DOCUMENT 00 9113

ADDENDA

SPECIFICATION NO. 25-11684-C

CITY OF BERKELEY

PUBLIC SAFETY BUILDING JAIL AUTOMATION UPGRADES

2100 MARTIN LUTHER KING JR WAY

The following Addenda were issued, modifying the Project Manual:

Addendum No. 1, issued on **December 5, 2025**
Addendum No. 2, Issued on **December 16, 2025**
Addendum No. 3, Issued on **December 31, 2025**
Addendum No. 4, Issued on **January 27, 2026**

END OF DOCUMENT

ADDENDUM NO. 4

The bid documents for Specification No. 25-11684-C for the Public Safety Building Jail Automation Upgrades Project are amended as follows:

1-1. COVER PAGE

BID OPENING DATE: Thursday, January 19, 2026

1-2. TABLE OF CONTENTS

Removed Section:

28 13 00 Access Control and Alarm System

Added Sections:

28 15 00 Intercom System

28 46 13 Integrated Sequences of Operation

28 46 19 PLC Integrated Control System

1-3. ARTICLE 1, DOCUMENT 00 1113 – NOTICE INVTING BIDS

Notice Inviting Bids: City of Berkeley ("City") will receive sealed Bids at City of Berkeley, Purchasing Manager's Office, located at the Martin Luther King Jr. Civic Center, 2180 Milvia Street, Third Floor, Berkeley, CA 94704, Telephone (510) 981-7320, until 2:00 PM, **Thursday, January 19, 2026** for the following public work:

1-4. REVISIONS TO SPECIFICATIONS & DRAWINGS

Refer to "ADDENDUM 4 - SPECIFICATIONS & DRAWING NARRATIVE".

QUESTIONS AWORKND RESPONSES:

2-1 Q: Since the primary scope of this project is automation, would we qualify if we subcontract the construction work to a contractor who holds a B license, or is the prime bidder required to hold the General Building Contractor license?

A: A general contractor holding a B license must submit the bid for the project, with any additional trades performed through subcontractors.

END OF DOCUMENT

ADDENDUM 4 - SPECIFICATIONS & DRAWING NARRATIVE

SPECIFICATIONS

1. Section 28 05 00 - COMMON WORK RESULTS FOR ELECTRONIC SAFETY AND SECURITY
    a. Paragraph 1.2.A (pg 1) – Revise Scope of Work.

2. Section 28 13 00 - ACCESS CONTROL AND ALARM SYSTEMS
    a. Delete the Section in its entirety.

3. Section 28 15 00 - INTERCOM SYSTEM
    a. Add the Section in its entirety.

4. Section 28 23 00 – VIDEO SURVEILLANCE
    a. Paragraph 2.6 (pg 13) – Add workstation furniture

5. Section 28 46 13 - INTEGRATED SEQUENCES OF OPERATION
    a. Add the Section in its entirety.

6. Section 28 46 19 - PLC INTEGRATED CONTROL SYSTEM
    a. Add the Section in its entirety.

End of Specifications Narrative

DRAWINGS

1. TN4.01 - COMM. - (N) SERVER ROOM 1111 ENLARGED PLANS AND ELEVATIONS
    a. Remove the ply backboard and DGP/ACS panels on the west wall.
    b. Delete the ACS on the chain link fence in Telecom Room 1111.
    c. Delete the ACS keynotes.
2. TY0.02 - ESS - SYMBOL SCHEDULE
    a. Delete the card reader symbol.
    b. Revise access control to read as “PLC Control”.
    c. Revise the “SS” symbol to read as “(E) Public Address/Paging Speaker”.
    d. Add the Master Intercom Station symbol “M”.
3. TY2.01 - ESS - FIRST FLOOR DEVICE PLAN
    a. Delete the ACS on the chain link fence in Telecom Room 1111.
    b. Delete the ACS keynotes.
4. TY4.01 - ESS - CONTROL CENTER 1126 ENLARGED PLAN & ELEVATIONS
    a. Add two master intercom stations.

5. TY7.01 - ACCESS CONTROL AND INTERCOM SYTEMS SINGLE LINE DIAGRAMS
    a. Delete ACS Single Line Diagram in its entirety.
    b. Revise Detail 2 to read as “Intercom & Public Address System Single Line Diagram”
    c. Add “Detail 3 – Control Electronics System Single Line Diagram”.
    d. Delete ACS keynotes.
6. TY9.01 - DETAILS - SECURITY SYSTEMS ACCESS CONTROL
    a. Delete Detail 1 – Card Reader.
    b. Delete Detail 2 – ACS Elevation
    c. Delete ACS keynotes.

End of Drawings Narrative

CITY OF BERKELEY

DEPARTMENT OF PUBLIC WORKS
CAPITAL PROJECTS

PROJECT MANUAL

Public Safety Building Jail Automation Upgrades

SPECIFICATION NO. 25-11684-C

November, 2025

ADVERTISEMENT DATE: November 3, 2025

PRE-BID CONFERENCE: November 18, 2025

BID OPENING DATE: Thursday, February 19, 2026

1947 CENTER STREET, 4th Floor, BERKELEY, CALIFORNIA 94704 (510) 981-6400

DOCUMENT 00 1113

NOTICE INVITING BIDS

ARTICLE 1 - INVITATION TO BID

1.01 Notice Inviting Bids: City of Berkeley ("City") will receive sealed Bids at City of Berkeley, Purchasing Manager's Office, located at the Martin Luther King Jr. Civic Center, 2180 Milvia Street, Third Floor, Berkeley, CA 94704, Telephone (510) 981-7320, until **2:00 PM, Thursday, February 19, 2026** for the following public work:

SPECIFICATION NO. 25-11684-C
CITY OF BERKELEY
Public Safety Building Jail Automation Upgrades
2100 Martin Luther King Jr Way

1.02 Project Description: Upgrades to the low-voltage systems in the first-floor detention area, including modifications to cell and entry door controls, replacement of audio and video surveillance equipment, installation of HVAC systems, and conversion of a storage room into a climate-controlled telecommunications room, including ancillary work in accordance with the terms and conditions of the Contract Documents. Work shall be completed within **126** Calendar Days from the date when Contract Time commences to run.

1.03 Procurement of Bidding Documents:
Bidding Documents contain the full description of the Work. Bidders may obtain Bidding Documents by November 3, 2025 from City of Berkeley's Public Works website under Current Construction Project Bid Opportunities:

https://berkeleyca.gov/doing-business/working-city/bid-proposal-opportunities

For information pertaining to the Bidding Documents, please contact the Project Manager, Uriel Gonzalez, 1947 Center Street, 5th Floor, Berkeley, CA 94704, by Email at UGonzalez@berkeleyca.gov or by Telephone at (510) 981-6627 or by FAX **(510) 981-6390**.

1.04 Planholders List:

Bidders are responsible for notifying Uriel Gonzalez, via email at UGonzalez@berkeleyca.gov to be included on the Planholders List. Please include the following in the email subject header: "Planholders list for Specification No. 25-11684-C for Public Safety Building Jail Automation Upgrades". In the body of the email, please state the Name of the Company Representative, Company Name, Address, Telephone Number, Fax Number, and Email Address.

1.05 Instructions: Bidders shall refer to Document 00 2113 (Instructions to Bidders) for required documents and items to be submitted in a sealed envelope for deposit into the Bid Box, located at **City of Berkeley, Purchasing Manager's Office, Martin Luther King Jr. Civic Center, 2180 Milvia Street, Third Floor, Berkeley, CA 94704, Telephone (510) 981-7320** no later than the time and date set forth in Paragraph 1.01 above.

1.06 Non-Mandatory Pre-Bid Site Visit: City **WILL** conduct a Non-Mandatory Pre-Bid Conference and Site Visit at 2100 Martin Luther King Jr Way**.** The location of work is open to the public during normal business or daylight hours. It is recommended that potential bidders visit the site independently to review site conditions prior to bid. City will conduct a Pre-Bid Conference and Site Visit at 2100 Martin Luther King Jr Way, at 10:00 AM November 18, 2025

1.07 Bid Preparation Cost: Bidders are solely responsible for the cost of preparing their Bids.

1.08 Reservation of Rights: City specifically reserves the right, in its sole discretion, to reject any or all Bids, to re-bid, or to waive inconsequential defects in bidding not involving time, price or quality of the work. City may reject any and all Bids and waive any minor irregularities in the Bids.

ARTICLE 2 - LEGAL REQUIREMENTS

2.01 Required Contractor's License(s): A California **"B"** contractor's license is required to bid this contract. Joint ventures must secure a joint venture license prior to award of this Contract. Specialty work may require a specialty contractor's license, held by Bidder or a listed subcontractor.

2.02 Bid Alternates: Bid alternates are identified in Document 00 4113 (Bid Form). The determination of lowest bid shall be based upon: Base contract bid price only.

2.03 Substitution of Securities: City will permit the successful bidder to substitute securities for any retention monies withheld to ensure performance of the contract, as set forth in Document 00 6290 Escrow Agreement For Security Deposits In Lieu Of Retention and incorporated herein in full by this reference, in accordance with Section 22300 of the California Public Contract Code.

2.04 Prevailing Wage Laws: The successful Bidder must comply with all prevailing wage laws applicable to the Project, and related requirements contained in the Contract Documents. Copies of the general prevailing rates of per diem wages for each craft, classification, or type of worker needed to execute the Contract, as determined by Director of the State of California Department of Industrial Relations, are on file at **http://www.dir.ca.gov/oprl/pwd/** and are deemed included in the Bidding Documents. The successful Bidder shall post the applicable prevailing wage rates at the Site.

2.05 Community Workforce Agreement: This contract **WILL** be subject to the Community Workforce Agreement approved by the Berkeley City Council on June 23, 2015 (See Document 00 6580 – City of Berkeley Contracting Policies). The successful bidder and all subcontractors, at any tier, **WILL** be required to sign an Agreement to be Bound as a condition precedent to entering into any contract for this project.

2.06 First Source Construction Agreement: This contract **WILL NOT** be subject to the First Source Construction Agreement (See Document 00 6580 – City of Berkeley Contracting Policies).

2.07 This contract **WILL (NOT)** be subject to Supplementary Conditions for Federal Funding. Section 00 7201.

END OF SECTION

DOCUMENT 00 2113

INSTRUCTIONS TO BIDDERS

Bids are requested by City of Berkeley ("City"), for a general construction contract, or work described in general, as set forth in Document 00 1113 (Notice Inviting Bids), and the following additional terms.

ARTICLE 1 - PROCEDURES FOR SUBMISSION OF BIDS

1.01 Required Pre-Bid Conference and Site Visit

A. City **WILL** conduct a Non-Mandatory Pre-Bid Conference and Site Visit at 2100 Martin Luther King Jr Way, at November 18, 2025. The location of work is open to the public during normal business or daylight hours. It is recommended that potential bidders visit the site independently to review site conditions prior to bid.

B. Questions regarding the site and the Bid Documents may be sent to the City's Representative to clarify such matters as Bidders may request. The Site Visit may be the Bidders' only opportunity to investigate conditions at the Site. Other Pre-Bid Site Visits may be scheduled at City's sole discretion, depending on staff availability.

C. City will issue Minutes of the Pre-Bid Conference, which shall constitute the sole and exclusive record and statement of the results of the Pre-Bid Conference. The Minutes issued by City are not Contract Documents.

1.02 Required Pre-Bid Investigations

A. Prior to submission of Bid, Bidder must conduct a careful examination of Bidding Documents and understand the nature, extent, and location of Work to be performed. Refer to Document 00 7200 (General Conditions) on required pre-bid investigations.

B. Bidders may examine any available existing conditions information (e.g., record documents, specifications, studies, drawings of previous work), as well as applicable environmental assessment information (if any) regarding the Project, which will be posted on the website location indicated in Document 00 1113 (Notice Inviting Bids), paragraph 1.03.

1.03 Bidder Questions and Answers

A. Bidders must direct all questions about the meaning or intent of Bidding Documents to City's Project Manager in writing as indicated in Document 00 1113 (Notice Inviting Bids), paragraph 1.03. Interpretations or clarifications considered necessary by City in response to such questions will be issued by written Addenda posted to the City's website.

B. Questions received less than ten (10) calendar days prior to the date for opening Bids may not be answered.

C. Only questions answered by formal written Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect, and Bidders shall not rely on oral statements.

1.04 Addenda

A. Addenda may also be issued to modify the Bidding Documents as deemed advisable by City. Addenda shall be acknowledged by number in Document 00 4113 (Bid Form) and shall be part of the Contract Documents. A complete listing of Addenda may be secured from City on the website as indicated in Document 00 1113 (Notice Inviting Bid), paragraph 1.03.

1. It is the Contractor's responsibility to check the City's website for Addenda prior to submitting their bid.

ARTICLE 2 - RECEIPT OF BIDS

2.01 Date and Time

A. Sealed Bids will be received by the City until the date and time indicated in Document 00 1113 (Notice Inviting Bids). All Bid envelopes will be time-stamped to reflect their submittal time. City shall reject all Bids received after the specified time and will return such Bids to Bidders unopened. Bidders must submit Bids in accordance with this Document 00 2113.

2.02 Two Envelope Bid Submission:

A. City will receive Bids in opaque sealed 10 inch x 13 inch envelopes, containing the required items described herein.

B. Bidders must submit Bids in two envelopes: "Envelope A – Bid Submittals" and "Envelope B – Statement of Qualifications."

C. Bidders should mark their Bid envelopes using the name, address, identifying information and specification number, indicated in Document 00 1113 (Notice Inviting Bids).

2.03 Required Contents of "Envelope A – Bid Submittals"

A. Document 00 4113 (Bid Form). Bidders must submit Bids on Document 00 4113 (Bid Form) in accordance with the provisions of Document 00 4113. Bidders must complete all Bid items and supply all information required by Bid documents and specifications.

B. Document 00 4313 (Bond Accompanying Bid). Bidders must submit Document 00 4313 (Bond Accompanying Bid) accompanied by a cashier's check, certified check (certified without qualification and drawn on a solvent bank of the State of California or a National Bank doing business in the State of California) or completed form of Document 00 4313 of not less than 10% of the base Bid, payable to City and completed in accordance with the provisions of Document 00 4313.

C. Document 00 4314 (Bidder Registration and Experience Form). Bidders must submit Document 00 4314 (Bidder Registration and Experience Form), completed in accordance with the provisions of Document 00 4314.

