0 Lift Information

The following lift information provided by:	Name:
	Company:

9.1 What is the heaviest lift to be lifted with this crane? At what radius?	Weight:	lbs.	Radius:	ft.
9.2 What is the maximum radius this crane will be lifting? Weight of lift?	Weight:	lbs.	Radius:	ft.
9.3 What is the maximum load for pick and carry lifts? Maximum radius for pick and carry lifts?	Weight:	lbs.	Radius:	ft.

9.4 Does this crane have an approved load chart for on rubber picks?	☐ YES	☐ N/A	☐ See Notes
9.5 All lifting procedures conform with the load chart requirements	☐ YES		☐ See Notes
9.6 All lifts will be performed without exceeding 75% of the rated capacity?	☐ YES		☐ See Notes
9.7 Written plans provided to General Contractor Safety Management for critical lifts	☐ YES	☐ N/A	☐ See Notes

9.8 The Critical lift plan has been provided by:	Company:
	Name:
	Title:
	Date:

9.9 Wind speed limitation specified by the manufacturer M.P.H			☐ See Notes
9.10 Other:	☐ YES	☐ N/A	☐ See Notes

10.0 Set Up

10.1 Crane is level	☐ YES		☐ See Notes
10.2 Ground compacted and stable	☐ YES		☐ See Notes
10.3 Properly cribbed under outrigger pads only	☐ YES	☐ N/A	☐ See Notes
10.4 Crane configuration is compatible with manufacture's requirements	☐ YES		☐ See Notes
10.5 Area of travel is level, clear, and stable for pick and carry	☐ YES		☐ See Notes
10.6 Area has be checked for underground utilities in crane area	☐ YES		☐ See Notes

10.7 Outriggers are fully extended deployed with the tires off the ground or used in compliance with manufacturer's specifications	☐ YES	☐ N/A	☐ See Notes
10.8 Airport Flag is properly attached to boom tip	☐ YES	☐ N/A	☐ See Notes
10.9 Other:	☐ YES	☐ N/A	☐ See Notes
11.0 Operation			
11.1 Pre lift meeting held with crane and rigging crew	☐ YES		☐ See Notes
11.2 Designated signal man	☐ YES	☐ N/A	☐ See Notes
11.3 Operation of crane conducted in a smooth and safe manner	☐ YES		☐ See Notes
11.4 Lifting sequence and plan is known and followed by the operator	☐ YES		☐ See Notes
11.5 The crane is operated the required distance from overhead power lines	☐ YES	☐ N/A	☐ See Notes
11.6 Tag lines are used on loads	☐ YES	☐ N/A	☐ See Notes
11.7 Other:	☐ YES	☐ N/A	☐ See Notes
ASSESSMENT			
12.0 Results			
12.1 This crane may proceed with lifts as scheduled	☐ YES		☐ See Notes
12.2 This operator may proceed with lifts as scheduled	☐ YES		☐ See Notes
12.3 The accessory gear may be used as scheduled	☐ YES	☐ N/A	☐ See Notes
12.4 The below-the-hook lifting devices may be used as scheduled	☐ YES	☐ N/A	☐ See Notes
12.5 Other:	☐ YES	☐ N/A	☐ See Notes

SUBCONTRACTOR:

_____
Company Name

_____
Signature

_____
Print Name

_____
Date

SURVEYOR:

_____
Company Name

_____
Signature

_____
Print Name

_____
Date

EXHIBIT C AJAX/TANDEM SITE REQUIREMENTS

ATTACHMMENT B-3

AJAX SAFETY POLICY AGREEMENT

PROJECT: City of Venice - Public Safety Facility

JOB NO: 201825

Attachment B-3 by reference, is made a part herein of the Ajax Safety Policy, Attachment B-1 & B-2.

1. Subcontractor shall provide written assurance to the Contractor, Ajax Building Corporation, that the Subcontractor acknowledges the O.S.H.A. Excavation Safety Standards 29 CFR Part 1926.650-.652 Subpart P and CS/SB – "Trench Safety Act" of the State of Florida and will comply with same.
2. Subcontractor shall provide a separate item for the Contractor to identify the methods of compliance (i.e., sloping, shoring, or trench box).
3. Subcontractor shall provide a separate item for the Contractor to identify the cost of compliance based on the linear feet of trench to be excavated, or in the case of shoring, the square feet of shoring to be used.
4. Subcontractor will provide competent person for all excavation work.

HAZARD COMMUNICATION

1. Subcontractor acknowledges that they will abide by the requirements of the U.S Department of Labor's Hazard Communication Compliance Kit. Copies are available upon request.

HAZARDOUS WASTE HANDLING & DISPOSAL

1. Subcontractors shall remove from the site all hazardous waste materials created from execution of his work. Disposal shall be by certified carriers and documentation shall be provided to the Contractor evidencing same. Contractor shall assist Subcontractor with obtaining Owner's signature for manifest when applicable. Subcontractor shall train its employees on types of hazardous waste and ensure they are handled properly including prevention of disposal in jobsite construction debris containers.
2. Any Subcontractor disposing hazardous waste in a construction debris container (dumpster) or pile shall be liable for the entire cost of containment and disposal. Any hazardous waste spills or releases shall be cleaned up by the Subcontractor.

GENERAL

1. Subcontractors shall provide Contractor with all Material Safety Data Sheets (MSDS) for all materials being used on the project prior to material being delivered. MSDS books submitted shall be project specific and not include MSDS sheets for material not being used on this project.
2. Subcontractor will provide Contractor with copies of Subcontractor written Safety & Hazard Communication Polices.
3. No radios or stereos are permitted on site. Radios for communication purposes are permitted.
4. Subcontractor shall report all injuries or accidents to Contractor within 24 hours and will provide a copy of First Notice of Injury form within 5 days.

CRANE MANAGEMENT

1. Subcontractor acknowledges receipt of Ajax Building Corporations Crane and Rigging Safety Program, Attachment B-2. Subcontractor understands and shall comply with all requirements contained within this Program.

_____ _____

Signature *Date*

_____

Company Name

_____

Name/Title

EXHIBIT C AJAX/TANDEM SITE REQUIREMENTS

ATTACHMENT C[S]

SUBCONTRACTOR
INSURANCE COVERAGE REQUIREMENTS

WORKER'S COMPENSATION	Minimum Limits
State:	Statutory Requirements
Applicable Federal: (For example, Longshoremen's)	Statutory Requirements

COMPREHENSIVE GENERAL LIABILITY	Minimum Limits
Bodily Injury:	$1,000,000.00 Each Occurrence
Property Damage:	$1,000,000.00 Each Occurrence

Including Premises-Operations; Independent Contractor's Protective; Products and Completed Operations, Personal Injury and Advertising Injury assumed under an insured contract, including Tort Liability of another assumed in a contract; Broad Form Property Damage; Explosion, Collapse and Underground Coverages; and Products coverages.

If the Commercial General Liability Policy ("CGL") contains a general aggregate limit, it shall apply separately to this Subcontract. The CGL insurance shall be written on ISO occurrence form CG 00 01.

Contractor, Owner, and Architect must be spelled out on certificate and shall be included as additional insureds under Subcontractor's CGL policy and, if necessary, umbrella liability insurance using ISO additional insured endorsement CG 20 10 and shall include a completed operations additional insured endorsement CG 20 37.

This insurance shall apply as primary insurance with respect to any other insurance or self-insurance afforded to Contractor. There shall be no endorsement or modification of the CGL to make it excess over other available insurance.

Subcontractor shall maintain CGL and, if necessary, commercial umbrella liability insurance with a limit not less than $1,000,000 each occurrence for at least three years following final payment for the Work. The policy shall provide a Products and Completed Operations aggregate of at least two times its each occurrence limit. Continuing CGL insurance shall be written on ISO occurrence form CG 00 01 (or a substitute form providing equivalent coverage) and shall at minimum cover liability arising from Products and Completed Operations and liability assumed under an insured contract.

COMPREHENSIVE AUTOMOBILE LIABILITY	Minimum Limits
Bodily Injury:	$1,000,000.00 Each Occurrence
Property Damage:	$1,000,000.00 Each Occurrence

Comprehensive Automobile Liability shall include coverage for any owned autos, non-owned autos, and hired autos.

Contractor, Owner, and Architect must be spelled out on certificate and shall be included as additional insureds under Subcontractor's Comprehensive Automobile Liability policy and, if necessary, umbrella liability insurance policy using applicable ISO endorsements and shall include applicable completed operations additional insured ISO endorsements.

CERTIFICATE FORM REQUIREMENTS

All certificates must be issued on an ACORD form.

In addition to the additional Insureds being spelled out in the description section of the certificate, the project name, number, and address must also be included.

The certificate shall be executed with a "live" signature by a duly authorized representative of each insurer and shall provide for a 30 day written notice prior to cancellation.

Activity ID	Activity Name	Original Duration	Start	Finish
Venice Public Safety Facility - SEPTEMBER 2019 MONTHLY OWNE		585	03-13-2018 A	07-17-2020
PROJECT MILESTONES		385	03-14-2019 A	07-17-2020
A6150	CONCRETE / MASONRY / STEEL BIDDING COMPLETE	0	03-14-2019 A	
A6140	NTP ISSUED - GMP #1 SITE WORK	0	03-18-2019 A	
A5890	100% BUILDING CONSTRUCTION DOCUMENTS COMPLETE	0		03-25-2019 A
A6120	100% CIVIL DOCUMENTS COMPLETE	0		03-25-2019 A
A5930	START CONSTRUCTION ON SITE (GMP #1 - SITE WORK)	0	04-15-2019 A	
A5900	GMP FINALIZED	0		05-31-2019 A
A5910	BOARD FINAL APPROVAL	0		06-11-2019 A
A6130	FOUNDATIONS START ON SITE	0	07-01-2019 A	
A5990	FOUNDATIONS COMPLETE	0		07-19-2019 A
A6000	EXTERIOR WALLS COMPLETE	0		10-18-2019
A5940	STRUCTURE COMPLETE - DRY IN ACHIEVED	0		12-30-2019
A5980	DRYWALL FINISHING COMPLETE	0		03-09-2020
A5950	SUBSTANTIAL COMPLETION	0		06-02-2020
A6050	OWNER MOVE IN COMPLETE	0		07-16-2020
A5960	FINAL COMPLETION	0		07-17-2020
PRECONSTRUCTION SERVICES		313	03-13-2018 A	06-25-2019 A
PROCUREMENT		269	03-01-2019 A	03-06-2020
CONSTRUCTION SERVICES		323	04-02-2019 A	07-17-2020
VENICE AVE		95	04-02-2019 A	01-13-2020
A6290	RIGHT OF WAY PERMIT	15	04-02-2019 A	09-10-2019 A
A6620	ISSUE DRAWINGS	1	09-10-2019 A	09-18-2019 A
A6310	PRICE PLAN CHANGES	20	09-19-2019 A	10-07-2019
UTILITY WORK		32	09-30-2019 A	11-20-2019
A6320	DIRECTIONAL BORE 10" WATER (WEST)	5	09-30-2019 A	10-01-2019 A
A6300	INSTALL MOT	1	10-01-2019 A	10-01-2019 A
A6330	DEMO SIDEWALK	3	10-08-2019	10-10-2019
A6340	PRESSURE TEST 10" WATER	1	10-08-2019	10-08-2019
A6350	8" (12") WATER MAIN (EAST)	5	10-11-2019	10-17-2019
A6360	PRESSURE TEST 8"	1	10-18-2019	10-18-2019
A6370	INSTALL DRIVEWAY CULVERTS & OUTFALL	5	10-21-2019	10-25-2019
A6380	FORM & POUR DRIVEWAY APRONS	5	10-28-2019	11-01-2019
A6390	DEMO EXISTING ENTRANCE	2	10-28-2019	10-29-2019
A6400	SANITARY FORCE MAIN FROM LIFT STATION	5	11-04-2019	11-08-2019
A6410	TEST FORCE MAIN	1	11-11-2019	11-11-2019
A6420	FORM & POUR SIDEWALKS	4	11-12-2019	11-15-2019
A6430	GRADE SWALE	2	11-18-2019	11-19-2019
A6440	SOD SWALE	1	11-20-2019	11-20-2019
ROAD WORK		37	11-18-2019	01-13-2020
A6450	INSTALL MOT	1	11-18-2019	11-18-2019
A6460	LIGHT POLE REMOVAL	2	11-19-2019	11-20-2019
A6470	TREE REMOVAL	2	11-21-2019	11-22-2019

Actual Work
Remaining Work
Critical Remaining Work
Milestone
Summary

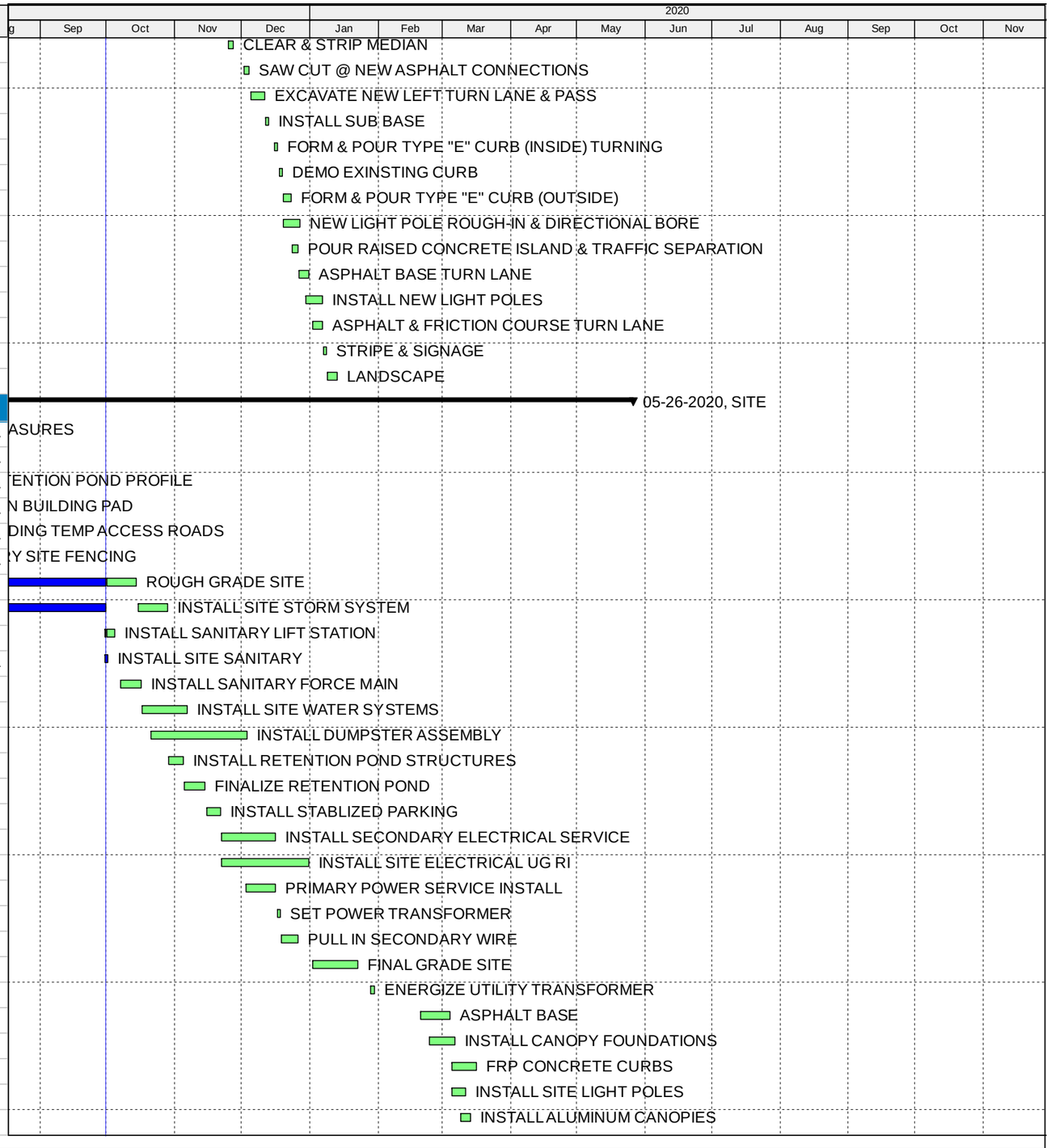
Venice Public Safety Facility - SEPTEMBER 2019 MONTHLY OWNER

Start Date: 03-13-2018
Finish Date: 07-17-2020
Current Date: 10-09-2019
Data Date: 10-01-2019