D. Document 00 4330 (Subcontractor List). Bidders must submit Document 00 4330 (Subcontractors List) completed in accordance with the provisions of Document 00 4330. The Subcontractors List must include the names of all subcontractors for those subcontractors who will perform any portion of work, including labor, rendering of service, or specially fabricating and installing a portion of the work or improvement according to detailed drawings contained in the plans and specifications, in excess of one half of one percent (0.5%) of the total Bid amount. Any violation of this requirement may result in a Bid being deemed non-responsive and not being considered.

E. Document 00 4519 (Non-Collusion Affidavit). Bidders must submit Document 00 4519 (Non-Collusion Affidavit) completed in accordance with the provisions of Document 00 4519.

F. Document 00 4546 (Bidder Certifications). Bidders must submit Document 00 4546 (Bidder Certification) completed in accordance with the provisions of Document 00 4546.

2.04 Required Contents of "Envelope B – Statement of Qualifications"

A. Document 00 4513 (Statement of Qualifications for Construction Work). Bidder must submit Document 00 4513 (Statement of Qualifications for Construction Work) in accordance with the provisions of Document 00 4513.

ARTICLE 3 - BID OPENING AND EVALUATION

3.01 Determination of Apparent Low Bidder

A. City will open each Bidders' Envelope A at the time and place indicated in Document 00 1113 (Notice Inviting Bids), initially evaluate them for responsiveness, and determine an Apparent Low Bidder as specified herein.

B. Apparent Low Bid will be determined solely on the total amount of all Bid items based on terms contained in Document 00 1113 (Notice Inviting Bids) and Document 00 4113 (Bid Form). All Bidders are required to submit Bids on all Bid items (including any alternates).

C. For the purposes of award, the apparent low Bidder will be the conforming responsible Bidder offering the lowest total amount for the Total Base Bid shown in the Bid Form. Once the low bidder is determined as herein described, the City reserves the right to award any combination of Additive Bid alternates, or not award any Additive Bid alternates, as it deems to be in the best interest of the City, regardless of whether the total bid of the particular combination selected is higher or lower than any other bidder for that same combination.

D. For the Apparent Low Bidder only, City will open Envelope B and evaluate the Apparent Low Bidder for responsiveness to the requirements of Document 00 4513 and for Responsibility.

E. If Apparent Low Bidder is determined to be non-responsive or non-responsible, then City may proceed to the next Apparent Low Bidder's Bid pursuant to any procedures determined in its reasonable discretion, and proceed for all purposes as if this Apparent Low Bidder were the original Apparent Low Bidder.

3.02 Evaluation of Bids

A. Bids must be full, complete, clearly written and using the required forms. Bidders shall make any change in the Bid by crossing out the original entry, entering and initialing the new entry. Bidder's failure to submit all required documents strictly as required entitles City to reject the Bid as non-responsive. All Bidders must submit Bids containing each of the fully executed documents supplied in this Project Manual.

B. In evaluating Bids, City will consider Bidders' qualifications, whether or not the Bids comply with the prescribed requirements, unit prices, and other data, as may be requested in Document 00 4113 (Bid Form) or prior to the Notice of Award.

C. City may conduct reasonable investigations and reference checks of Bidder and other persons and organizations as City deems necessary to assist in the evaluation of any Bid and to establish Bidder's responsibility, qualifications, financial ability and ability to perform the Work in accordance with the Contract Documents to City's satisfaction within the prescribed time. Submission of a Bid constitutes Bidder's consent to the foregoing.

D. City shall have the right to consider information provided by sources other than Bidder. City shall also have the right to communicate directly with Bidder's surety regarding Bidder's bonds.

E. Discrepancies between the multiplication of units of Work and unit prices will be resolved in favor of the unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum. Discrepancies between written words and figures will be resolved in favor of the words.

F. Bids shall be deemed to include the written responses of the Bidder to any questions or requests for information of City made as part of Bid evaluation process after submission of Bid.

3.03 Reservation of Rights

A. City reserves the right to reject any or all nonconforming, non-responsive, unbalanced, or conditional Bids, and to reject the Bid of any Bidder as non-responsive as a result of any error or omission in the Bid, or if City believes that it would not be in the best interest of Project to make an award to that Bidder, whether because the Bid is not responsive or the Bidder is unqualified or of doubtful financial ability or fails to meet any other pertinent standard or criteria established by City. For purposes of this paragraph, an "unbalanced Bid" is one having nominal prices for some Bid items and enhanced prices for other Bid items.

B. City may retain Bid securities and Bid bonds of other than the Apparent Low Bidder for a period of 90 Days after award or full execution of the Contract, whichever first occurs.

C. City may reject any or all Bids and waive any informalities or minor irregularities in the Bids. City also reserves the right, in its discretion, to reject any or all Bids and to re-Bid the Project.

ARTICLE 4 - MANDATORY BID PROTEST PROCEDURES

4.01 Submission of Written Bid Protest

A. Any Bid protest in connection with the construction contract or work described in general in Document 00 1113 (Notice Inviting Bids) must be submitted in writing to the Project Manager as indicated in Document 00 1113, paragraph 1.03 before 3:30 p.m. of the fifth Business Day following opening of the Bidders' envelopes.

B. The initial protest document must contain a complete statement of the basis for the protest.

C. The protest must refer to the specific portion of the document that forms the basis for the protest.

D. The protest must include the name, address, and telephone number of the person representing the protesting party.

E. Only Bidders who the City otherwise determines are responsive and responsible are eligible to protest a Bid; protests from any other Bidder will not be considered. In order to determine whether a protesting Bidder is responsive and responsible, City may evaluate all information contained in any protesting Bidder's Bid, and conduct the same investigation and evaluation as City is entitled to take regarding an Apparent Low Bidder.

F. The party filing the protest must concurrently transmit a copy of the initial protest document and any attached documentation to all other parties with a direct financial interest that may be adversely affected by the outcome of the protest. Such parties shall include all other Bidders who appear to have a reasonable prospect of receiving an award depending upon the outcome of the protest.

4.02 Exclusive Remedy

A. The procedure and time limits set forth in this paragraph are mandatory and are Bidder's sole and exclusive remedy in the event of Bid protest. Bidder's failure to comply with these procedures shall constitute a waiver of any right to further pursue the Bid protest, including filing a Government Code Claim or legal proceedings. A Bidder may not rely on a protest submitted by another Bidder, but must timely pursue its own protest.

ARTICLE 5 - AWARD AND EXECUTION OF CONTRACT

5.01 Notice of Intent to Award and Submittal of Executed Contract Documents

A. If Contract is to be awarded, it will be awarded to the lowest responsible responsive Bidder. City will issue Document 00 5100 Notice of Intent to Award. Such Award, if made, will be made within sixty (60) calendar days after the opening of the Bid Proposals.

B. Successful Bidder must execute and submit to City the "Required Contract Documents and Proof of Insurance" set forth below, by 5:00 p.m. of the 10th calendar Day following the Notice of Intent to Award.

5.02 Required Contract Documents and Proof of Insurance

A. Document 00 5200 (Agreement), fully executed by successful Bidder. Submit **two** originals and an emailed PDF, each bearing an original signature (in blue ink) and initials on each page.

B. Document 00 6113.13 (Construction Performance Bond), fully executed by successful Bidder and surety, in the amount set forth in Document 00 6113.13. Submit **two** originals and an emailed PDF.

C. Document 00 6113.16 (Construction Labor and Material Payment Bond), fully executed by successful Bidder and surety, in the amount set forth in Document 00 6113.16. Submit **two** originals and an emailed PDF.

D. Document 00 6536 (Guaranty), fully executed by successful Bidder. Submit **two** originals and an emailed PDF.

E. Insurance certificates and endorsements required by Document 00 7316 (Supplementary Conditions — Insurance and Indemnification): Submit **one** original set and an emailed PDF.

F. Document 006580 (City Contracting Policies), fully executed by successful bidder. Submit **one** original set and an emailed PDF.

5.03 Failure to Execute and Deliver Documents:

A. If Bidder to whom Contract is awarded, within the period described in this Document 00 2113, fails or neglects to execute and deliver all required Contract Documents and file all required bonds, insurance certificates, and other documents, City may, in its sole discretion, rescind the award, recover on Bidder's surety bond, or deposit Bidder's cashier's check or certified check for collection, and retain the proceeds thereof as liquidated damages for Bidder's failure to enter into the Contract Documents. Bidder agrees that calculating the damages City may suffer as a result of Bidder's failure to execute and deliver all required Contract Documents would be extremely difficult and impractical and that the amount of Bidder's required Bid security shall be the agreed and presumed amount of City's damages.

B. Upon such failure to timely deliver all required Contract Documents as set forth herein, City may determine the next Apparent Low Bidder and proceed accordingly. Such Award, if made, will be made within sixty (60) calendar days after the opening of the Bid Proposals.

ARTICLE 6 - GENERAL CONDITIONS AND REQUIREMENTS

6.01 Modification of Commencement of Work:

A. City expressly reserves the right to modify the date for the Commencement of Work under the Contract and to independently perform and complete work related to Project. City accepts no responsibility to Contractor for any delays attributed to its need to complete independent work at the Site.

B. City shall have the right to communicate directly with Apparent Low Bidder's proposed performance bond surety, to confirm the performance bond. City may elect to extend the time to receive faithful performance and labor and material payment bonds.

6.02 Conformed Project Manual:

A. Following Award of Contract, City may prepare a conformed Project Manual reflecting Addenda issued during bidding, which will, failing objection, constitute the approved Project Manual.

6.03 Payment Bond:

A. If the Project described in Document 00 1113 (Notice Inviting Bids) involves an expenditure in excess of twenty-five thousand dollars ($25,000), the successful Bidder must file a payment bond with and approved by City prior to entering upon the performance of the Work, in accordance with Civil Code § 3247.

6.04 Wage Rates:

A. The successful Bidder must comply with all prevailing wage laws applicable to the Project, and related requirements contained in the Contract Documents. Copies of the general prevailing rates of per diem wages for each craft, classification, or type of worker needed to execute the Contract, as determined by Director of the State of California Department of Industrial Relations, are on file at **http://www.dir.ca.gov/oprl/pwd/** and are deemed included in the Bidding Documents. The successful Bidder shall post the applicable prevailing wage rates at the Site.

6.05 Withdrawal of Bids:

A. Bidders may withdraw their Bids at any time prior to the Bid opening time fixed in this Document 00 2113, only by written request for the withdrawal of Bid filed with City's Purchasing Department, at 2180 Milvia Street, 3rd Floor, Berkeley, CA 94704. Bidder or its duly authorized representative shall execute request to withdraw Bid.

6.06 Ineligible Contractors and Subcontractors:

A. No contractor or subcontractor may be listed on a bid proposal for a public works project unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5 [with limited exceptions from this requirement for bid purposes only under Labor Code section 1771.1(a)].

B. City shall not accept a Bid from a Bidder who is ineligible to bid or work on, or be awarded, a public works project pursuant to California Labor Code section 1777.1 or 1777.7. Bidders and the Contractor who is awarded the project contract shall not utilize, or allow work by, any subcontractor who is ineligible to bid or work on, or be awarded, a public works project pursuant to California Labor Code Section 1777.1 or 1777.7. (See California Public Contract Code Section 6109.) The California Division of Labor Standards Enforcement publishes a list of debarred contractors and subcontractors on the Internet at www.dir.ca.gov/DLSE/debar.html.

6.07 Substitutions:

A. Bidders must base their Bids on products and systems specified in Contract Documents or listed by name in Addenda. City will consider substitution requests only for "or equal items." Bidders wanting to use "or equal" item(s) may submit Document 00 6325 (Substitution Request Form) no later than 35 calendar days after Notice of Award. As a limitation on Bidder's privilege to request substitution of "or equal" items, City has found that certain items are designated as City standards and certain items are designated to match existing items in use on a particular public improvement either completed or in the course of completion or are available from one source. As to such items, City will not permit substitution. Such items are described in the Bidding Documents.

6.08 Definitions:

A. All abbreviations and definitions of terms used in this Document 00 2113 are set forth in Document 00 7200 (General Conditions) and Section 01 4200 (References and Definitions).

END OF SECTION

DOCUMENT 00 3132

GEOTECHNICAL DATA AND EXISTING CONDITIONS

ARTICLE 1 - REPORTS AND INFORMATION ON EXISTING CONDITIONS

1.01 Inspection of Reports:

A. City, its consultants, and prior contractors may have collected documents providing a general description of the Site and conditions of the Work. These documents may consist of geotechnical reports for and around the Site, contracts, contract specifications, tenant improvement contracts, as-built drawings, utility drawings, and information regarding Underground Facilities (collectively, “Existing Conditions Data”.)

B. Bidders may inspect Geotechnical and Existing Conditions Data. These documents are listed in Section 01 1100 (Summary) and are available for review at the address identified therein. Copies may be obtained for the cost of reproduction and handling upon Bidder’s payment for the costs.

C. Existing Conditions Data is for information only and does not describe labor, materials or equipment furnished by Contractor, but rather, information regarding conditions of the work. Such Existing Conditions Data is not a Contract Document.

ARTICLE 2 - USE OF EXISTING CONDITIONS DATA

2.01 Above-Ground Existing Conditions:

A. City makes no warranty or representation of existing aboveground conditions, as-built conditions, or other aboveground actual conditions verifiable by reasonable independent investigation. These conditions are verifiable by Bidder by the performance of its own independent investigation that Bidder must perform prior to bidding and Bidder must not rely on the information supplied by City regarding existing conditions.

B. Bidder represents and agrees that in submitting its Bid, it is not relying on any information regarding above-ground existing conditions supplied by City.

2.02 Underground Facilities:

A. Information supplied regarding existing Underground Facilities at or contiguous to the Site is based on information furnished to City by others (e.g., the builders of such Underground Facilities or others).

B. City assumes responsibility for only the general accuracy, completeness or thoroughness of information regarding Underground Facilities that are owned by City. This express assumption of responsibility applies only if Bidder has conducted the independent investigation required of it under Document 00 7200 (General Conditions) and discrepancies were not apparent. Bidder is solely responsible for any interpretation or conclusion drawn from this information.

C. City is not responsible for information regarding Underground Facilities owned by others.

2.03 Hazardous Materials Surveys:

A. Bidders may rely on this data and information for general accuracy regarding the locations of potentially hazardous materials subject of the Work. City does not warrant and makes no representation regarding the completeness or thoroughness of any data or information regarding existing conditions or hazardous materials, including, but not limited to, quantities, characteristics, volumes, or associated structural features. Bidder represents and agrees that in submitting a Bid it is not relying on any such data, information or deductions.