TASK filter: All Activities

EXHIBIT D CURRENT PROJECT SCHEDULE

Activity ID	Activity Name	Original Duration	Start	Finish
A6480	CLEAR & STRIP MEDIAN	3	11-25-2019	11-27-2019
A6490	SAW CUT @ NEW ASPHALT CONNECTIONS	3	12-02-2019	12-04-2019
A6500	EXCAVATE NEW LEFT TURN LANE & PASS	5	12-05-2019	12-11-2019
A6510	INSTALL SUB BASE	2	12-12-2019	12-13-2019
A6520	FORM & POUR TYPE "E" CURB (INSIDE) TURNING	2	12-16-2019	12-17-2019
A6530	DEMO EXINSTING CURB	2	12-18-2019	12-19-2019
A6540	FORM & POUR TYPE "E" CURB (OUTSIDE)	2	12-20-2019	12-23-2019
A6600	NEW LIGHT POLE ROUGH-IN & DIRECTIONAL BORE	5	12-20-2019	12-27-2019
A6550	POUR RAISED CONCRETE ISLAND & TRAFFIC SEPARATION	2	12-24-2019	12-26-2019
A6560	ASPHALT BASE TURN LANE	3	12-27-2019	12-31-2019
A6610	INSTALL NEW LIGHT POLES	5	12-30-2019	01-06-2020
A6570	ASPHALT & FRICTION COURSE TURN LANE	3	01-02-2020	01-06-2020
A6580	STRIPE & SIGNAGE	2	01-07-2020	01-08-2020
A6590	LANDSCAPE	3	01-09-2020	01-13-2020
SITE		285	04-12-2019 A	05-26-2020
A1730	NPDES / EROSION CONTROL MEASURES	5	04-12-2019 A	04-22-2019 A
A1740	CLEAR & GRUB SITE	10	04-24-2019 A	05-27-2019 A
A1750	EXCAVATE RETENTION POND PROFILE	15	05-20-2019 A	06-21-2019 A
A1760	PREPARE MAIN BUILDING PAD	14	05-21-2019 A	06-24-2019 A
A1770	PREPARE BUILDING TEMP ACCESS ROADS	10	05-23-2019 A	06-21-2019 A
A1850	INSTALL TEMPORARY SITE FENCING	4	06-04-2019 A	06-04-2019 A
A3410	ROUGH GRADE SITE	20	06-25-2019 A	10-14-2019
A1810	INSTALL SITE STORM SYSTEM	20	07-05-2019 A	10-28-2019
A1780	INSTALL SANITARY LIFT STATION	5	09-30-2019 A	10-04-2019
A1800	INSTALL SITE SANITARY	5	09-30-2019 A	10-01-2019 A
A1790	INSTALL SANITARY FORCE MAIN	8	10-07-2019	10-16-2019
A1820	INSTALL SITE WATER SYSTEMS	15	10-17-2019	11-06-2019
A3360	INSTALL DUMPSTER ASSEMBLY	30	10-21-2019	12-03-2019
A1830	INSTALL RETENTION POND STRUCTURES	5	10-29-2019	11-04-2019
A1840	FINALIZE RETENTION POND	8	11-05-2019	11-14-2019
A3170	INSTALL STABLIZED PARKING	5	11-15-2019	11-21-2019
A3050	INSTALL SECONDARY ELECTRICAL SERVICE	15	11-22-2019	12-16-2019
A3300	INSTALL SITE ELECTRICAL UG RI	25	11-22-2019	12-31-2019
A3030	PRIMARY POWER SERVICE INSTALL	10	12-03-2019	12-16-2019
A3040	SET POWER TRANSFORMER	2	12-17-2019	12-18-2019
A3060	PULL IN SECONDARY WIRE	5	12-19-2019	12-26-2019
A3080	FINAL GRADE SITE	15	01-02-2020	01-22-2020
A3070	ENERGIZE UTILITY TRANSFORMER	2	01-28-2020	01-30-2020
A3090	ASPHALT BASE	10	02-20-2020	03-04-2020
A3370	INSTALL CANOPY FOUNDATIONS	10	02-24-2020	03-06-2020
A3100	FRP CONCRETE CURBS	8	03-05-2020	03-16-2020
A3290	INSTALL SITE LIGHT POLES	5	03-05-2020	03-11-2020
A3380	INSTALL ALUMINUM CANOPIES	5	03-09-2020	03-13-2020



Actual Work
Remaining Work
Critical Remaining Work
Milestone
Summary

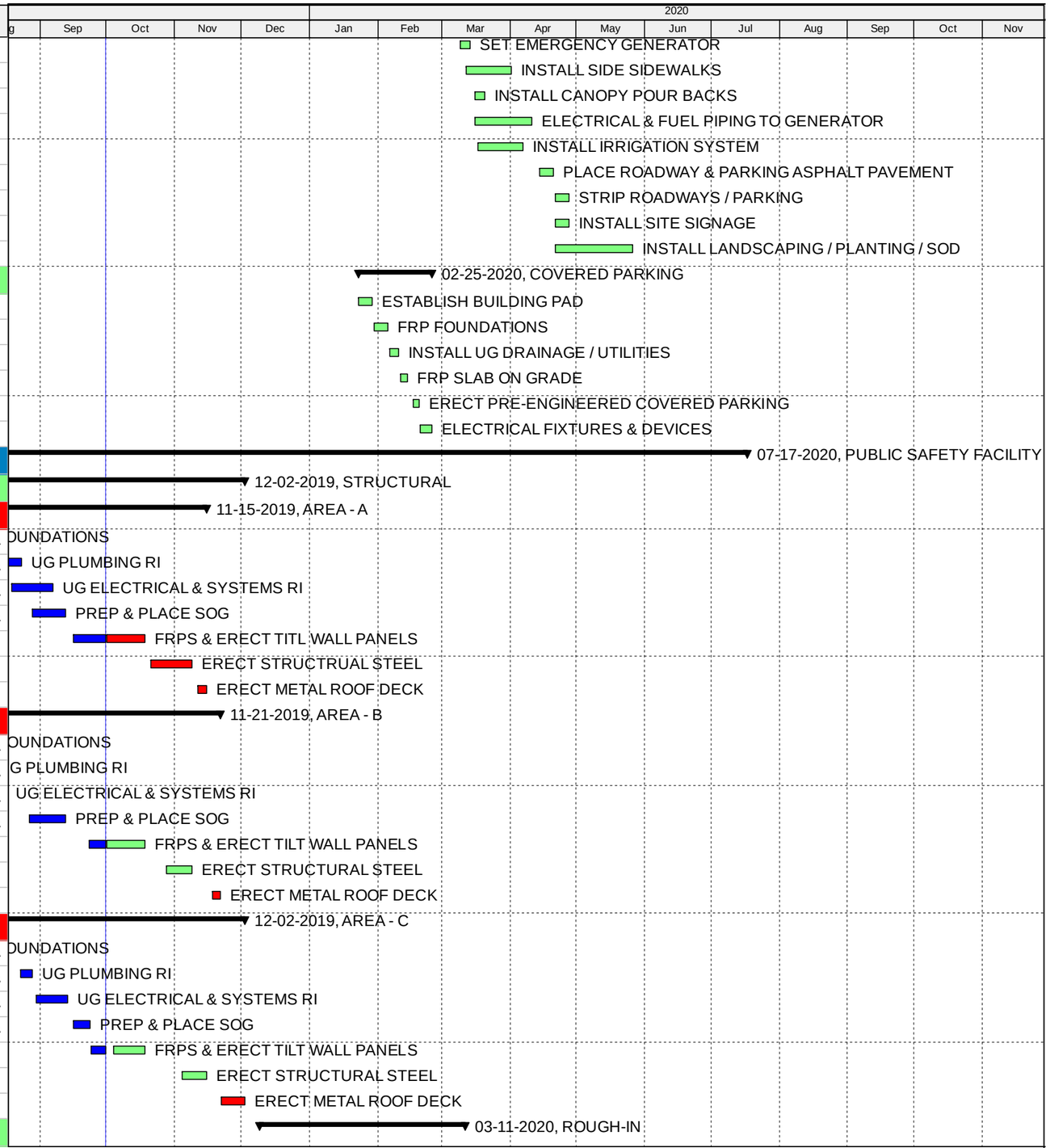
Venice Public Safety Facility - SEPTEMBER 2019 MONTHLY OWNER

Start Date: 03-13-2018
Finish Date: 07-17-2020
Current Date: 10-09-2019
Data Date: 10-01-2019

TASK filter: All Activities

EXHIBIT D CURRENT PROJECT SCHEDULE

Activity ID	Activity Name	Original Duration	Start	Finish
A3520	SET EMERGENCY GENERATOR	5	03-09-2020	03-13-2020
A3120	INSTALL SIDE SIDEWALKS	15	03-12-2020	04-01-2020
A3390	INSTALL CANOPY POUR BACKS	5	03-16-2020	03-20-2020
A3530	ELECTRICAL & FUEL PIPING TO GENERATOR	20	03-16-2020	04-10-2020
A3160	INSTALL IRRIGATION SYSTEM	15	03-17-2020	04-06-2020
A3130	PLACE ROADWAY & PARKING ASPHALT PAVEMENT	5	04-14-2020	04-20-2020
A3140	STRIP ROADWAYS / PARKING	5	04-21-2020	04-27-2020
A3150	INSTALL SITE SIGNAGE	5	04-21-2020	04-27-2020
A3180	INSTALL LANDSCAPING / PLANTING / SOD	25	04-21-2020	05-26-2020
COVERED PARKING		24	01-23-2020	02-25-2020
A3310	ESTABLISH BUILDING PAD	5	01-23-2020	01-29-2020
A3320	FRP FOUNDATIONS	5	01-30-2020	02-05-2020
A3330	INSTALL UG DRAINAGE / UTILITIES	3	02-06-2020	02-10-2020
A3340	FRP SLAB ON GRADE	4	02-11-2020	02-14-2020
A3350	ERECT PRE-ENGINEERED COVERED PARKING	3	02-17-2020	02-19-2020
A3420	ELECTRICAL FIXTURES & DEVICES	4	02-20-2020	02-25-2020
PUBLIC SAFETY FACILITY		263	07-01-2019 A	07-17-2020
STRUCTURAL		102	07-01-2019 A	12-02-2019
AREA - A		93	07-01-2019 A	11-15-2019
A1550	FRP - FOUNDATIONS	15	07-01-2019 A	07-17-2019 A
A1570	UG PLUMBING RI	10	07-31-2019 A	08-23-2019 A
A1580	UG ELECTRICAL & SYSTEMS RI	17	08-19-2019 A	09-06-2019 A
A1590	PREP & PLACE SOG	8	08-28-2019 A	09-12-2019 A
A1600	FRPS & ERECT TITL WALL PANELS	15	09-16-2019 A	10-18-2019
A1870	ERECT STRUCTRUAL STEEL	15	10-21-2019	11-08-2019
A1890	ERECT METAL ROOF DECK	5	11-11-2019	11-15-2019
AREA - B		85	07-02-2019 A	11-21-2019
A1610	FRP - FOUNDATIONS	15	07-02-2019 A	07-18-2019 A
A1630	UG PLUMBING RI	10	07-29-2019 A	08-08-2019 A
A1640	UG ELECTRICAL & SYSTEMS RI	14	08-02-2019 A	08-16-2019 A
A1650	PREP & PLACE SOG	8	08-27-2019 A	09-12-2019 A
A1660	FRPS & ERECT TILT WALL PANELS	15	09-23-2019 A	10-18-2019
A1860	ERECT STRUCTURAL STEEL	10	10-28-2019	11-08-2019
A1900	ERECT METAL ROOF DECK	4	11-18-2019	11-21-2019
AREA - C		75	07-03-2019 A	12-02-2019
A1670	FRP - FOUNDATIONS	11	07-03-2019 A	07-17-2019 A
A1690	UG PLUMBING RI	10	08-23-2019 A	08-28-2019 A
A1700	UG ELECTRICAL & SYSTEMS RI	12	08-30-2019 A	09-13-2019 A
A1710	PREP & PLACE SOG	6	09-16-2019 A	09-23-2019 A
A1720	FRPS & ERECT TILT WALL PANELS	14	09-24-2019 A	10-18-2019
A1880	ERECT STRUCTURAL STEEL	10	11-04-2019	11-15-2019
A1910	ERECT METAL ROOF DECK	5	11-22-2019	12-02-2019
ROUGH-IN		66	12-09-2019	03-11-2020



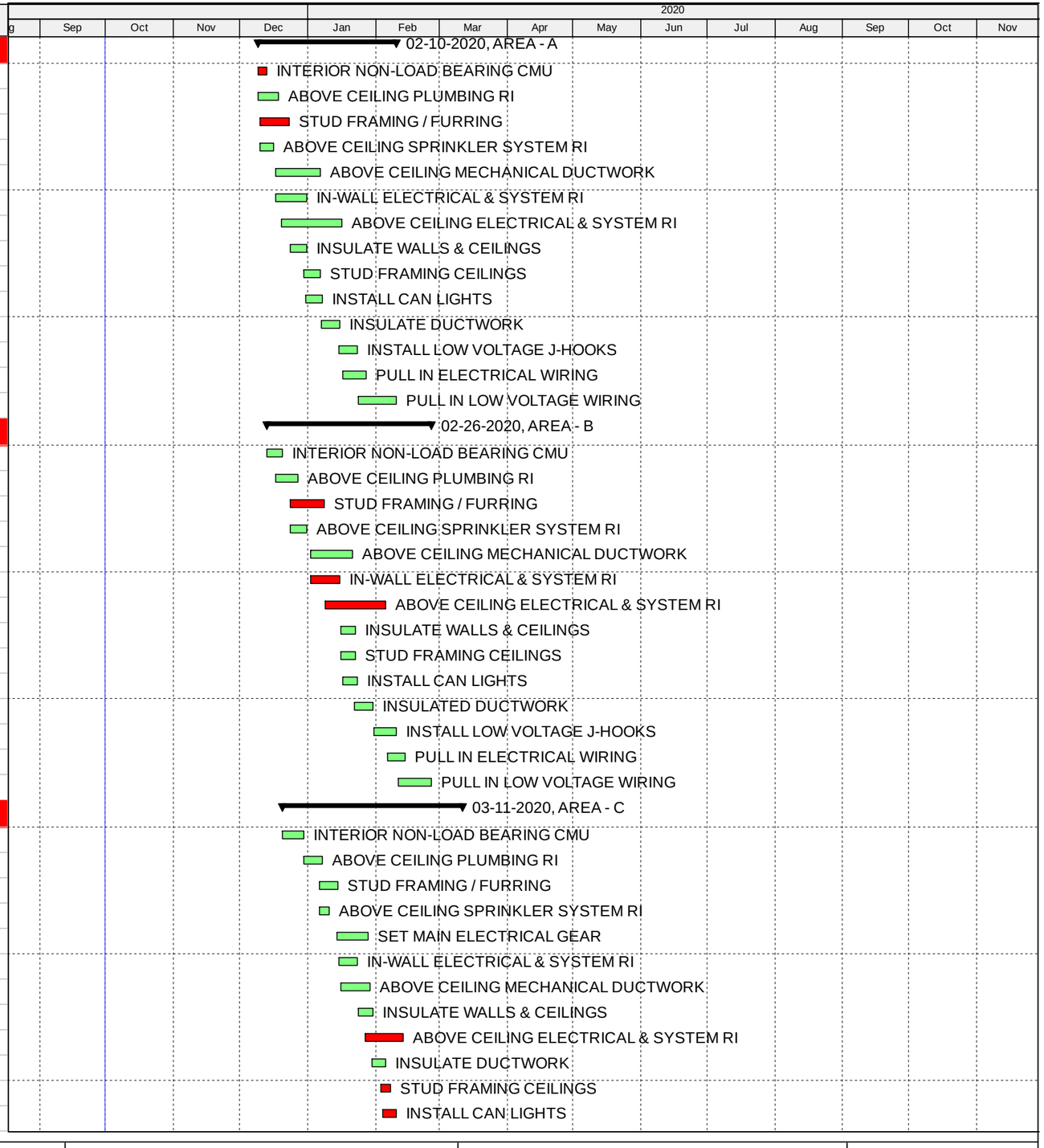
Actual Work
Remaining Work
Critical Remaining Work
Milestone
Summary