B. Data and information regarding the locations of hazardous materials are not part of Contract Documents.

2.04 Geotechnical Data:

A. Bidder may rely upon the general accuracy of the “technical data” contained in the geotechnical reports and drawings identified above, but only insofar as it relates to subsurface conditions,

provided Bidder has conducted the independent investigation required of it and discrepancies were not apparent.

B. The term “technical data” shall include actual reported depths, reported quantities, reported soil types, reported soil conditions, and reported material, equipment, or structures that were encountered during subsurface exploration. The term “technical data” does not include, and Bidder may not rely upon, any other data, interpretations, opinions or information shown or indicated in such drawings or reports that otherwise relate to subsurface conditions or described structures. The term “technical data” shall not include the location of Underground Facilities.

C. Bidder may not rely on the completeness of reports and drawings for the purposes of bidding or construction. Bidder is solely responsible for any interpretation or conclusion drawn from any “technical data” or any other data, interpretations, opinions, or information contained in supplied geotechnical data.

D. Except as expressly set forth in this Document 00 3132, City does not warrant, and makes no representation regarding, the accuracy or thoroughness of any geotechnical data.

E. Bidder represents and agrees that in submitting its Bid, it is not relying on any geotechnical data supplied by City, except as specifically set forth herein.

ARTICLE 3 - INVESTIGATIONS

3.01 Required Investigations:

A. Before submitting a Bid, each Bidder shall be responsible to obtain such additional or supplementary examinations, investigations, explorations, tests, studies and data concerning conditions (surface, subsurface, and Underground Facilities) at or contiguous to the Site or otherwise, which may affect cost, progress, performance or furnishing of Work or which relate to any aspect of the means, methods, techniques, sequences or procedures of construction to be employed by Bidder and safety precautions and programs incident thereto or which Bidder deems necessary to determine its Bid for performing and furnishing the Work in accordance with the time, price and other terms and conditions of Contract Documents.

B. Bidders shall advise City in writing during the Bid period of any questions, suppositions, inferences or deductions Bidders may have for City’s review and response.

C. City has provided time in the period prior to bidding for Bidder to perform these investigations.

3.02 Access to Site for Investigations:

A. During the Pre-Bid Site Visit(s), City will provide each Bidder access to the Site to conduct such examinations, investigations, explorations, tests, and studies, as each Bidder deems necessary for submission of a Bid. The Bidder may request alternate dates and times to access the site. Such request must be made in writing at least ten (10) calendar days prior to bid. Bidders must fill all holes and clean up and restore the Site to its former conditions upon completion of such explorations, investigations, tests, and studies. Such investigations may be performed only under the provisions of Document 00 2113 (Instructions to Bidders) and Document 00 7200 (General Conditions) including, but not limited to, proof of insurance and obligation to indemnify against claims arising from such investigation work. Each Bidder shall supply all equipment required to perform any investigations as each Bidder deems necessary. City has the right to limit the number of pieces of machinery operating at one time due to safety concerns.

END OF SECTION

BIDDERS AND CONTRACTORS CHECKLIST

Items Required at Bid Opening: **2:00 PM, Thursday, February 19, 2026,** at City of Berkeley, Purchasing Manager's Office, Martin Luther King Jr. Civic Center, 2180 Milvia Street, Third Floor, Berkeley, CA 94704

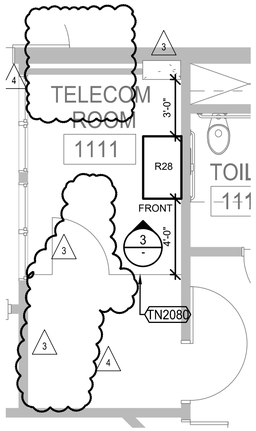
Envelope A
- ☐ Bid Form (Document 00 4113)
- ☐ Bond Accompanying Bid (Document 00 4313)
- ☐ Bidder Registration and Experiencing Form (Document 00 4314)
- ☐ Subcontractor List (Document 00 4330)
- ☐ Non-Collusion Affidavit (Document 00 4519)
- ☐ Bidder Certification (Document 00 4546)

Envelope B
- ☐ Statement of Qualifications for Construction Work (Document 00 4513)

Items Required after Notice of Intent to Award for Construction (Document 00 5100):
- ☐ Agreement (Document 00 5200)
- ☐ Construction Performance Bond (Document 00 6113.13)
- ☐ Construction Labor and Material Payment Bond (Document 00 6113.16)
- ☐ OPTIONAL - Escrow Agreement for Security Deposit in Lieu of Retention (Document 00 6290)
- ☐ Insurance Certificates with Endorsements (Document 00 7316)
- ☐ City of Contracting Policies (Document 00 6580)
  - ☐ Memorandum of Understanding
  - ☐ Workforce Composition Form (to be completed by Contractor and any Subcontractors who will do work valued at $3,000 or more)
  - ☐ Agreement for Change in Subcontractors (List all Subcontractors, Contractor to sign and date)
  - ☐ Nuclear Free Zone Disclosure Statement
  - ☐ Oppressive States Compliance Statement
  - ☐ Hardwood Disclosure Form
  - ☐ First Source Construction Agreement (for projects between $100,000 and $500,000)
  - ☐ Community Workforce Agreement, Agreement to be Bound (for projects over $500,000; to be completed by Contractor and any Subcontractors who will do work valued at $3,000 or more)
  - ☐ Certificate of Compliance with Equal Benefits Ordinance
  - ☐ Taxpayer Identification Report
  - ☐ Right to Audit Form
  - ☐ Sanctuary City Compliance Certificate
- ☐ Contractor's License
- ☐ City of Berkeley Business License
- ☐ Vendor Application Form (if not current City vendor)
- ☐ IRS Form I-9 (if not current City vendor)

Items Required During Construction:
- ☐ Progress Schedules and Submittals (Document 01 3230)
- ☐ Monthly Progress Payment Applications (Document 01 2000)
  - ☐ Weekly Certified Payroll Statements for period of Progress Payment Application
  - ☐ First Source Agreement OR Community Workforce Agreement Monthly Reports

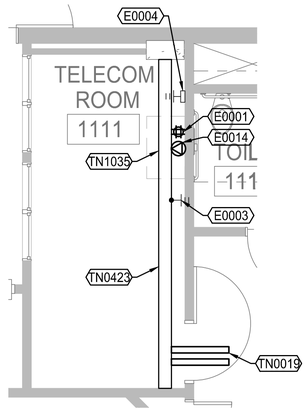
Items Required Upon Completion of Project for Final Payment:
- ☐ Agreement and Release of Any and All Claims (Document 00 6530)
- ☐ Guaranty (Document 00 6536)
- ☐ Warranties (Document 01 7700)
- ☐ Closeout Submittals (Document 01 7800)



1 COMMUNICATIONS - TELECOM ROOM 1111 ENLARGED PLAN

1/4"=1'-0"

NORTH



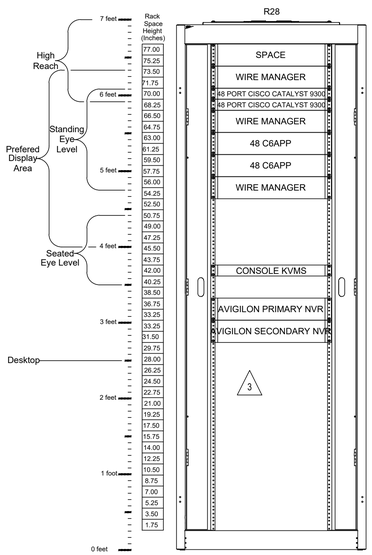
2 COMMUNICATIONS - TELECOM ROOM 1111 ENLARGED RCP

1/4"=1'-0"

NORTH

KEYNOTES

- A0001 NOT USED.
- E0001 PROVIDE A QUAD 5-20R RECEPTACLE ON A DEDICATED CIRCUIT, PER R28 SERVER RACK, MOUNTED ON THE CABLETRAY.
- E0003 GROUND EACH RACK, CABINET AND CABLE TRAY PER CEC ARTICLE 250 AND SPECIFICATION SECTION 27 05 29.
- E0004 PROVIDE MAIN GROUNDING BUS BAR WITH (6) #6 COMPRESSION LUGS, MINIMUM. MOUNT ON THE BACKBOARD BELOW THE CABLE TRAY.
- E0014 PROVIDE ONE L6-30R, PER R28 SERVER RACK, MOUNTED TO SIDE OF CABLE TRAY.
- E0025 NOT USED.
- TN0019 (2) 4" C.
- TN0423 PROVIDE 12" WIDE CABLE RUNWAY (CR-12) SUPPORTED FROM CEILING/STRUCTURE. MOUNT BOTTOM @ 7'-6" A.F.F.
- TN1035 PROVIDE WATERFALL DROPOUTS FOR EACH RACK, TYP.
- TN1050 NOT USED.
- TN1060 NOT USED.
- TN2080 CHAIN LINK FENCE.



3 RACK ELEVATIONS

1"=1'-0"

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REGISTERED COMMUNICATIONS DISTRIBUTION DESIGNER

DATE

RAY ENRIQUEZ
REGIS. NO. 100511
EXPIRES 12/31/2025

APPROVALS

PROJECT TITLE

City of Berkeley
PSB - Detention Area Automation Upgrades

2100 Martin Luther King Jr. Way,
Berkeley, CA 94704

PERMIT SET

ISSUE DATE	**09/16/2025**
N&T JOB NUMBER	**21827.00**

REVISIONS

	DATE	DESCRIPTION
2	06/06/2025	PLAN CHECK 2
3	**12/10/2025**	**ADDENDUM 2**
4	**01/21/2026**	**ADDENDUM 4**

DRAWN BY **IK, TT** CHECKED BY **RE**

SHEET TITLE

COMMUNICATIONS - TELECOM ROOM 1111 ENLARGED PLANS & ELEVATIONS

SHEET NUMBER

TN4.01

SYMBOL	DEVICE	FUNCTION OR SERVICE	LOCATION	WORK OF	ROUGH-IN	RACEWAY	ELEVATION	CABLE FILL	FINISH	DETAIL SHEET(S)
1	SINGLE SENSOR, CCTV IP CAMERA, FIXED FOCUS	VISUAL SURVEILLANCE	WALL OR CLG AS INDICATED	28 23 00	4S BOX. 2 GANG RING	(1) 3/4" C.	AS SCHEDULED	1 CAT 6A CABLE PER DIV 27. HR TO SERVER ROOM 1111.	AS SPECIFIED	TY9.02
3	THREE SENSOR, 180 DEGREE, CCTV IP CAMERA, FIXED FOCUS	VISUAL SURVEILLANCE	WALL OR CLG AS INDICATED	28 23 00	4S BOX. 2 GANG RING	(1) 3/4" C.	AS SCHEDULED	1 CAT 6A CABLE PER DIV 27. HR TO SERVER ROOM 1111.	AS SPECIFIED	TY9.02
4	FOUR SENSOR, 360 DEGREE, CCTV IP CAMERA, FIXED FOCUS	VISUAL SURVEILLANCE	WALL OR CLG AS INDICATED	28 23 00	4S BOX. 2 GANG RING	(1) 3/4" C.	AS SCHEDULED	1 CAT 6A CABLE PER DIV 27. HR TO SERVER ROOM 1111.	AS SPECIFIED	TY9.02
1D	SINGLE SENSOR, CCTV IP CAMERA, FIXED FOCUS, DETENTION GRADE HOUSING	VISUAL SURVEILLANCE	WALL OR CLG AS INDICATED	28 23 00	4S BOX. 2 GANG RING	(1) 3/4" C.	AS SCHEDULED	1 CAT 6A CABLE PER DIV 27. HR TO SERVER ROOM 1111.	AS SPECIFIED	TY9.02
4										
DS	DOOR POSITION SWITCH. RE-USE EXISTING HARDWARE AND CABLING.	PLC CONTROL	LRI 1	28 46 19	LRI 1	R1	EXISTING	C1		
EL	ELECTRIC LOCK. RE-USE EXISTING HARDWARE AND CABLING.	PLC CONTROL	LRI 1	28 46 19	LRI 1	R1	EXISTING	C1		
IC	AUDIO INTERCOM	INTERCOM 4	LRI 2	28 15 00 4	LRI 2	R1	EXISTING	C2	LRI 2	
R28	FLOOR MOUNTED EQUIPMENT RACK WITH VERTICAL WIRE MANAGEMENT, 4 POST, ZONE 4 RATED.	TELECOMMUNICATIONS	FLOOR	27 11 16	AS SPECIFIED ON SECTION 27 11 16.		BOLTED TO THE FLOOR.	N/A	BLACK	
SS	(E) PUBLIC ADDRESS/PAGING SPEAKER	AUDIO	CEILING				CEILING			
4 M	PUSH-TO-TALK MASTER INTERCOM STATION WITH GOOSE NECK MIC	INTERCOM	DESK	28 15 00						

NOTE NO. CABLING NOTES

C1 RE-USE EXISTING CABLING.

C2 RE-USE EXISTING CABLING. ADD CONTACT CLOSURE OR RELAY CABLE TO ENABLE THE NEAREST VIDEO SURVEILLANCE CAMERA WHEN THE IC BUTTON IS PRESSED.

NOTE NO. LOCATION & ROUGH-IN NOTES

LRI 1 LOCATION AS INDICATED ON PLANS. RE-USE EXISTING HARDWARE.

LRI 2 LOCATION AS INDICATED ON PLANS. RE-USE EXISTING BACK BOX AND FACEPLATE.

NOTE NO. RACEWAY NOTES

R1 RE-USE EXISTING CONDUIT.