Venice Public Safety Facility - SEPTEMBER 2019 MONTHLY OWNER

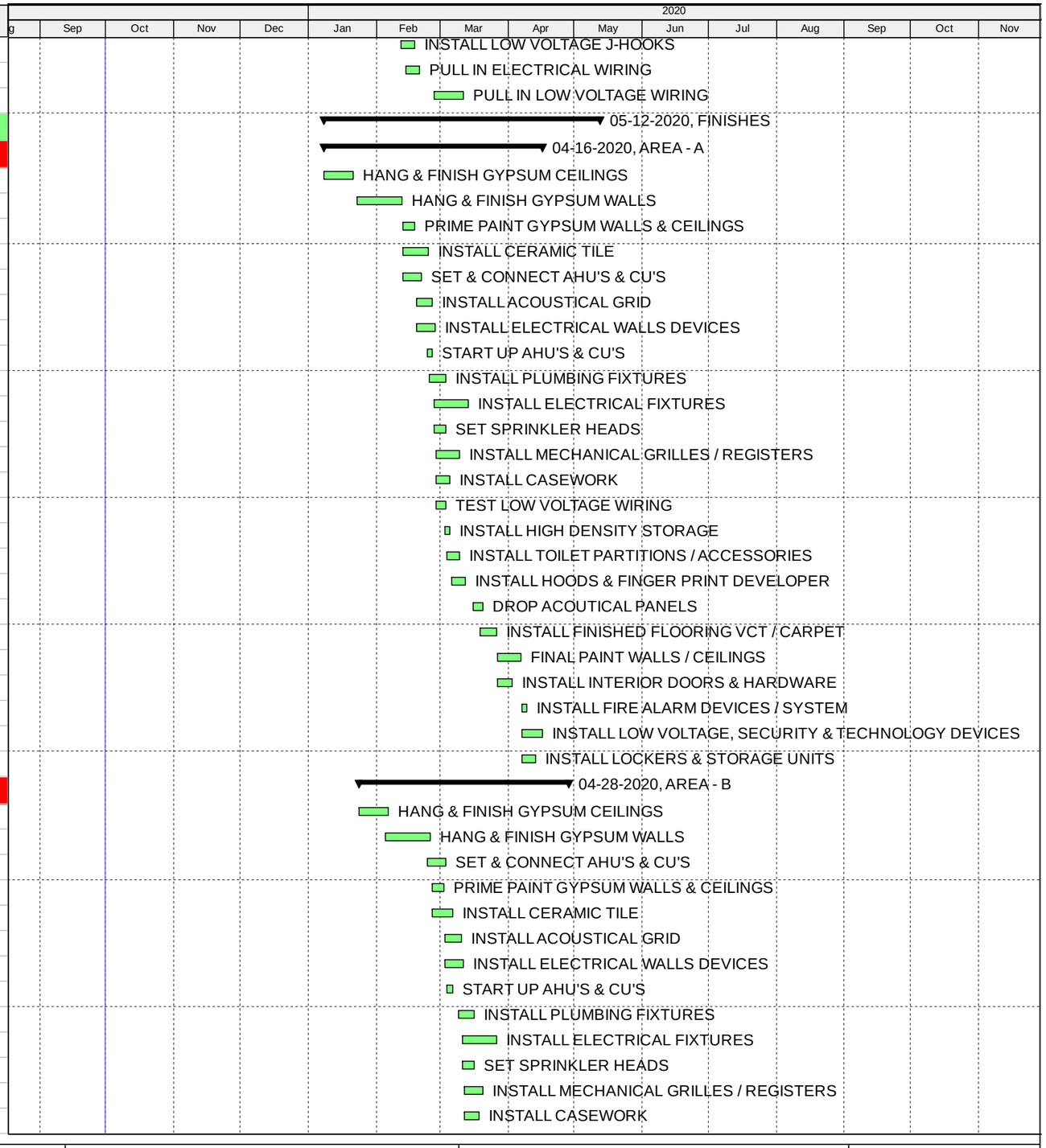
Start Date: 03-13-2018
Finish Date: 07-17-2020
Current Date: 10-09-2019
Data Date: 10-01-2019

EXHIBIT D CURRENT PROJECT SCHEDULE

Activity ID	Activity Name	Original Duration	Start	Finish
AREA - A		44	12-09-2019	02-10-2020
A1920	INTERIOR NON-LOAD BEARING CMU	4	12-09-2019	12-13-2019
A1940	ABOVE CEILING PLUMBING RI	8	12-09-2019	12-18-2019
A1930	STUD FRAMING / FURRING	10	12-10-2019	12-23-2019
A2390	ABOVE CEILING SPRINKLER SYSTEM RI	5	12-10-2019	12-16-2019
A1950	ABOVE CEILING MECHANICAL DUCTWORK	13	12-17-2019	01-06-2020
A1970	IN-WALL ELECTRICAL & SYSTEM RI	10	12-17-2019	12-31-2019
A1960	ABOVE CEILING ELECTRICAL & SYSTEM RI	18	12-20-2019	01-16-2020
A1980	INSULATE WALLS & CEILINGS	5	12-24-2019	12-31-2019
A3000	STUD FRAMING CEILINGS	5	12-30-2019	01-06-2020
A2300	INSTALL CAN LIGHTS	5	12-31-2019	01-07-2020
A2190	INSULATE DUCTWORK	7	01-07-2020	01-15-2020
A3430	INSTALL LOW VOLTAGE J-HOOKS	7	01-15-2020	01-23-2020
A1990	PULL IN ELECTRICAL WIRING	7	01-17-2020	01-27-2020
A2000	PULL IN LOW VOLTAGE WIRING	12	01-24-2020	02-10-2020
AREA - B		52	12-13-2019	02-26-2020
A2010	INTERIOR NON-LOAD BEARING CMU	5	12-13-2019	12-20-2019
A2030	ABOVE CEILING PLUMBING RI	8	12-17-2019	12-27-2019
A2020	STUD FRAMING / FURRING	10	12-24-2019	01-08-2020
A2400	ABOVE CEILING SPRINKLER SYSTEM RI	5	12-24-2019	12-31-2019
A2040	ABOVE CEILING MECHANICAL DUCTWORK	14	01-02-2020	01-21-2020
A2060	IN-WALL ELECTRICAL & SYSTEM RI	10	01-02-2020	01-15-2020
A2050	ABOVE CEILING ELECTRICAL & SYSTEM RI	20	01-09-2020	02-05-2020
A2070	INSULATE WALLS & CEILINGS	5	01-16-2020	01-22-2020
A3010	STUD FRAMING CEILINGS	5	01-16-2020	01-22-2020
A2290	INSTALL CAN LIGHTS	5	01-17-2020	01-23-2020
A2200	INSULATED DUCTWORK	7	01-22-2020	01-30-2020
A3440	INSTALL LOW VOLTAGE J-HOOKS	7	01-31-2020	02-10-2020
A2080	PULL IN ELECTRICAL WIRING	7	02-06-2020	02-14-2020
A2090	PULL IN LOW VOLTAGE WIRING	12	02-11-2020	02-26-2020
AREA - C		57	12-20-2019	03-11-2020
A2100	INTERIOR NON-LOAD BEARING CMU	5	12-20-2019	12-30-2019
A2120	ABOVE CEILING PLUMBING RI	6	12-30-2019	01-07-2020
A2110	STUD FRAMING / FURRING	7	01-06-2020	01-14-2020
A2410	ABOVE CEILING SPRINKLER SYSTEM RI	5	01-06-2020	01-10-2020
A3940	SET MAIN ELECTRICAL GEAR	10	01-14-2020	01-28-2020
A2150	IN-WALL ELECTRICAL & SYSTEM RI	7	01-15-2020	01-23-2020
A2130	ABOVE CEILING MECHANICAL DUCTWORK	10	01-16-2020	01-29-2020
A2160	INSULATE WALLS & CEILINGS	5	01-24-2020	01-30-2020
A2140	ABOVE CEILING ELECTRICAL & SYSTEM RI	14	01-27-2020	02-13-2020
A2210	INSULATE DUCTWORK	5	01-30-2020	02-05-2020
A3020	STUD FRAMING CEILINGS	5	02-03-2020	02-07-2020
A2280	INSTALL CAN LIGHTS	5	02-04-2020	02-10-2020