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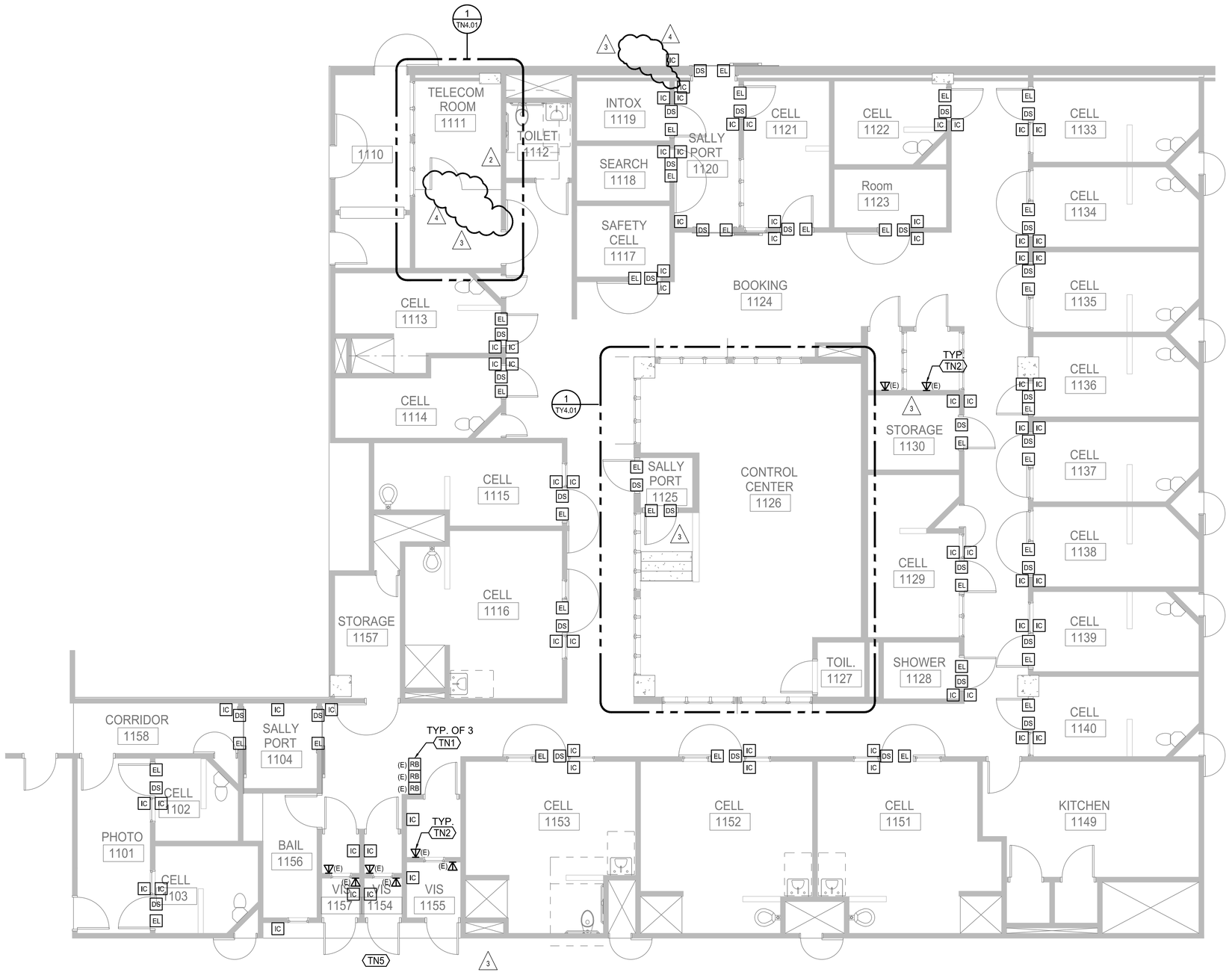
DRAWN BY IK, TT | CHECKED BY RE

SHEET TITLE

ELECTRONIC SECURITY SYSTEMS - SYMBOL SCHEDULE

SHEET NUMBER

TY0.02



1 ELECTRONIC SECURITY SYSTEMS - FIRST FLOOR DEVICE PLAN

3/16"=1'-0"

NORTH

KEYNOTES

TN COMMUNICATIONS SYSTEMS: WORK OF DIVISION 27 & 28.

TN1 (E) DOOR RELEASE BUTTONS TO REMAIN IN PLACE, TYP OF 3. THESE BUTTONS UNLOCKS VISITOR DOORS 1154, 1155 & 1157.

TN2 NOT USED.

TN3 NOT USED.

TN4 PROVIDE EQUAL TO AIPHONE IX-NVP 3-GANG AUDIO INTERCOM STATION.

TN5 THE SCOPE OF WORK SHOWN FOR THE VISITOR ROOMS 1154, 1155 AND 1157 WILL BE UNDER BID ALTERNATE 1.

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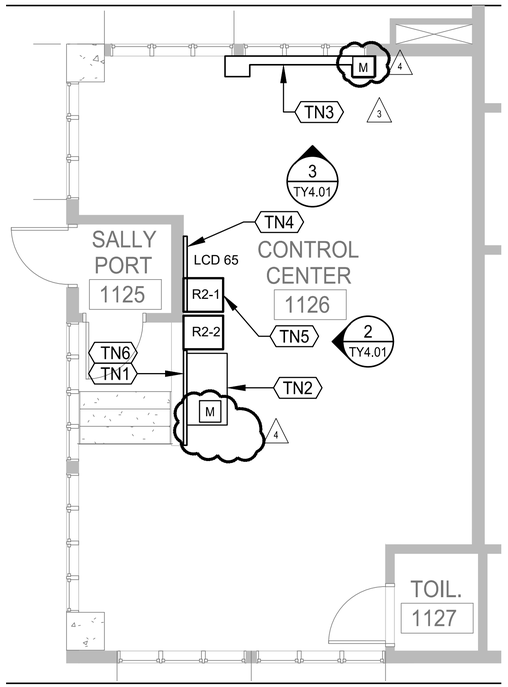
SHEET TITLE

ELECTRONIC SECURITY SYSTEMS - FIRST FLOOR DEVICE PLAN

SHEET NUMBER

TY2.01



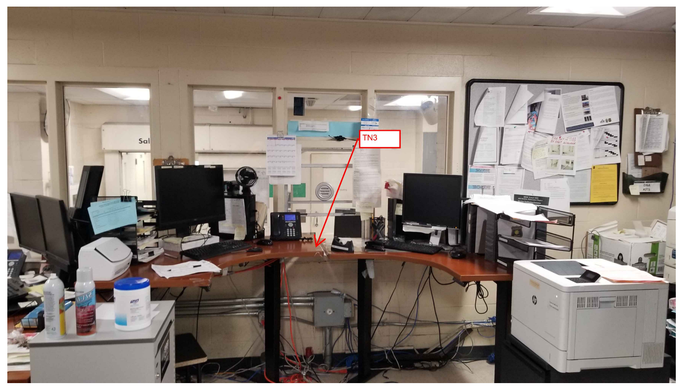
1 ESS - CONTROL CENTER 1126 ENLARGED PLAN

1/4"=1'-0"

NORTH

2 EXISTING PLC CONSOLE

NTS



3 LOCATION OF SECOND WORKSTATION

NTS

DEMOLITION KEYNOTES

- TD1 REMOVE EXISTING PLC CONSOLE, MONITORS AND CASEWORK. DO NOT REMOVE EXISTING PLC CABLING SINCE IT WILL BE RE-USED.
- TD2 REMOVE EXISTING TV MONITOR.

KEYNOTES

- TN 3 COMMUNICATIONS SYSTEMS: WORK OF DIVISIONS 27 & 28.
- TN1 INTERCEPT AND RE-USE ALL OF THE EXISTING PLC CABLING USED FOR THE AUDIO INTERCOMS AND DETENTION CELL DOOR HARDWARE. TERMINATE EXISTING CABLING ON NEW DGP/ACS PANELS/POWER SUPPLIES.
- TN2 4 PROVIDE WORKSTATION FURNITURE EQUAL TO WINSTED VUE-L 99" OPEN BASE WITH CPU PEDESTAL. MOUNT THE FIRST WORKSTATION WITH TWO (2) 32" TOUCHSCREEN MONITORS.
- TN3 MOUNT THE SECOND WORKSTATION WITH TWO (2) 32" TOUCHSCREEN MONITORS ON THE EXISTING FURNITURE.
- TN4 PROVIDE NEW 65" LCD TV. MOUNT TOP OF TV APPROX 3" BELOW THE CEILING. CONNECT THE TV TO THE ADJACENT WORKSTATION VIA HDMI CABLE.
- TN5 PROVIDE (2) R2 SWING GATE WALL RACK MOUNTED BELOW THE WINDOWS. INSTALL THE AIPHONE IX-10AS NETWORK ADAPTORS AND POE SWITCHES IN THE WALL RACKS. INSTALL THE RACKS TO SWING-OUT IN OPPOSITE DIRECTIONS.
- TN6 PROVIDE 3/4" THICK, FIRE-RESISTANT TREATED PLYWOOD BACKBOARD FROM FLOOR TO BELOW THE WINDOW. TRIM TO FIT.

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SHEET TITLE

ESS - CONTROL CENTER 1126 ENLARGED PLAN & ELEVATIONS

SHEET NUMBER

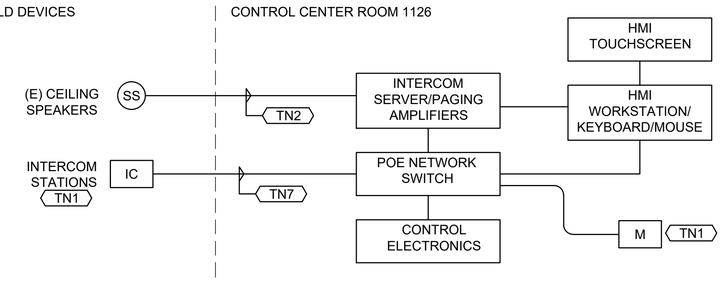
TY4.01

DELETE IN ITS ENTIRETY

4

1 ACCESS CONTROL SINGLE LINE DIAGRAM

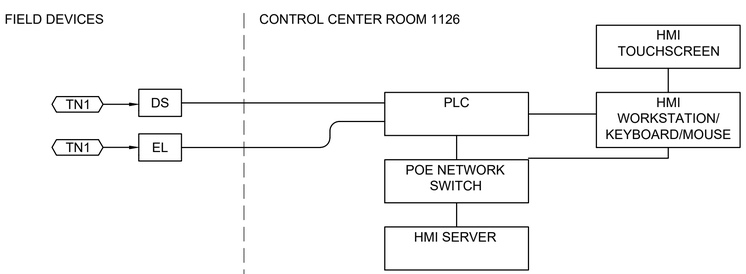
NTS [1]



2 INTERCOM & PUBLIC ADDRESS SYSTEM SINGLE LINE DIAGRAM

NTS

4



3 CONTROL ELECTRONICS SYSTEM SINGLE LINE DIAGRAM

NTS

4

SHEET NOTES

[1] FUNCTIONAL BLOCK DIAGRAMS ARE DIAGRAMMATIC. CONTRACTOR TO SUBMIT SHOP DRAWINGS INDICATING EXACT QTY AND LOCATION OF ACCESS CONTROLLERS AND RELATED HARDWARE REQUIRED TO MEET THE FUNCTIONAL REQUIREMENTS OF THE PROJECT.

KEYNOTES

TN TELECOMMUNICATIONS & ELECTRONIC SECURITY SYSTEMS: COMPLY WITH DIVISIONS 27 & 28. 4

TN1 REFER TO PLANS FOR QUANTITY.

TN2 INTERCEPT EXISTING PAGING CABLING IN THE EXISTING CONSOLE IN CONTROL CENTER ROOM 1126 AND RE-USE FOR PAGING SYSTEM. 4

TN3 NOT USED.

TN4 NOT USED.

TN5 NOT USED.

TN6 NOT USED.

TN7 INTERCEPT EXISTING INTERCOM CABLING IN THE EXISTING CONSOLE IN CONTROL CENTER ROOM 1126 AND RE-USE FOR INTERCOM SYSTEM

3 4

3

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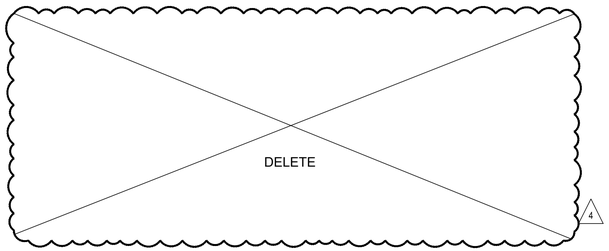
SHEET TITLE 4

INTERCOM, PUBLIC ADDRESS & CONTROL ELECTRONICS

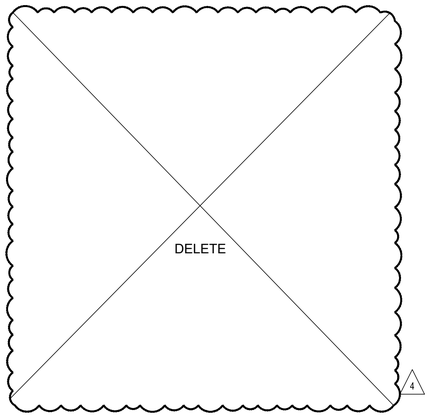
SHEET NUMBER

TY7.01



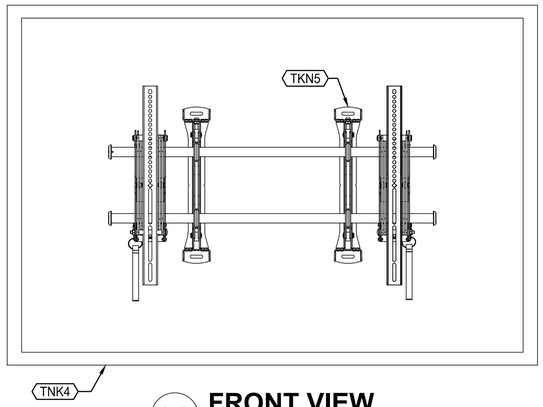
1 CARD READER - TYPE CR

NTS



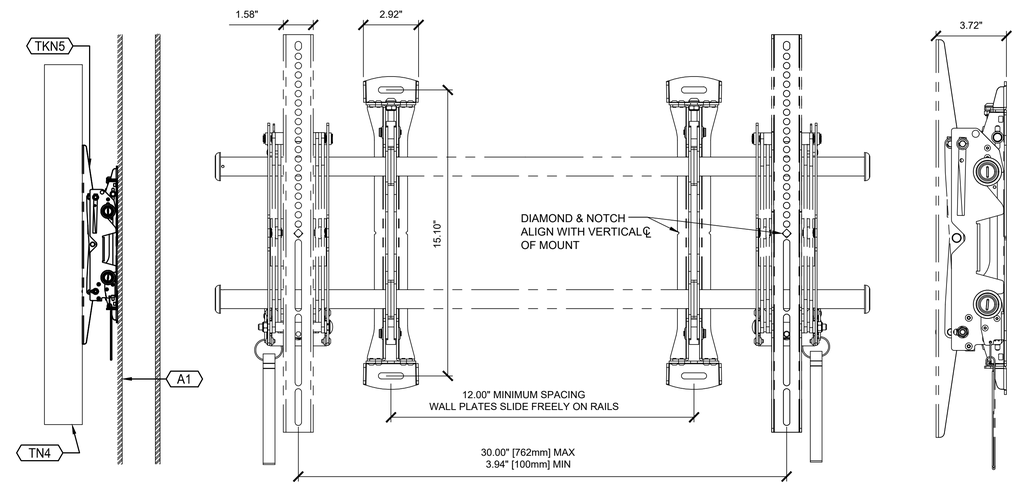
2 ACS ELEVATION

VIEW FROM SECURE SIDE, CEILING ACCESS NTS



3A FRONT VIEW

NTS



3B SIDE VIEW

NTS

3C FRONT VIEW

NTS

3D SIDE VIEW

NTS

3 FLAT PANEL MOUNT ASSEMBLY

NTS

SHEET NOTES

1. NOT EVERY DOOR CONDITION IS DEPICTED. REFER TO THE FLOOR PLANS FOR THE DEVICES REQUIRED AT EACH OPENING AND PROVIDE ROUGH-IN AS REQUIRED BASED ON SIMILAR ASSEMBLIES DETAILED ON THE TY SHEETS.
2. AT ACCESSIBLE CEILING CONDITIONS, SUPPORT ELECTRONIC SECURITY CABLING ON CABLE HOOKS OR BASKET TRAYS.
3. WHERE ESS SIGNAL CABLING IS CONSOLIDATED WITH A NETWORK OF CONDUITS AND PULL BOXES, MAINTAIN 40% MAXIMUM FILL.

KEYNOTES

EKN1 NOT USED. 4

TN ELECTRONIC SECURITY SYSTEMS: COMPLY WITH DIVISION 28.

TN1 NOT USED.

TN2 NOT USED.

TN3 NOT USED. 4

TN4 FLAT PANEL DISPLAY/LCD - NET WEIGHT NOT TO EXCEED 135 LBS.

TN5 FLAT PANEL MOUNT - NET WEIGHT NOT TO EXCEED 40 LBS. 4

TN6 NOT USED.

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SHEET TITLE

DETAILS - SECURITY SYSTEMS ACCESS CONTROL

SHEET NUMBER

TY9.01

SECTION 28 05 00

COMMON WORK RESULTS FOR ELECTRONIC SAFETY AND SECURITY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including Conditions and Division 1 Specification Sections, apply to this Section.

B. Provisions of this Section apply to Electronic Safety and Security Work, including the following Sections:

1. Section 28 05 13 – Conductors and Cables for Electronic Safety and Security
2. Section 28 05 28 – Pathways for Electronic Safety and Security

1.2 SCOPE OF WORK

A. Section includes, but is not necessarily limited to:

1. Common standards and procedures for the Electronic Safety and Security Work.
2. Design, engineer and provide complete, all means of support, suspension, attachment, fastening, bracing, and restraint (hereinafter "support") of the Work of this Division. Provide engineering of such support by parties licensed to perform work of this type in the Project jurisdiction.

4
Addendum 4

3. **Two workstations with access to a touch screen monitor that manages the doors/intercoms. (One at the CORPUS desk and one near the existing PLC console)**
4. **Restriction of doors that only one door can be opened at a time.**
5. **An audible alert when a door is opened.**
6. **A visual indicator that a door is open.**
7. **The door control panel should work in concert with the intercom and the camera. (i.e. when we activate an intercom to speak, it should pull up the nearest camera. Or when we open a door, there should be a two-step process, select the door, which opens a camera view, then a confirmation to actually open the door.)**
8. **Create a log of doors opening and closing that can be audited.**
9. **When an intercom is activated, there should be an audible and visual indicator. Include the ability to mute individual alerts, but retain the visual.**
10. **The system must be on a closed network, but the availability to “flip a switch” to connect to the outside world for remote maintenance. The switch access needs an audible and visual indicator.**
11. **Emergency ability to override and open all doors. This would require at least a two-step process or greater to activate.**

12. **Provide an Ignition platform by Inductive Automation with unlimited tags and client licenses running on redundant servers.**

13. **The systems must integrate door controls, intercom calls, cameras and other network connected devices with an open communication protocol.**

14. **Provide a Harding DCC digital intercom controller, Intercom Master station at the workstations, integrated with the HMI. Upgrade intercoms to digital control using existing field stations but replace all head end hardware. Incorporate camera call-ups.**

15. **Provide new PLC equipment to control and monitor detention doors with sufficient IO for existing controlled devices. Replace all relays and terminals.**

16. **Provide integration with the Jail management system to the HMI for the following:**

    a. **Ability to retrieve inmate information by cell assignment**

    b. **Ability to locate cell assignment by inmate name.**

    c. **Monitor for control room to display inmate information including classification and relevant notes.**

1.3 REFERENCES

A. Conform to the applicable portions of the following standards agencies:

1. UNDERWRITERS LABORATORIES (UL)

    a. UL 294 (1999; Rev thru Oct 2001) Access Control System Units

    b. UL 639 (1997; Rev thru Sep 2002) Intrusion Detection Units

1.4 DEFINITIONS

A. See also Section 27 05 00 – Common Work Results for Communications.

B. General Abbreviations used in these specifications. Refer additionally to the abbreviations list appearing on the Drawings.

1.	ADA	Americans With Disabilities Act.
2.	AFC	Above Finished Ceiling.
3.	AFF	Above the Finished Floor.
4.	BLDG	Building
5.	CAT	Category
6.	CL	Centerline
7.	DIV	Division
8.	(E)	Existing
9.	FBO	Furnished By City
10.	HR	Home Run

11.	ID	Inside Diameter
12.	LAN	Local Area Network
13.	MAX	Maximum
14.	NIC	Not In Contract.
15.	OD	Outside Diameter
16.	OFE	City Furnished Equipment.
17.	PSRH	Project Standard Receptacle Height.
18.	PSSH	Project Standard Switch Height.
19.	TYP	Typical
20.	UON	Unless Otherwise Noted.

C. Definitions of Terms:

1. As defined in Section 28 13 00 – Access Control and Alarm Systems.

1.5 SUBMITTALS

A. Submit the following according to Conditions of the Construction Contract and Division 1 Specification Sections.

B. General Requirements

1. Submit all materials for review arranged in same order as Specifications, individually referenced to Specification Section, Paragraph and Contract Drawing number. Conform in every detail as applies to each referencing Section.

2. Submit 8 ½"x 11" items bound in volumes and drawings in edge bound sets. Submit all drawings on sheets of the same size.

3. Make each specified submittal as a coordinated package complete with all information specified herein. Incomplete or uncoordinated submittals will be returned with no review action.

C. Contractor and Key Personnel Experience.

1. A minimum of 30 days prior to installation, submit documentation of the experience of the Electronic Safety and Security contractor(s) and of their key personnel.

2. Qualifications shall be provided for:

a. Electronic Safety and Security contractor(s),

b. Electronic Safety and Security installers,

c. Supervisor(s) (if different from the installers).

3. Refer to Quality Assurance paragraph in this section for complete requirements.

D. Progress Schedule: Comply with Section 01 32 13 - Project Coordination.

E. Manufacturer's Product Data:

1. Manufacturer's Product Data Sheets. Collate in sequence of List of Materials:

2. Data sheet for each item in each Electronic Security Section, including all accessories, clearly marked for proposed product required for the Project, to including but not limited to the following where required by the Project scope:

   a. Common Work

      1) Power Supplies

      2) UPS's

      3) Switches

      4) Relays

      5) Batteries

      6) Tamper resistant security fasteners

      7) Terminal blocks

      8) End-of-Line Resistors.

   b. Wiring

      1) Cabling of each type used on the project.

   c. Racks and Cabinets (where provided under the work of Division 28).

   d. Electronic Security Systems Pathway

      1) Raceway

      2) Raceway connectors

      3) Gutter

      4) Terminal Cans, Pull Boxes, Device Boxes

      5) Enclosures

      6) Means of support

   e. Access Control and Intrusion Device Field Devices

      1) Door position sensors

      2) Request to exit devices

3. Material Safety Data Sheet, where applies.

4. List of Materials Schedule. For each item, include:

   a. Referencing Specification Section

   b. Referencing Paragraph

   c. Referencing Drawing, if specified only on plans

   d. Manufacturer.

   e. Model number.

   f. Listing, including name of Nationally Recognized Testing Laboratory.

g. Precede each submittal book with a summary schedule, with columns for each item above and rows for each item submitted.

1) Example:

Specification Section	Paragraph	Contract Drawing Reference	Manufacturer	Model No.	UL/CLA Listed
28 05 00	2.03C		XYZ	123	Y
28 13 00	2.07A1		AAA	34-56	Y
		T2.01	ZZY	456	Y

F. Functional description, provide

1. A system description, including analysis and calculations used in sizing equipment required.
2. Description to show how the equipment shall operate as a system to meet the performance requirements. The following information shall be supplied as a minimum:
   a. Description of site equipment and its configuration
   b. Protocol description
3. Startup operations
4. System expansion capability and method of implementation
5. System power requirements and UPS sizing

G. Field (Installation) and Shop Drawings: Include wiring diagrams and installation details of equipment indicating proposed location, layout and arrangement, control panels, accessories, piping, ductwork, and other items that must be shown to ensure a coordinated installation. Wiring diagrams shall identify circuit terminals and indicate the internal wiring for each item of equipment and the interconnection between each item of equipment. Drawings shall indicate adequate clearance for operation, maintenance, and replacement of operating equipment devices. Collate in sequence at least the following plans:

1. Drawing index/symbol sheet.
2. Floor plans. At scale of Contract Documents. Show:
   a. Device locations, type and circuit number(s).
   b. Mounting height.
   c. Conduit size.
   d. Rough-in.
   e. Wire type.
   f. Wire fill.
   g. Termination rooms, including BDF and IDF Closets where use of these spaces are indicated on the Bid Documents
3. Sections/Elevations: At scale of Contract Documents:
   a. Mounting location reference.

b. Terminal cabinets.

c. Electrical power receptacles required for the work of this Section.

d. Block wiring terminations

e. Clearances

f. Backboard Wire and Cable Management

g. Electrical and Mechanical panels, including panel boards, EMS and fire alarm, and mechanical systems in vicinity of the work of these Sections.

4. System Conduit Riser Drawing. Submit drawings that clearly and completely indicate the function of each Electronic Safety and Security component. Indicate termination points of devices, and interconnections required for system operation. Indicate interconnection between modules and devices. Show:

   a. Terminal cabinets.

   b. Coordination with floor plans.

5. Single line diagram of Electronic Security and Safety Systems. Indicate the relationship of integrated components on one diagram and show power source, system controls, impedance matches; plus number, size, identification, and maximum lengths of interconnecting wires.

   a. Show at least:

      1) Equipment: Function, make, model.

      2) Rack number.

   b. Grounding and bonding scheme

   c. Terminal cabinets.

   d. Coordination with floor plans.

6. Mounting details:

   a. Identify each item requiring seismic restraint installation in accordance with CBC Chapter 16. Include floor mounted items weighing more than 400 pounds and wall mounted or suspended items weighing more than 20 pounds.

   b. Supports for such items shall be provided support, bracing, and anchorage, designed by the Contractor in accordance with the following criteria:

      1) Design to resist seismic forces in accordance with CBC Chapter 16.

      2) Minimum Design Parameters - As defined for the Project in Division, with respect to Occupancy Category, Site Classification, Seismic Design Category, Importance Factor, Spectral Acceleration and SDI.

   c. Specific details of restraints including anchor bolts submitted under the Section 27 05 29 – Hangers and Supports for Communications Systems for mounting and maximum loading at each location, showing compliance and coordination with Code and the project Architectural, Structural and Mechanical Documents.

   d. Stamped and signed by an Engineer licensed in the Project jurisdiction for work of this type.

1) Submit an accompanying Engineering analysis stamped and signed by an Engineer licensed in California for work of this type, indicating that the Equipment Enclosure System will comply with California Building Code for the Project Seismic Zone when loaded with the weight of the equipment submitted.

2) Show calculations on drawings or in bound volume for review by Authorities having jurisdiction.

e. Show loads, type and strength of connections, sizes, dimensions, materials, etc.

f. Provide details for:

1) Equipment Rack anchorage.

7. Installation details

a. Terminal cabinets: Draw elevations of terminal blocks corresponding to the Single Line Diagram.

b. Firestopping,

c. Details of flexible raceway connections to be made to vibrating equipment

d. Details of J-Box and sealant application for the typical conditions listed in Section 27 05 48 – Noise and Vibration Controls for Communications Systems.

e. California Access Compliance Manual and Americans with Disabilities Act (ADA) compliance.

8. Fabrication details

a. Receptacles.

b. Panels.

c. Special mounting provisions

d. Legends/engraving details. Half or full size:

9. Schedules of Application

a. An itemized list of all items of equipment to be fitted with flexible electrical connections.

b. Catalog cuts of the products to be applied as J-Box mastic and Acoustical Sealant, and a schedule of rooms to receive application of mastic and sealant at J-Boxes.

H. Test plan

1. Project Site Test Reports:

a. Schedule: Submit test reports in timely manner relative to Project schedule such that the City's Representative may conduct verification of submitted test data without delay of scheduled progress.

b. Project Site test report: Submit following system completion and prior to and as condition precedent to Acceptance Review and Testing of the Work of this Section.

c. Content: Include at least:

1) Time and date of test.
2) Personnel conducting test.
3) Test equipment, including serial and date of calibration.
4) Test object.
5) Procedure used.
6) Results of test
7) Numerical or graphical presentation.
8) Electronic file in format and media directed by the City's Representative.

d. Refer additionally to the requirements of Part 3 of this Section and of the individual Electronic Safety and Security Sections.

I. Hazardous Materials Notification: In the event no product or material is available that does not contain asbestos, PCB or other hazardous materials as determined by the City, a "Material Safety Data Sheet" (MSDS) equivalent to OSHA Form 20 shall be submitted for that proposed product or material prior to installation.

J. Asbestos and PCB Certification: After completion of installation, but prior to Substantial Completion, Contractor shall certify in writing that products and materials installed, and processes used, do not contain asbestos or polychlorinated biphenyls (PCB), using format in Article 3 of General Conditions using format in Division 1 Section "Closeout Procedures".