Activity ID	Activity Name	Original Duration	Start	Finish
A3450	INSTALL LOW VOLTAGE J-HOOKS	5	02-12-2020	02-18-2020
A2170	PULL IN ELECTRICAL WIRING	5	02-14-2020	02-20-2020
A2180	PULL IN LOW VOLTAGE WIRING	10	02-27-2020	03-11-2020
FINISHES		90	01-08-2020	05-12-2020
AREA - A		72	01-08-2020	04-16-2020
A2230	HANG & FINISH GYPSUM CEILINGS	10	01-08-2020	01-21-2020
A2220	HANG & FINISH GYPSUM WALLS	15	01-23-2020	02-12-2020
A2240	PRIME PAINT GYPSUM WALLS & CEILINGS	4	02-13-2020	02-18-2020
A2330	INSTALL CERAMIC TILE	8	02-13-2020	02-24-2020
A3210	SET & CONNECT AHU'S & CU'S	7	02-13-2020	02-21-2020
A2250	INSTALL ACOUSTICAL GRID	6	02-19-2020	02-26-2020
A2260	INSTALL ELECTRICAL WALLS DEVICES	7	02-19-2020	02-27-2020
A3220	START UP AHU'S & CU'S	3	02-24-2020	02-26-2020
A2380	INSTALL PLUMBING FIXTURES	6	02-25-2020	03-03-2020
A2270	INSTALL ELECTRICAL FIXTURES	12	02-27-2020	03-13-2020
A2420	SET SPRINKLER HEADS	4	02-27-2020	03-03-2020
A2310	INSTALL MECHANICAL GRILLES / REGISTERS	7	02-28-2020	03-09-2020
A2320	INSTALL CASEWORK	5	02-28-2020	03-05-2020
A2450	TEST LOW VOLTAGE WIRING	3	02-28-2020	03-03-2020
A3200	INSTALL HIGH DENSITY STORAGE	3	03-03-2020	03-05-2020
A2370	INSTALL TOILET PARTITIONS / ACCESSORIES	4	03-04-2020	03-09-2020
A3110	INSTALL HOODS & FINGER PRINT DEVELOPER	5	03-06-2020	03-12-2020
A2590	DROP ACOUTICAL PANELS	5	03-16-2020	03-20-2020
A2350	INSTALL FINISHED FLOORING VCT / CARPET	6	03-19-2020	03-26-2020
A2360	FINAL PAINT WALLS / CEILINGS	7	03-27-2020	04-06-2020
A2430	INSTALL INTERIOR DOORS & HARDWARE	5	03-27-2020	04-02-2020
A2340	INSTALL FIRE ALARM DEVICES / SYSTEM	3	04-07-2020	04-09-2020
A2440	INSTALL LOW VOLTAGE, SECURITY & TECHNOLOGY DEVICES	8	04-07-2020	04-16-2020
A2600	INSTALL LOCKERS & STORAGE UNITS	5	04-07-2020	04-13-2020
AREA - B		68	01-24-2020	04-28-2020
A2620	HANG & FINISH GYPSUM CEILINGS	10	01-24-2020	02-06-2020
A2610	HANG & FINISH GYPSUM WALLS	15	02-05-2020	02-25-2020
A6250	SET & CONNECT AHU'S & CU'S	7	02-24-2020	03-03-2020
A2640	PRIME PAINT GYPSUM WALLS & CEILINGS	4	02-26-2020	03-02-2020
A2630	INSTALL CERAMIC TILE	8	02-26-2020	03-06-2020
A2660	INSTALL ACOUSTICAL GRID	6	03-03-2020	03-10-2020
A2670	INSTALL ELECTRICAL WALLS DEVICES	7	03-03-2020	03-11-2020
A6270	START UP AHU'S & CU'S	3	03-04-2020	03-06-2020
A2650	INSTALL PLUMBING FIXTURES	6	03-09-2020	03-16-2020
A2690	INSTALL ELECTRICAL FIXTURES	12	03-11-2020	03-26-2020
A2700	SET SPRINKLER HEADS	4	03-11-2020	03-16-2020
A2710	INSTALL MECHANICAL GRILLES / REGISTERS	7	03-12-2020	03-20-2020
A2720	INSTALL CASEWORK	5	03-12-2020	03-18-2020



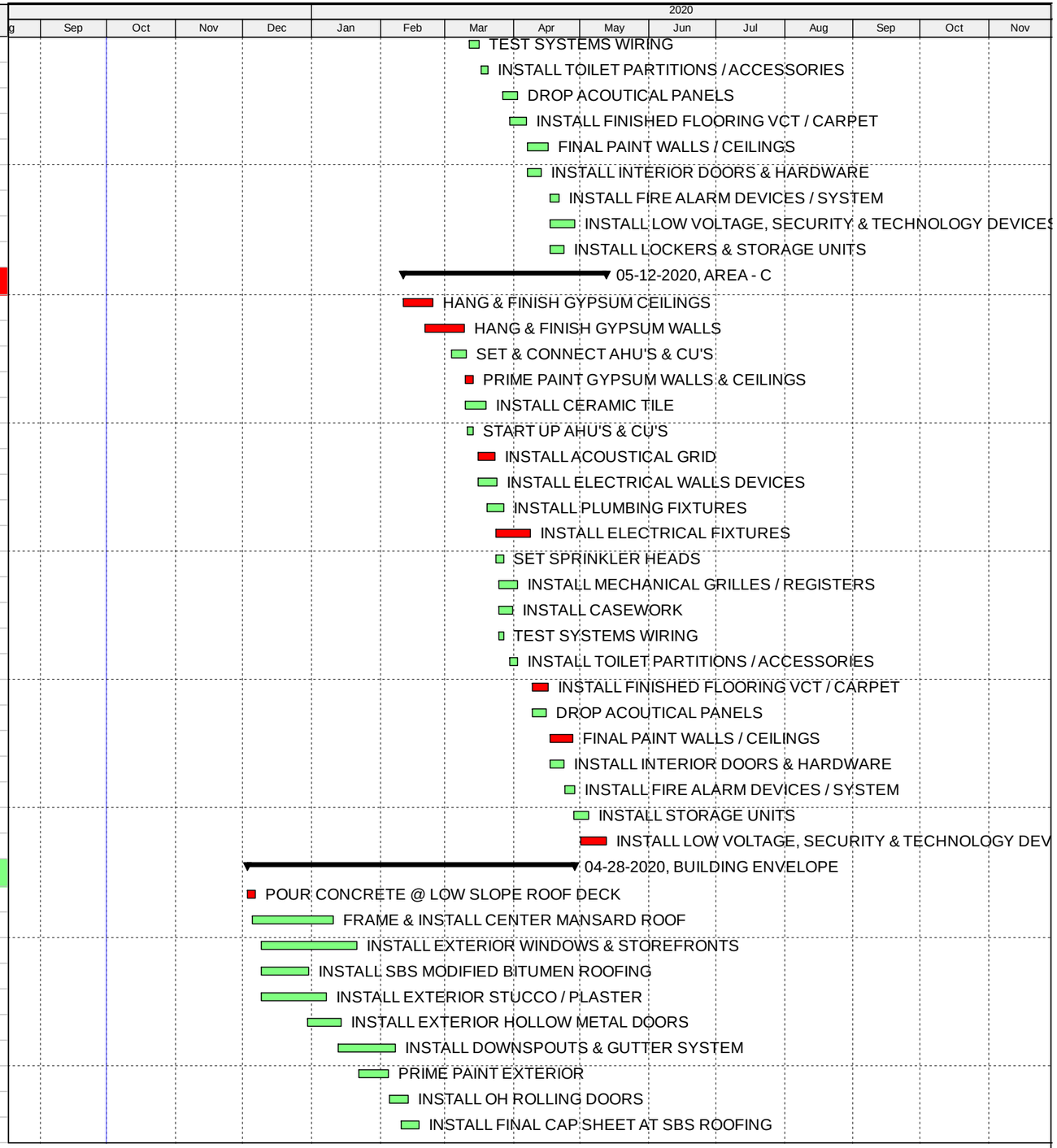
Actual Work
Remaining Work
Critical Remaining Work
Milestone
Summary

Venice Public Safety Facility - SEPTEMBER 2019 MONTHLY OWNER

Start Date: 03-13-2018
Finish Date: 07-17-2020
Current Date: 10-09-2019
Data Date: 10-01-2019