1.6 QUALITY ASSURANCE

A. Procedures: In accordance with Section 01 45 00 - Quality Control.

B. Qualifications

1. Installer's Qualifications

a. Prior to installation, submit data of the installer's experience and qualifications. Show that the installer who will perform the work has a minimum of 2 years experience successfully installing Electronic Safety and Security Systems of the same type and design as specified herein. Include the names, locations, and points of contact of at least two installations of the same type and design as specified herein where the installer has installed such systems.

b. Indicate the type of each system and certify that each system has performed satisfactorily in the manner intended for a period of not less than 12 months.

4
Addendum 4

c. Security Contractor must be a certified Avigilon Dealer in order to certify the installation of the ~~ACS and~~ VMS in the PSB Detention Area.

C. Designated Supervisor: Provide a designated supervisor present and in responsible charge in the fabrication shop and on the Project Site during all phases of installation and testing of the Work of this Section. This supervisor shall be the same individual through the execution of the Work unless illness, loss of personnel, or other circumstances reasonably beyond the control of the Contractor intervene.

D. Reference Documents: At all times when the work is in progress, maintain at the workplace, fabrication shop or Project Site as applies.

1. A complete set of the latest stamped, actioned submittals of record.
2. A complete set of manufacturer's original operation, instruction and service manuals for each equipment item.

E. Test Equipment

1. Requirements:
   a. Maintain and operate test equipment at the fabrication shop and the job site for both routine and Acceptance Testing of the Work of this Section.
   b. Maintain test equipment at the job site while work is in progress from installation of equipment racks until City Acceptance of this Work; thereafter remove all of this test equipment from the job site.
   c. Unless otherwise indicated, test equipment shall remain property of the Contractor.
   d. Provide all required test cables, jigs and adapters.
   e. Provide equipment with traceable calibration, with calibration date not greater than one year prior to the date of the use of the equipment to perform the specified testing.
2. Equipment: Specified in individual Sections.

F. Standard Products

1. Provide materials and equipment that are products of manufacturers regularly engaged in the production of such products which are of equal material, design and workmanship. Products shall have been in satisfactory commercial or industrial use for 2 years prior to bid opening. The 2-year period shall include applications of equipment and materials under similar circumstances and of similar size. The product shall have been on sale on the commercial market through advertisements, manufacturers' catalogs, or brochures during the 2-year period. Where two or more items of the same class of equipment are required, these items shall be products of a single manufacturer; however, the component parts of the item need not be the products of the same manufacturer unless stated in this section. All components must be of new condition, used or reconditioned products will not be accepted.
   a. Alternative Qualifications. Products having less than a 2-year field service record will be acceptable if a certified record of satisfactory field operation for not less than 6000 hours, exclusive of the manufacturers' factory or laboratory tests, is furnished.
2. Material and Equipment Manufacturing Date
   a. Products manufactured more than 3 years prior to date of delivery to site shall not be used, unless specified otherwise.

G. Manufacturer’s identification tags or marks are not acceptable on surfaces which will remain exposed to view after installation.

1. Evidence of “patching” after removal of tags or marks is not acceptable.

1.7 REGULATORY REQUIREMENTS

A. Regulations Applicable: Including but not limited to those defined in Section 01 41 00 - Regulatory Requirements.

1. Nothing in the Contract Documents shall be construed to permit Work not conforming to applicable laws, ordinances, rules, or regulations.

2. Safety Agency Listing: All devices provided under the Work of this Section which are connected to the Project electrical system shall be listed by a Nationally Recognized Testing Laboratory, and shall be so labeled.

3. In each of the publications referred to herein, consider the advisory provisions to be mandatory, as though the word, "shall" had been substituted for "should" wherever it appears. Interpret references in these publications to the "authority having jurisdiction," or words of similar meaning, to mean the City's Representative. Equipment, materials, installation, and workmanship shall be in accordance with the mandatory and advisory provisions of NFPA 70 unless more stringent requirements are specified or indicated.

1.8 DELIVERY, STORAGE AND HANDLING

A. Procedures:

1. In accordance with General Conditions and Division 1 Section "Product Requirements", as specified in the individual sections of Division 27 and the following.

B. General

1. Provide protection from weather, moisture, extreme heat and cold, dirt, dust, and other contaminants for cabling and equipment placed in storage.

1.9 ENVIRONMENTAL REQUIREMENTS

A. Connecting hardware shall be rated for operation under ambient conditions of 32 to 140 degrees F and in the range of 0 to 95 percent relative humidity, non-condensing.

1.10 SEQUENCING

A. Comply with Section 01 10 00 - Summary and Section 01 32 16 – Project Schedules.

1.11 OPERATING AND MAINTENANCE DATA

A. Commercial off the shelf manuals shall be furnished for operation, installation, configuration, and maintenance of products provided as a part of the Electronic Safety and Security cabling and pathway system. Precede the manuals with a systems narrative specific to this Project, outlining the major systems functionality, the major systems components, and identifying which manuals document the performance of which subsystems.

1. Submit operations and maintenance data in accordance with Section 01 78 30 - Guarantees Bonds Service and Maintenance Contracts and as specified herein not later than 2 months prior to the date of beneficial occupancy.

B. Spare Parts

1. In addition to the requirements of Section 01 78 30 - Guarantees Bonds Service and Maintenance Contracts, provide a complete list of parts and supplies, with current unit prices and source of supply, and a list of spare parts recommended for stocking.

1.12 PROJECT RECORD DOCUMENTS

A. Comply with 01 78 00 - Closeout Submittals, and the following.

1. Record Drawings

a. Content

1) Provide a least as required for the Shop and Installation Drawings defined elsewhere in this Section.

2) Contractor shall be responsible for updating building and Electronic Safety and Security plans to reflect as-built conditions.

3) Indicate actual work on Drawings; indicate actual products used, replace vendor neutral nomenclature used in bid set with makes and models of actual installed devices.

b. CAD.

1) Use a computer aided drafting (CAD) system in the preparation of record drawings for this Project. CAD system shall produce files in AutoCAD® .DWG format, latest release at time of Project bid closure. Campus Standard, no substitution permitted.

2) Except where prohibited by Contract, City's Representative will furnish CAD backgrounds in AutoCAD® .DWG format, for use by the Contractor in preparing Record Drawings.

1.13 WARRANTY SERVICE

A. In addition to provisions of General Conditions and Division 1 Section "Product Requirements", provide the following.

1. Response Time:

a. Provide an access control manufacturer qualified technician familiar with the work at the Project Site within 24 hours after receipt of a notice of non-emergency malfunction.

b. Provide an access control manufacturer qualified technician familiar with the work at the Project Site within 4 hours after receipt of a notice of an emergency malfunction. An emergency malfunction is defined as one causing gate or door openings to be either inaccessible or unsecured.

c. Provide the City's Representative with telephone number attended 8 hours a day, 7 days a week, to be called in the event of a malfunction.

B. Provide all additional Warranties as defined in each Electronic Safety and Security Systems Section.

1.14 CLOSEOUT

A. Punch List: Perform any and all remedial work, at no claim for additional cost or time. Where required, retest and submit Test Report. Notify the City's Representative of completion of Punch List.

B. Portable Equipment: Furnish all portable equipment and spares to the City's Representative, along with complete documentation of the materials presented. Where applicable, furnish portable equipment in the original manufacturer's packing.

C. Operating and Maintenance Data: Install framed operating and maintenance instructions. Submit Manuals.

D. Project Record Documents: Submit print and digital copies. Digital files shall be in AutoCAD .dwg format, latest release at time of Project bidding..

E. Keys: If applicable, replace construction locks with permanent locks. Provide 5 sets of keys to the City's Representative.

F. Instruction: Conduct specified instruction.

G. Warranty: Submit Warranty dated to run from date of Substantial Completion of the Project.

PART 2 - PRODUCTS

2.1 UNAUTHORIZED MATERIALS

A. Materials and products required for work of this section shall not contain asbestos, polychlorinated biphenyls (PCB) or other hazardous materials identified by the City.

2.2 GENERAL

A. Where a particular material, device, piece of equipment or system is specified directly, the current manufacturer's specification for the same shall be considered to be a part of these specifications, as if completely contained herein in every detail.

B. Each material, device or piece of equipment shall comply with all of the manufacturer's current published specifications for that item.

C. Products shall be made by manufacturers regularly engaged in the production of such products.

D. Provide quantity as shown on Contract Drawings, or as otherwise indicated.

E. Provide all auxiliary and incidental materials and equipment necessary for the operation and protection of the Work of this Section as if specified in full herein.

F. Unless recycled content is specified, provide new materials.

G. Provide the manufacturer's latest design/model, permanently labeled with the manufacturer's name, model number and serial number.

H. Where products are of similar type or use, provide products of the same manufacturer, unless otherwise indicated.

I. Components

1. UL or third party certified. Cabling and interconnecting hardware and components for Electronic Safety and Security systems shall be UL listed or third party independent testing laboratory certified, and shall comply with NFPA 70 and conform to the requirements specified herein.

2. Where equipment or materials are specified to conform to industry and technical society reference standards of the organizations, submit proof of such compliance.

   a. The label or listing by the specified organization will be acceptable evidence of compliance.

   b. In lieu of the label or listing, submit a certificate from an independent testing organization, competent to perform testing, and approved by the City's Representative.

   c. The certificate shall state that the item has been tested in accordance with the specified organization's test methods and that the item complies with the specified organization's reference standard.

J. Enclosures:

1. Provide steel frames and enclosures designed and wired to eliminate all induced currents.

2. Make bolted connections with self-locking devices.

3. All enclosures should be appropriate to environment of installation – refer to the requirements of Section 28 05 28 – Pathways for Electronic Safety and Security.

K. Finishes: Any item or component of the Work of this Section which is visible shall comply with the following.

1. Finishes noted or scheduled on the Contract Drawings take precedence.

2. Where design location requires that products, materials or equipment are visible to the public, no manufacturer's logos larger than 1/2 inch shall be visible. Unless otherwise noted or directed, neatly remove or permanently paint out such logos.

3. Where finishes are not noted or otherwise defined in the Contract Documents, submit manufacturer's standard finish samples for selection by the City's Representative.

2.3 LABELING

A. Shall meet the legibility, defacement, exposure and adhesion requirements of UL 969.

B. Unless otherwise indicated, provide black text on a white background.

C. Shall be preprinted or computer printed type. Hand written labels are not acceptable.

D. Manufacturers

1. Brother P-Touch

2. Brady

3. Or equal.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine existing conditions before starting work. Submit conflicts in a timely manner for resolution

3.2 GENERAL

A. Conform to UL 681, UL 1037, and UL 1076, the appropriate installation manual and the requirements of each specification section for each equipment type, whichever is most restrictive . Components within the system shall be configured with appropriate "service points" to pinpoint system trouble in less than 20 minutes.

3.3 PREPARATION

A. Prepare and sequence the work to minimize disruption to each room environment and any existing Electronic Safety and Security systems.

B. Protection: Cover all computers, electronic equipment, desks, chairs, furniture and other articles when working at ceiling level and/or performing dust producing tasks.

3.4 LABELING

A. Field devices: Each Electronic Security System initiating device and each annunciating device shall be labeled with the assigned ID matching the device ID used in the Access Control programming and set-up screens.

1. The ID shall incorporate the device abbreviation, the architectural door number and a sequential number assigned to each device of the same type occurring at the door opening in the form Door Number - Device Abbreviation – Sequential Number - .

a. Example: One LA at door number 101A: 101A-LA-1.

b. Example: Two DO’s at door 121: 121-DO-1, 121-DO-2.

2. Apply label to an unobtrusive spot on the device, cut to minimum practical size before applying.

B. Panels. Attach to the interior of each control a panel clear plastic holder in this holder place a laser printed list of the door and card reader relay points zone numbers and other signals that may be transmitted to the central station, the type of device, exactly what the alarm and restoral signals indicate. This list shall be typed on 8-½" x 11" paper provide a copy of these list(s) in Microsoft Word on electronic media format delivered to the City’s Representative.

3.5 REPAIR AND RESTORATION

A. Where working in spaces occupied by the City, return to their original positions any furniture or articles relocated to perform the work.

3.6 CLEANING

A. Where working in spaces occupied by the City:

1. Immediately after completing work within each space, clean up and remove all materials, scrap and dust.

2. All scrap material in work area shall be picked up and removed from the building at the end of each day. See also Division 1 for additional requirements.

3. All dust resulting from work performed shall be vacuumed up daily.

4. All scrap material shall be removed from Site and disposed of in an authorized disposal site. Refer to Section 01 74 19 - Construction Waste Management and Disposal.

3.7 SYSTEMS PERFORMANCE TESTING AND ADJUSTING PROCEDURES

A. General Procedures

1. It shall be the responsibility of the Security Contractor to demonstrate to the City's Representative that the security system is complete and functional as per these specifications. For intrusion detection field devices test shall ensure that the requisite degree of intrusion detection is provided.

2. Acceptance testing shall be scheduled by the Security Contractor thorough established project channels

3. Furnish all necessary instruments and equipment required for conducting tests.

B. Device Level Tests

1. Initially, test each sensor and subsystem component individually.

2. Test all wire for shorts, open circuits, or grounding.

3. Immediately correct any defective work

C. Systems Tests.

1. When the function of each component within a particular subsystem such as each sensor within a particular zone is verified, certify that subsystem of the entire Electronic Safety and Security System is satisfactorily meeting required specifications. Test each subsystem similarly until each detection zone has been certified.

2. When subsystem certification is complete, test entire integrated system to ensure that subsystem elements are compatible and function as a complete system. Integrated system test shall be accomplished in linear fashion, end-to-end, and shall verify that each simulated intrusion performed within each detection zone produces an appropriate alarm or signal.

3. Integrated system test shall also verify that alarm is correctly annunciated at the terminal block associated with the field devices,

D. Contractor Testing

1. Provide for approval, not later than 30 days prior to formal inspection and test, a detailed operational test plan of how each component, subsystem, and entire Electronic Safety and Security System will be tested.

2. Submit a written test report from an authorized representative of the equipment manufacturer that the system has been 100% tested and approved. Submit prior to request for final payment.

3. Test each individual circuit and device for proper operation in the presence of telecommunications personnel. Correct all failures and retest at contractors expense to verify corrections. Correct as built drawings, O & M manuals, programming sheets and system programming to reflect the City's final occupancy room numbers.