EXHIBIT D CURRENT PROJECT SCHEDULE

Activity ID	Activity Name	Original Duration	Start	Finish
A2730	TEST SYSTEMS WIRING	3	03-12-2020	03-16-2020
A2680	INSTALL TOILET PARTITIONS / ACCESSORIES	4	03-17-2020	03-20-2020
A2750	DROP ACOUTICAL PANELS	5	03-27-2020	04-02-2020
A2740	INSTALL FINISHED FLOORING VCT / CARPET	6	03-30-2020	04-06-2020
A2760	FINAL PAINT WALLS / CEILINGS	8	04-07-2020	04-16-2020
A2770	INSTALL INTERIOR DOORS & HARDWARE	5	04-07-2020	04-13-2020
A2780	INSTALL FIRE ALARM DEVICES / SYSTEM	3	04-17-2020	04-21-2020
A2790	INSTALL LOW VOLTAGE, SECURITY & TECHNOLOGY DEVICES	8	04-17-2020	04-28-2020
A2800	INSTALL LOCKERS & STORAGE UNITS	5	04-17-2020	04-23-2020
AREA - C		66	02-11-2020	05-12-2020
A2820	HANG & FINISH GYPSUM CEILINGS	10	02-11-2020	02-24-2020
A2810	HANG & FINISH GYPSUM WALLS	12	02-21-2020	03-09-2020
A6260	SET & CONNECT AHU'S & CU'S	5	03-04-2020	03-10-2020
A2840	PRIME PAINT GYPSUM WALLS & CEILINGS	4	03-10-2020	03-13-2020
A2830	INSTALL CERAMIC TILE	8	03-10-2020	03-19-2020
A6280	START UP AHU'S & CU'S	3	03-11-2020	03-13-2020
A2860	INSTALL ACOUSTICAL GRID	6	03-16-2020	03-23-2020
A2870	INSTALL ELECTRICAL WALLS DEVICES	7	03-16-2020	03-24-2020
A2850	INSTALL PLUMBING FIXTURES	6	03-20-2020	03-27-2020
A2890	INSTALL ELECTRICAL FIXTURES	12	03-24-2020	04-08-2020
A2900	SET SPRINKLER HEADS	4	03-24-2020	03-27-2020
A2910	INSTALL MECHANICAL GRILLES / REGISTERS	7	03-25-2020	04-02-2020
A2920	INSTALL CASEWORK	5	03-25-2020	03-31-2020
A2930	TEST SYSTEMS WIRING	3	03-25-2020	03-27-2020
A2880	INSTALL TOILET PARTITIONS / ACCESSORIES	4	03-30-2020	04-02-2020
A2940	INSTALL FINISHED FLOORING VCT / CARPET	6	04-09-2020	04-16-2020
A2950	DROP ACOUTICAL PANELS	5	04-09-2020	04-15-2020
A2960	FINAL PAINT WALLS / CEILINGS	7	04-17-2020	04-27-2020
A2970	INSTALL INTERIOR DOORS & HARDWARE	5	04-17-2020	04-23-2020
A2980	INSTALL FIRE ALARM DEVICES / SYSTEM	3	04-24-2020	04-28-2020
A3190	INSTALL STORAGE UNITS	5	04-28-2020	05-04-2020
A2990	INSTALL LOW VOLTAGE, SECURITY & TECHNOLOGY DEVICES	8	05-01-2020	05-12-2020
BUILDING ENVELOPE		104	12-03-2019	04-28-2020
A2500	POUR CONCRETE @ LOW SLOPE ROOF DECK	4	12-03-2019	12-06-2019
A2520	FRAME & INSTALL CENTER MANSARD ROOF	25	12-05-2019	01-10-2020
A2470	INSTALL EXTERIOR WINDOWS & STOREFRONTS	30	12-09-2019	01-21-2020
A2510	INSTALL SBS MODIFIED BITUMEN ROOFING	15	12-09-2019	12-30-2019
A2540	INSTALL EXTERIOR STUCCO / PLASTER	20	12-09-2019	01-07-2020
A2480	INSTALL EXTERIOR HOLLOW METAL DOORS	10	12-30-2019	01-14-2020
A2530	INSTALL DOWNSPOUTS & GUTTER SYSTEM	20	01-13-2020	02-07-2020
A2550	PRIME PAINT EXTERIOR	10	01-22-2020	02-04-2020
A2490	INSTALL OH ROLLING DOORS	7	02-05-2020	02-13-2020
A2580	INSTALL FINAL CAP SHEET AT SBS ROOFING	7	02-10-2020	02-18-2020



Actual Work
Remaining Work
Critical Remaining Work
Milestone
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Venice Public Safety Facility - SEPTEMBER 2019 MONTHLY OWNER

Start Date: 03-13-2018
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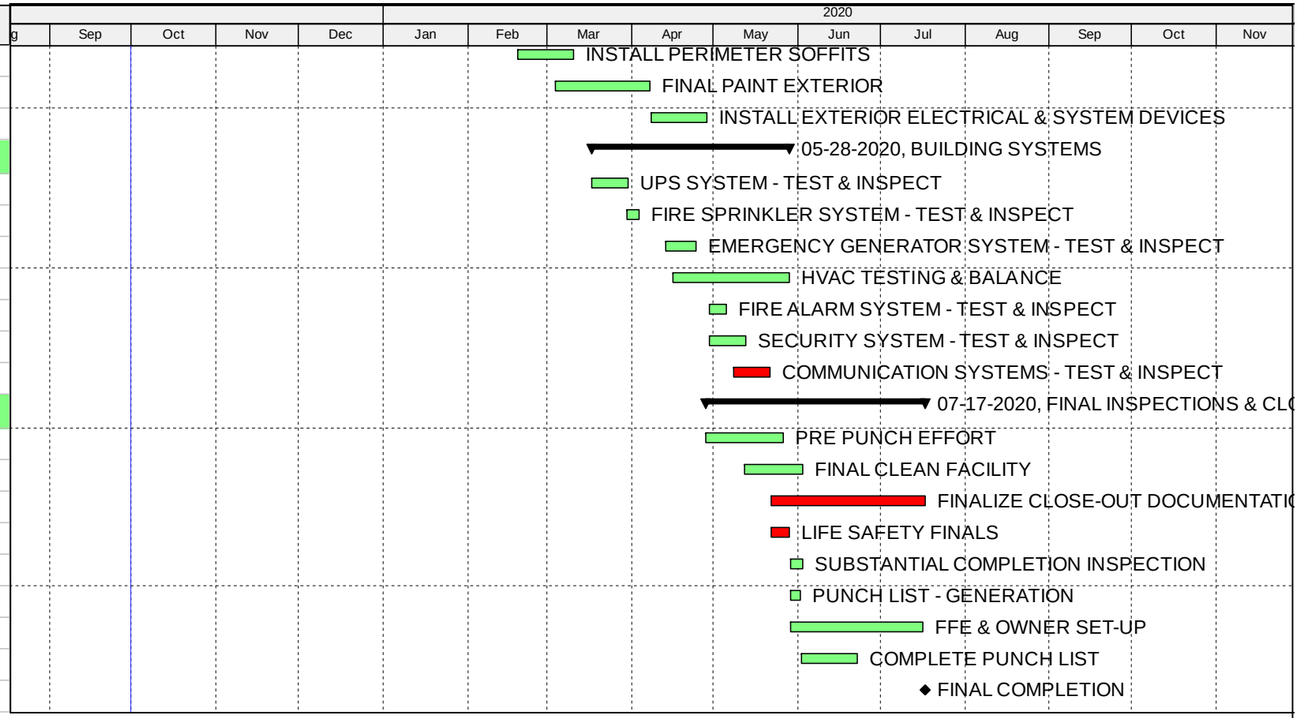
Current Date: 10-09-2019
Data Date: 10-01-2019

EXHIBIT D CURRENT PROJECT SCHEDULE

Activity ID	Activity Name	Original Duration	Start	Finish
A3400	INSTALL PERIMETER SOFFITS	15	02-19-2020	03-10-2020
A2560	FINAL PAINT EXTERIOR	25	03-04-2020	04-07-2020
A2570	INSTALL EXTERIOR ELECTRICAL & SYSTEM DEVICES	15	04-08-2020	04-28-2020
BUILDING SYSTEMS		52	03-17-2020	05-28-2020
A3490	UPS SYSTEM - TEST & INSPECT	10	03-17-2020	03-30-2020
A3480	FIRE SPRINKLER SYSTEM - TEST & INSPECT	5	03-30-2020	04-03-2020
A3500	EMERGENCY GENERATOR SYSTEM - TEST & INSPECT	10	04-13-2020	04-24-2020
A3510	HVAC TESTING & BALANCE	30	04-16-2020	05-28-2020
A2460	FIRE ALARM SYSTEM - TEST & INSPECT	5	04-29-2020	05-05-2020
A3460	SECURITY SYSTEM - TEST & INSPECT	10	04-29-2020	05-12-2020
A3470	COMMUNICATION SYSTEMS - TEST & INSPECT	10	05-08-2020	05-21-2020
FINAL INSPECTIONS & CLOSE-OUT		58	04-28-2020	07-17-2020
A3570	PRE PUNCH EFFORT	20	04-28-2020	05-26-2020
A5870	FINAL CLEAN FACILITY	15	05-12-2020	06-02-2020
A3580	FINALIZE CLOSE-OUT DOCUMENTATION	40	05-22-2020	07-17-2020
A3650	LIFE SAFETY FINALS	4	05-22-2020	05-28-2020
A3540	SUBSTANTIAL COMPLETION INSPECTION	3	05-29-2020	06-02-2020
A3550	PUNCH LIST - GENERATION	2	05-29-2020	06-01-2020
A4440	FFE & OWNER SET-UP	35	05-29-2020	07-16-2020
A3560	COMPLETE PUNCH LIST	15	06-02-2020	06-22-2020
A5880	FINAL COMPLETION	0		07-17-2020



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Venice Public Safety Facility - SEPTEMBER 2019 MONTHLY OWNER

Start Date: 03-13-2018
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EXHIBIT D CURRENT PROJECT SCHEDULE

CITY OF VENICE PROCUREMENT-
FINANCE DEPARTMENT

401 W. VENICE AVE. - ROOM # 204
VENICE, FL. 34285
(941) 486-2626
FAX (941) 486-2790

ADDENDUM NO. 1

Date: November 18, 2019

To: All Prospective Proposers

Re: RFP# 3115-19 Audio/ Visual/ Data Systems for the City of Venice Public Safety Facility

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This addendum sets forth changes and/or information as referenced and is hereby made part of and should be attached to the subject Contract Documents. Receipt of this Addendum shall be acknowledged below and in the submitted proposal. It shall be the responsibility of each proposer, prior to submitting a proposal, to contact the City of Venice- Procurement- Finance Department to determine if addenda were issued and to make such addenda a part of their proposal.

QUESTIONS

The following responses to questions submitted in reference to **RFP 3115-19** shall become part of the requirements of the RFP, and all costs associated with the information provided shall be included in the proposal submitted by the vendor.

1 *RM 167 CCC Training Room - Specs indicate there shall be three (3) electric projection screens, Drawing AV503 only shows two (2). Which is correct?*

RESPONSE: Provide two (2) projection screens at Room 167 CCC Training Room per Drawings AV503 and AV201C.

2 *RM 167 CCC Training Room - Drawing AV503 show the four (4) flat panel displays shall be controlled via infrared. Please verify this type of control is preferred over RS232 or IP?*
RESPONSE: The basis of design is infrared control, however RS232 or IP is an acceptable option. Display units shall be configured with these capabiities.

3 *Other Rooms - Drawing AV201B shows four (4) offices that require Note: 1 "outlet for HDMI transmission system". Please clarify what shall be provided by the AVS installers to meet these requirements. Same on drawing AV201C Breakout Room 169.*
RESPONSE: At Offices 195, 196, 197 and 198 and Break Out Room 169 - provide HDMI connection from box located in wall mounted at +18” to the box located in the same office mounted at +72”.

4 *Training Room 167 - Please provide details as to model number for Clearone ceiling microphones mentioned on drawing AV503 and clarify connections to Biamp audio DSP. Training Room 167 - Biamp TesiraForte DAN VT is Dante capable and has 12 mic/line inputs with AEC.*
RESPONSE: Basis of design is Clearone microphone Model 910-001-013-W with analog mic level output. An equal Dante version is acceptable.

5 *Training Room 167 - Are connections to microphones analog audio or Dante? If analog, is Dante capable DSP required?*
RESPONSE: Basis of design for connections is analog. Dante equal is acceptable.

6 *Training Room 167 - Are workstation and decoder connections mono or 2-channel? Depending on number of connections, is a second audio DSP required?*
RESPONSE: Workstations and decoders are 2 channels. DSP schedule indicates Left and Right channel connectors for each of those. No second DSP is required. DSP schedule shows 10 inputs and 2 outputs being used.

7 *Podiums/Lecterns - There are podiums shown in various rooms. Are these to be furnished by AV Contractor or by others? If to be furnished by AV Contractor, please provide manufacturer/model.*
RESPONSE: Podiums are provided by Owner and not in the scope of this RFP.

8 *Taxes - Are taxes to be included or not?*
REPONSE: Proposals shall include all required taxes.

9 *Will the City allow an electronic submission only? This will grant more time to generate a response.*
RESPONSE: No. The submittal requirements are outlined in Section 6 of the Solicitation Documents.

10 *Will the City allow a company within 100 miles of the project location to be defined as local? This is the standard definition of "local" for municipalities like Hillsborough and Manatee when points are assigned in a bid.*

RESPONSE: The local preference policy is part of the City's Code of Ordinances and cannot be amended. The requirements for local preference can be found in Section 1, paragraph 16 of the Solicitation Documents.

11 *Please clarify the scopes of work that the City requires for the new facility. The responsibility matrix is not clear.*

RESPONSE: The Responsibility Matrix shown on page 27 0010-17 of the specification states the scopes identified within the "Red Boxes" are included in the scope of the RFP (see "Red Box" at top of page that says SCOPES INCLUDED). Scopes of Work shown on the Responsibility Matrix and **OUTSIDE** of the "Red Boxes" are not included in this RFP, including scopes identified as Owner responsibility.

12 *Will the City purchase or install any of the new materials that are required in the new facility?*
RESPONSE: The City is engaged in a Direct Purchase program to procure certain material and equipment scopes of work on the project for tax savings, and may look for similar opportunities for scopes of work included in this RFP. No scopes of work included under this RFP are currently planned to be installed by the City.

13 *The scope of work is defined as AV systems, data/voice systems and CATV distribution. Please confirm if the DAS scope is excluded from the new work that will be required. If the DAS scope is supposed to be part of the new installation, will the City exclude it from this RFP based on cost and complexity?*

RESPONSE: The DAS scope is not included in this RFP as indicated in the Responsibility Matrix.

14 *Is $150,000 the City's firm budget for this RFP? Do they have funding for higher than that amount if necessary?*

RESPONSE: The City will evaluate proposals to determine if additional funding is required and/or scope reduction may be necessary. Responding vendors are instructed to include costs for all specified Scopes of Work required by the RFP.

15 *Regarding RFP 3115-19, specifically Section 274100 – AUDIO/VISUAL SYSTEMS, we have the following additional questions: Display sizes - Please provide display sizes for the following rooms, I did not see them mentioned anywhere: Training Room, Rooms 169, 195, 196, 197 and 198.*

RESPONSE: The following monitors are required at each room:

CCC Training Room 167 - four (4) 85" Type D Displays
Break Out Room 169 - one (1) 62" Type T Display
Office 195 - one (1) 75" Type T Display
Offices 196, 197 & 198 - no display required (future)

ADDITIONAL ADDENDUM 01 ITEMS:

ADD01-01 Physical Agility Room 177 - provide one (1) 85" Type T Display (note: second display shown on T201B is future)

Peter A. Boers
Procurement Department

Acknowledgment is requested even if you have elected not to respond to this bid. A designated management representative of your firm can sign the receipt for this addendum. Please acknowledge receipt of this addendum immediately by fax to (941) 486-2790 or mail to the above noted address, if a fax is not possible.

Receipt Acknowledged:

_____
Signature

_____
Company

_____
Date

CITY OF VENICE PROCUREMENT-
FINANCE DEPARTMENT

401 W. VENICE AVE. - ROOM # 204
VENICE, FL. 34285
(941) 486-2626
FAX (941) 486-2790

ADDENDUM NO. 2

Date: November 19, 2019

To: All Prospective Proposers

Re: RFP# 3115-19 Audio/ Visual/ Data Systems for the City of Venice Public Safety Facility

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This addendum sets forth changes and/or information as referenced and is hereby made part of and should be attached to the subject Contract Documents. Receipt of this Addendum shall be acknowledged below and in the submitted proposal. It shall be the responsibility of each proposer, prior to submitting a proposal, to contact the City of Venice- Procurement- Finance Department to determine if addenda were issued and to make such addenda a part of their proposal.

QUESTIONS

The follow up question below was submitted to responses provided for Questions 4, 5 and 6 in Addendum 01. The response provided in reference to **RFP 3115-19** shall become part of the requirements of the RFP, and all costs associated with the information provided shall be included in the proposal submitted by the vendor.

1 *The Clearone Model 910-001-013-W microphone is not a single channel microphone, it has 3 analog mic elements/outputs. Therefore, connecting all 3 elements in all 4 microphones would require 12 channels of audio, not 4 channels as shown in the "DSP schedule" on Drawing AV503 and mentioned in Addendum 1, Question 6. Also, Dante audio model may not be required if there is not any Dante audio in the system. Please clarify how many elements of the 4 ceiling microphones are to be connected, if an additional DSP is required, and if Dante audio is required.*

RESPONSE: Use the Dante version of the microphones with the Dante Interface Box as indicated in the attached **AD02-Dante Interface Diagram**. No need to add additional DSP capacity. Dante is now required.

END OF ADDENDUM 02

Peter A. Boers
Procurement Department

Acknowledgment is requested even if you have elected not to respond to this bid. A designated management representative of your firm can sign the receipt for this addendum. Please acknowledge receipt of this addendum immediately by fax to (941) 486-2790 or mail to the above noted address, if a fax is not possible.

Receipt Acknowledged:

_____

Signature

_____

Company

_____

Date

Sample Scenario:
Four Dante Mic Arrays connecting to a CONVERGE Pro 2 mixer.
Dante Interface unit provides Primary and Secondary Dante ports for Dante network redundancy.
* If the Ethernet Switch is not PoE enabled, then use external PoE Power Injector.