4. Provide City's Acceptance Form with a check box associated with each card reader and input point. A check mark in the box will indicate that each point has been correctly installed and that communication between the controller and the server has been established. This form shall be completed prior to City acceptance of the system.

3.8 COMMISSIONING AND ACCEPTANCE

A. General:

1. Upon completion of the work, remove excess debris, materials, equipment, apparatus, tools and similar items. Leave the premises clean, neat and orderly.

B. Results Expected:

1. Electronic Security Systems shall be complete and ready for use.

2. Testing, start-up and cleaning work shall be complete.

3. Maintenance Materials: Special tools for proper operation and maintenance of the equipment provided under this Specification shall be delivered to the City.

C. Inspections

1. There shall be three phases of commissioning inspections:

   a. Rough-in inspection

   b. Above-ceiling inspection (after cables are placed)

   c. Final inspection and testing

2. The Contractor shall verify that the installation and materials used have been inspected before they are enclosed within building features, or otherwise hidden from view. The Contractor shall bear costs associated with uncovering or exposing installations or features that have not been inspected and approved.

D. Rough-in inspection. Once electrical rough-in and pathways have been installed, but prior to walls and ceilings being installed, the Contractor shall request of the City's Representative, in writing, for the official rough-in inspection to take place. The City's Representative will then schedule a time to be on-site to conduct this inspection.

1. At a minimum, the City's Representative will evaluate the following items:

   a. Accurate location and height above finished floor for all outlet boxes.

   b. Accurate dimensions (particularly depth) of all outlet boxes and diameter of in-wall conduit serving outlet boxes.

   c. Gutter size, location and clearance.

   d. Location and size of all other electronic security systems conduits or pathways.

   e. Location, spacing and clearance of and around electronic security systems racks and wall-mounted equipment.

f. That electronic security systems hard wired power and power receptacles, where installed under the work of this project, meet the design requirements.

2. The City's Representative is then to issue a written report to the Contractor identifying all items which currently do not meet the construction document requirements. All items are to be resolved prior to walls and ceilings being closed up. This report is not necessarily all-inclusive; should issues be discovered later in the project, the Contractor is still responsible for corrections/repairs.

E. Above-ceiling inspection

1. Once all electronic security systems cabling has been installed and properly supported and walls have been painted, but prior to the installation of ceiling tiles/material, contractor shall request of the design team, in writing, for the official above-ceiling inspection. The City's Representative will then schedule a time to be on-site to conduct this inspection

2. At a minimum, the City's Representative will evaluate the following items:

a. That all items from the previous inspection have been corrected.

b. That electronic security systems cabling is routed correctly and adequately supported.

c. That electronic security systems cabling is not painted or over-sprayed.

d. That the installed electronic security systems cabling matches what was specified/submitted.

e. That there are no kinks, splices, or other damage to the installed electronic security systems cabling.

f. That all field devices are properly supported, oriented and labeled.

g. That all penetrations through fire-rated walls are properly firestopped, including fire blocking materials installed in the annular spaces; and that the firestops are properly labeled.

3. The City's Representative is then to issue a written report to the Contractor identifying all items which currently do not meet the construction document requirements. This report is not necessarily all- inclusive; should issues be discovered later in the project, the appropriate communications subcontractor is still responsible for corrections/repairs.

F. Acceptance Review and Testing Procedures

1. The City's Representative will witness formal Acceptance Tests after receipt of written certification that all prior Punch List work is complete and that Contractor's functionality tests have been completed and that system is ready for final inspection. This request shall be made 3 weeks before substantial completion. The City's Representative will then schedule a time to be on-site to conduct this inspection.

2. The Contractor shall provide the following for the acceptance testing.

a. Personnel: Provide services of the designated supervisor, ACAS manufacturer representative and additional manufacturer qualified technicians familiar with

work of this Project. Provide quantity of technicians as required to comply with Project Schedule.

b. All tools appropriate for performance of adjustment of and corrections to this Work. Include spare wire and connectors and specified tooling for application.

c. Ladders, scaffolding and/or lifts as required to access high devices.

d. All test equipment.

e. Complete set of latest stamped, actioned submittals of record for reference.

f. Complete set of Test Reports.

g. Complete set of manufacturer's original operation, instruction and service manuals for each equipment item for reference.

3. The Contractor shall execute the test plan required in Submittals section and as approved and/or modified by the City's Representative. The testing must demonstrate complete operation of all systems and equipment, including any portable equipment.

4. These procedures may be performed at any hour of the day or night as required by the City's Representative to comply with the Project Schedule and avoid conflict with City staff or student activities. Provide all specified personnel and equipment at any time without claim for additional cost or time.

5. At a minimum, the City's Representative will check the following items:

a. Mechanical/Physical Installation.

1) That all items from the previous inspections have been corrected.

2) That all electronic security systems equipment and cabling terminal rooms is installed per the contract documents, including all required terminal blocks, pull boxes, termination resistors and electronic security systems grounding.

3) All other items necessary to guarantee contract documents are met and complete and functioning communications systems are installed.

4) All cables and electronic security systems field devices and pathway are properly labeled.

5) All penetrations through fire-rated walls are properly fire-stopped, including fire blocking materials installed in the annular spaces; and that the firestops are properly labeled.

b. Functionality Demonstration

1) Demonstrate functionality of each installed device is consistent with the read range, sensitivity and immunity to false alarms as specified by the device manufacturer.

2) Functional demonstration to also include, but not limited to the following active components and all related items installed under the work of the project:

a) Batteries

b) Cameras

c) Card readers

d) Door position sensors
e) Duress alarm components
f) Electrified hinges
g) Electrified latches
h) Electrified strikes
i) Glass break sensors
j) Key pad controllers
k) Local alarm devices
l) Motion detectors
m) Power supplies
n) Relays
o) Request to exit devices
p) Servers
q) Switches
r) UPS devices

6. Access Control Infrastructure:
   a. Demonstrate that operation of each opening, including access controlled doors and gates. Refer to the System Performance Requirements and Schedule of Programmatic Outcomes by Door Opening in Section 28 13 00 – Access Control and Alarm Systems is in full conformance with the specified functionality, including each C-Cure status item associated with the scheduled UCSC Door Class.
7. Door Position, Window and Hatch Switches
   a. Demonstrate functionality of each device. Demonstrate that operation of each monitored door by 1/2" or less from the fully closed position causes the position switch to change state.
8. Uninterrupted Power Systems:
   a. Disconnect normal power service. Demonstrate that the system remains in full operation for the specified time.

G. Adjust: As directed by the City's Representative.

3.9 POST ACCEPTANCE TEST REMEDIATION

A. Temporary Equipment: Provide and operate, without claim for additional cost or time, temporary equipment and/or systems to provide reasonably equivalent function, as determined by the City's Representative, in place of the Work of this Section which is incomplete or found not in conformance with the Contract Documents as of seven (7) days prior to the scheduled completion date. Provide such temporary equipment until Acceptance of the Work of this Section. Thereafter, remove such temporary equipment.

B. Correct:

1. In timely manner, correct identified Work of this Section which is incomplete or found not in conformance with the Contract Documents to comply with the Contract Documents, as reasonably determined by the City's Representative.

2. Conduct additional tests to in the presence of the City's representative to demonstrate that system conforms to the Contract Documents.

4 Addendum 4

3.10 **TRAINING**

A. **Provide on-site, project-specific training sessions for system operations, maintenance, and programming with designated total hours as follows:**

1.	**Electronic Components**	**3 hours**
2.	**Video Surveillance (CCTV) System**	**12 hours**
3.	**PLC Integrated Control System**	**14 hours**
4.	**HMI Control Stations**	**14 hours**
5.	**Intercom System**	**14 hours**

B. **All training is to review the existing systems as they apply to the equipment and systems provided under this contract. All personnel being trained are expected to have basic experience for the existing systems.**

C. **Operational Training:**

1. **Train security staff in the operation of the System. Operational training shall include how to monitor and control the systems provided under this contract and how to respond to system events.**

D. **Maintenance Training:**

1. **Train Owner's personnel in the basic user level maintenance and trouble shooting of the System. Structure training to identify the equipment and systems that can be serviced or reset by the on duty building engineer, how to identify systems that have failed or not working, and emergency shutdown procedures.**

2. **Provide a combination of classroom sessions supported by audio/visual aids, and field sessions with personnel participating in hands-on preventative, corrective maintenance and reactive maintenance.**

E. **Programming Training:**

1. **Train Owner's personnel in the site-specific programming and software trouble shooting of the System. Training will also include all user programmable features. Conduct training sessions using instructors who have been actively involved throughout construction and who are certified in writing by the manufacturers of the specific systems.**

2. **Provide a combination of classroom sessions supported by audio/visual aids, and field sessions with personnel participating in hands-on for programming changes, software uploading/downloading, trouble shooting, etc**.

F. **Submit an estimated training schedule 15 days prior to training for approval by the Owner's Representative. Estimate classroom and hands-on hours required for all three types of training (operational, maintenance, and programming). Include a syllabus for each class session.**

G. **All training materials including Operational and Maintenance (O&M) Manuals shall be reviewed and approved prior to conducting the specific training.**

END OF SECTION

SECTION 28 15 00

INTERCOM SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Intercom Stations
2. Paging Speakers
3. Master Intercom Stations
4. Intercom Server
5. Power Supplies

B. Related Work Under Other Sections

1. Section 28 05 00 – Common Work Results for Electronic Safety and Security.
2. Section 28 05 28 – Pathways for Electronic Safety and Security
3. Section 28 23 00 - Video Surveillance
4. Section 28 46 19 - PLC Integrated Control

1.3 SYSTEM DESCRIPTION

1. A detention grade IP intercom system with adjustable talk and listen modes will be provided. The IP intercom system will be server based, and be networked via TCP/IP communication. Intercom stations must be detention grade use.
2. The headend equipment must have DSP for auto adjustment of ambient noise. The audio path connection must automatically and actively perform noise cancellation during a call.
3. The master station (gooseneck microphone and speaker) shall be capable of both hands-free duplex mode and simplex mode (using push-to-talk).
4. The intercom system shall integrate with the HMI system to indicate queues of incoming calls on touchscreen with ability to select specific incoming calls.
5. All cell intercoms will be provided with Audio Threshold Monitoring and alarm at the HMI in Central Control.

1.4 **COORDINATION**

A. Coordinate with the Owner for all programmable system functions and features using matrix forms to gather user's inputs. Make all necessary program changes at no additional cost prior to final acceptance.

1.5 **EXTRA MATERIALS**

A. Deliver the following spare parts to the Owner:

1. (1) Master Intercom Station
2. (3) Intercom Station

PART 2 - PRODUCTS

2.1 **MANUFACTURERS**

A. Provide equipment and components including, but not limited to, the following without substitution. The Contractor will be responsible for the design and operability of all system components of the final approved system. If any of the below components are no longer in production by the manufacturer, replace with an equivalent or better component. If any of the components cannot be found or are in question, provide and submit for approval a component of equal or better quality.

1. Paging Amplifier - Bogen C100
2. Paging Amplifier Rack mt Kit - Bogen RPK50
3. Paging Speaker - Quam 8C10PAOT/TBLUB
4. Outdoor Loud Paging Speaker (with Backbox/Baffle) - Quam VP-2
5. Paging Zone Expander - Harding PZE-110-1
6. Intercom Digital Controller - Harding DCC-S100-0000-E100-MDIP
7. Intercom Digital Expander - Harding DCE-S100-4040-E1
8. Terminal Boards – Equal by Harding
9. Communication Cables – Equal by Harding
10. MTA Connectors – Equal by Harding
11. Administrative Software – Harding DXL-SOF-ADM
12. Master Intercom Station - Harding TMM-640
13. Intercom Station - Harding ICE 300 (25v/4-wire)
14. AM/FM/CD Player – Equal by Clarion CZ-302
15. PoE Network Switch – Equal by Cisco

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with Section 28 05 00, General Requirements.

B. Comply with manufacturer's recommendations, procedures and standards for the installation and operation of the equipment.

C. All microphone and line level audio signals shall be shielded, balanced lines. Matching transformers and pads shall be provided as required to ensure balancing and proper levels. Normal line operating levels shall be 0 dBm.

3.2 ADJUSTMENTS

A. After installation of the Intercommunication and Public Address Systems, and prior to performance testing, functionally test all system devices and other audio components, and all interfaces to other systems, including control panels. In addition, perform the following adjustments and measurements.

B. Make all intercom speaker tap and amplifier gain adjustments prior performance testing as follows:

1. Intercom Speaker Tap Adjustments: Select intercom taps for 75 dBA at 4 feet on-axis with power input equal to tap setting (for example, at 1/2-watt input).

2. System Amplifier Gain Adjustments: Adjust intercom amplifier gain controls in both the monitor and talk direction to provide unity gain (to produce the same level in the control room as the person talking at the intercom station, and vice versa) with speaker volume controls at mid-range. Adjust amplifiers for either unity gain, or for feedback stability, if unity gain cannot be achieved.

C. Once all volume levels have been accepted by the County, permanently mark or identify all adjustment settings on the amplifiers and accessories.

3.3 FIELD QUALITY CONTROL

A. Performance Measurements: Use a one-third-octave spectrum analyzer and pink-noise generator, or other test equipment pre-approved by the County, to measure system performance. Make the following audio performance measurements for the longest and the shortest intercom runs, and for a minimum of three different intercom stations with the longest and shortest runs:

B. Signal-to-Noise Ratio: Minimum of 40 dB below standard signal levels from 32 Hz to 16 kHz on an “A” weighing scale.

C. Signal-to-Crosstalk Ratio: Minimum of 40 dB below standard signal levels when measured on any other intercom or audio line.

D. Signal-to-Transient Ratio: 30 dB or better, measured as the signal-to-noise during any transient caused by the operations of (a) any piece of equipment associated with that program path, or (b) any other electrical, lighting, ventilation equipment and etc.

E. Intercom Level Uniformity: Less than +/- 2 dB difference in dBA between any two intercom stations.

F. Testing: Comply with Section 28 05 00, General Requirements.

3.4 **TRAINING**

A. Provide training in accordance with Section 28 05 00.

END OF SECTION

SECTION 28 23 00

VIDEO SURVEILLANCE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including Conditions and Division 1 Specification Sections, apply to this Section.

1.2 RELATED WORK IN OTHER SECTIONS:

A. Section 27 11 19 - Communications Termination Blocks and Patch Panels

1. Provides the patch panels, if not existing to support the cameras installed under the work of this project.

B. Section 27 15 00 - Communications Horizontal Cabling

1. Horizontal structured cabling to support the cameras installed under the work of this project.

C. Section 28 05 00 - Common Work Results for Electronic Safety and Security

1. Submittals required of the work of this section.
2. Miscellaneous parts and execution standards for the work of this Section.

D. Section 28 05 28

1. Provides raceway and backboxes for the work of this Section.

1.3 SCOPE

A. Work of Division 28 includes provision of a Unified Security Platform (USP), including video surveillance systems as described in this Section. Work of Section 28 23 00 includes provision of the visual surveillance portion of the USP, including but not limited to:

1. Video Surveillance System.
   a. 180 and 360 degree view high definition Multiview indoor and outdoor, self-illuminated TCP/IP cameras.
   b. 90 degree detention grade cameras.
2. Network Video Recorder (NVR) based Video Management System (VMS) with:
   a. Camera licensing for the quantity of cameras shown on the plans plus 10% spare licensing capacity.
3. POE enabled Ethernet Switches.

1.4 SUBMITTALS

A. Refer to the requirements of Section 28 05 00 – Common Work Results for Electronic Safety and Security.

1.5 SYSTEM PERFORMANCE REQUIREMENTS

A. Video Surveillance Systems:

1. Technical Performance:
   a. TCP/IP: System demonstrates full conformance with alarming, video analytics functionality, including motion detection using ONVIF Software (Open Network Video Interface Forum) Protocol.
   b. IP Cameras: Meet Manufacturers performance specification.
2. Functional Performance:
   a. Monitor and Display
      1) Remote monitoring and reviewing of recorded images by persons using:
         a) City's Local and Wide Area Network.
         b) Local Area Network using City furnished network switching, and cabling provided under the work of this Project.
      2) Provide images suitable for making identification of persons under lighting conditions resulting from the work of this Project and the prevailing environmental conditions at the Project site.
   b. Record
      1) Record video streams using network video recorder provided under the work of this Project
   c. Retrieve
      1) Retrieve any video stream recorded within the minimum required storage window using search and locate tools and event indices as described elsewhere herein.
3. Uninterrupted Power System: For systems deriving camera power from power supplies installed under the work of this Project, sustain system operation for 2 hours following loss of power.

1.6 COORDINATE

1. Coordinate intended camera locations with the work of the Other Trades and the work of Section 28 05 28 – Pathways for Electronic Safety and Security to ensure field conditions do not result in obscuring the intended camera view(s).
2. Refer to Division 27 specifications to ensure that station cabling required for the work of this section.

1.7 DEFINITIONS

A. Refer additionally to Section 28 05 00 - Common Work Results for Electronic Safety and Security.

B. Abbreviations used in this Section

1. ACS – Access Control System
2. AES: Advanced Encryption Standard
3. AGC: Automatic gain control
4. ALPR – Automated License Plate Recognition
5. API: Application Programming Interface
6. Aspect ratio: A ratio of width to height in images
7. Bit Rate: The number of bits/time unit sent over a network
8. Bonjour: Enables automatic discovery of computers, devices, and services on IP networks.
9. CSA – Client Software Application
10. DGM – Dynamic Graphical Maps
11. DHCP: Dynamic Host Configuration Protocol
12. DNS: Domain Name System
13. DVS – Digital Video Server

14. EIS: Electronic Image Stabilization
15. FPS: Frames per Second
16. FTP: File Transfer Protocol
17. H.264 (Video Compression Format)
18. IEEE 802.1x: Authentication framework for network devices
19. IP: Internet Protocol
20. IR light: Infrared light
21. ISO: International Standards Organization
22. JPEG: Joint Photographic Experts Group (image format)
23. LAN: Local Area Network
24. LED: Light Emitting Diode
25. LPR: License Plate Recognition
26. Lux: A standard unit of illumination measurement
27. MBR: Maximum Bit Rate
28. MPEG: Moving Picture Experts Group
29. Multicast: Communication between a single sender and multiple receivers on a network
30. NTP: Network Time Protocol
31. NTSC: National Television System Committee – a color encoding system based on 60Hz
32. NVR - Network Video Recorder
33. ONVIF: Global standard for the interface of IP-based physical security products
34. PACS: Physical Access Control System
35. PAL: Phase Alternating Line – a color encoding system based on 50Hz
36. PTZ: Pan/Tilt/Zoom
37. PoE: Power over Ethernet (IEEE 802.3af/at) standard for providing power over network cable
38. PPF: Pixels per foot
39. Progressive scan: An image scanning technology which scans the entire picture
40. QoS: Quality of Service
41. RAID: Redundant Array of Independent Disks
42. SDK – Software Development Kit
43. SIP: Session Initiation Protocol
44. SMA – Software Maintenance Agreement
45. SMPTE: Society of Motion Picture and Television Engineers
46. SMTP: Simple Mail Transfer Protocol
47. SNMP: Simple Network Management Protocol
48. SSL: Secure Sockets Layer
49. SSM – Server Software Module
50. SaaS: Software as a Service
51. TCP: Transmission Control Protocol
52. TLS: Transport Layer Security
53. UI: User Interface
54. UPS: Uninterruptible Power Supply
55. UPnP: Universal Plug and Play
56. USP: Unified Security Platform
57. USW: Unified Web Client
58. Unicast: Communication between a single sender and single receiver on a network
59. VBR: Variable Bit Rate
60. VMS: Video Management System
61. WDR: Wide dynamic range

1.8 LABELING AND DOCUMENTATION

A. Label the finished installation. Label each cable at each end uniquely using a Brady or similar cable labeling system.

B. Document the camera locations on a floor plan using CAD. Assign each camera a unique ID identical with those applied at the NVR and use this identification on the floor plans. Indicate the head end rack location and the major wiring runs. Provide a single-line diagram of the installed system. Submit PDF copies of the as built drawing documentation. In addition submit electronic copies of the CAD files for the City's use. Submit electronic files on a media type determined by the City.

C. Prepare and provide a hard copy and an electronic copy of an O&M manual for for the completed installation. Hard copy to be provided in a three ring binder. The electronic copy to be submitted on a PDF on a media type determined by the City's Representative.

1.9 TRAINING

A. Train the City's Representatives in operation of the installed video management system. Provide a least two separate four (4) hour training tracks focused on the training needs of specific stakeholder groups within the City’s operation and technical staff and City’s Technical/Information Technology Support Staff.

1. Provide eight hours classroom and hands-on training in VMS system functionality, IP communications protocols used, device handshaking and overall signal flow and read/write operations used in recording and retrieval. Review directory tree integration mechanisms and requirements for tree maintenance. Review methods for bare metal recovery of operations. Review VMS manufacturer’s approved methods for software upgrades and hardware replacement, including failed disks in the storage array.
2. For each Training session, Document the training provided using a camera and video recorder and provide a copy of the recorded training to the City for future reference and use in training new staff.

1.10 QUALITY ASSURANCE

A. Test Equipment - provide for the purposes of quality assurance as described in Section 28 05 00 - Common Work Results for Electronic Safety and Security.

1. Network Packet Analyzer: (Fluke, Wireshark)
2. Waveform/Vector Monitor.
3. Portable High Resolution Color Picture Monitor (Marshall Electronics, ToteVision or equal).

PART 2 - PRODUCTS

2.1 VIDEO SURVEILLANCE HEADEND EQUIPMENT

A. General:

a. All equipment and materials used shall be standard components that are regularly manufactured and used in the manufacturer’s CCTV system.
b. All systems and components shall have been thoroughly tested and proven in production use for at least 60 days prior to the installation of this system.
c. All CCTV Headend systems and components shall be provided with the availability of a toll free, 24-hour technical assistance program from the manufacturer, which provides immediate technical assistance to the end user at no charge

B. Network Video Management Software (NVMS)

1. Drawing Reference: VMS, NVR
2. The design and performance requirements for the NVMS software are as follows:
3. The NVMS shall be available as a pre-loaded application in the following Avigilon hardware:
   a. ACC ES HD Recorder
   b. Avigilon HD Video Appliance
   c. Avigilon HD Network Video Recorder
   d. Avigilon HD Network Video Recorder Workstation
4. The NVMS shall be available as a standalone software application with the following system requirements:
   a. Windows 10 IoT or LTSB
   b. Windows Server 2016 and above
5. The NVMS software application can be installed on any open platform hardware, and does not require hardware multiplexer or time-division technology for video or audio.
6. The NVMS shall support increasing recording storage capacity without additional licenses.
7. The NVMS shall decompress H.264 video through the client graphics card / graphical processing unit.
8. The NVMS shall be an enterprise level software solution that shall be scalable from one client, server and camera up to:
   a. 100 servers per Site.
   b. 300 cameras per server
   c. Up to 10 000 cameras per Site
   d. Indefinite number of concurrent client to Site connections, limited only by the bandwidth capability of the network and server.
9. The NVMS server and client software applications can be installed and run on the same computer or on separate computers.
10. The NVMS shall include but not limited to the following applications:
    a. Server Software Applications
       1) Control Center Server
       2) Control Center Admin Tool
       3) Control Center Gateway
    b. Client Software Applications
       1) Control Center Client
       2) Control Center Web Client
       3) Control Center Player
       4) Control Center Camera Installation Tool
       5) Control Center Mobile
       6) Gateway Web Client (HTML5)
11. The NVMS shall secure video and audio data by securely transmitting all command and control data via TCP/IP using cryptographic keys based on SSL to prevent eavesdropping or tampering.
12. The NVMS shall support storage and processing of video and audio.
    a. Audio and video must be recorded natively from the camera with no transcoding.
    b. Audio and video must be synchronized regardless of frame-rate, resolution or bitrate.
13. The NVMS shall support industry standard video compression formats, including but not limited to:
    a. JPEG2000
    b. MJPEG
    c. MPEG-4
    d. H.264

e. H.265

14. The NVMS shall perform dynamic video stream management.
    a. Dynamic video stream management shall reduce the system bandwidth and storage usage by only transmitting video to the client as required.
    b. The client shall communicate the maximum monitor resolution to the server and the server shall act as a video proxy and stream the required video resolution.
    c. The NVMS shall tile multi-megapixel videos streams and only transmit the requested portion of the video stream to the client.
    d. Recorded video storage is extended by dynamically reducing the quality of the recorded video over time so that video is still viable but uses less storage.
        1) JPEG and JPEG2000 video image rate is reduced to one half or one quarter of the original image rate.
        2) H.264 & H.265 video records a high quality stream and a low quality stream. The high quality stream is discarded after a set amount of time.
    e. Shall be available for local users, remote users and mobile devices.
15. The NVMS shall find devices and systems on the network by the following methods:
    a. Automatic — servers, video and audio sources that are connected to the same network as the client are automatically discovered.
    b. Search — servers, video and audio sources running on a different network segment than the client can be discovered by searching for the device's IP address or hostname.
    c. Parent to child — logging into a parent site automatically discovers the configured children sites.
16. The NVMS shall allow manually discovered server instances, video and audio sources to be visible to all users of a single client workstation.
    a. Network settings for all server instances will be identical for all users of a single client workstation.
17. The NVMS shall support recording and management of video and audio sources through the use of industry standard drivers. These drivers shall include:
    a. ONVIF Profile S
    b. Publically Published API
18. The NVMS shall support monitoring video and audio sources from:
    a. Avigilon **H5/H6 cameras**
    b. Avigilon self-learning analytics cameras
    c. Avigilon IP H.264/JPEG2000 cameras and encoders
    d. Rialto video analytics appliances
    e. ACTi cameras/encoders
    f. Arecont cameras
    g. Axis cameras/encoders
    h. Bosch cameras/encoders
    i. IQInvision cameras
    j. Mobotix cameras
    k. ONVIF 1.00, 1.01, and 1.02 cameras
    l. Panasonic cameras/encoders
    m. Pelco cameras
    n. Samsung cameras/encoders
    o. Samsung Techwin cameras
    p. Sanyo cameras
    q. Scallop cameras
    r. Sightlogix cameras
    s. Sony cameras
    t. VideoIQ cameras/encoders
19. The NVMS shall support de-warping of live and recorded video.

a. From supported cameras fitted with an Immervision Panomorph lens.
b. From cameras with a fixed fisheye lens, including but not limited to:
   1) Oncam Grandeye Evolution line of cameras.

20. The NVMS shall provide the ability to configure and manage alarms and events.
    a. Individual alarms from a third party system (access control, etc.) can be pre-selected and configured to be monitored.
    b. Can define alarm and event triggers.
    c. Can configure resulting video operations.
    d. Detect if the video or audio signal is lost and alert the system administrator.
    e. Support receiving Simple Network Management Protocol (SNMP) messages from servers and alert users.
    f. Alarm and event notifications can be customized and forwarded to:
       1) Users logged into the client application
       2) Users logged into the mobile application
       3) Configured email addresses
       4) External entities and third party software, such as central monitoring stations and call centers
    g. Can escalate alarms from one user or group to another if the alarm is unacknowledged for a preset duration.
    h. Email notifications can be configured to:
       1) Notify users and system administrators when an event or system health error occurs.
       2) Schedule when email notifications are sent.
       3) Include camera images in email notifications.
    i. Support receiving digital input triggers and triggering digital outputs from:
       1) An input/output board
       2) Supported IP camera or encoder
       3) Integrated system
21. The NVMS shall provide the ability to send central monitoring stations heartbeat messages, or regular notification to confirm the system connection and that there are no events of note.
22. The NVMS shall maintain an event log and allow users to use the log events as triggers for specific event actions.
23. Video Management Data Storage Server
    a. EIA 19" Rack Mount chassis, including all necessary mounting rails and hardware to mount in DIN (square hole) 4 post racks as provided under the work of Section 27 11 16 – Communications Cabinets, Racks, Frames and Enclosures.
    b. Each server not less than 2RU high.
    c. Quantity of servers: As required and recommended by the VMS manufacturer for the quantity equal to 1.1 times the number of cameras provided under the work of this Project.
    d. Features/Functions/Performance - iSCSI Raid Arrays
       1) Total Capacity: As required to capture full-motion video of specified cameras stored without overwriting for at least 365 days continuous operation**. If Data Aging will be employed, use at least 90 days of full resolution of the camera**. Assuming:
          a) 1.1 times the camera count initially provided with the Project. Contractor to calculate the required storage based on the requirements herein below then multiply the result times 1.1 to identify the minimum storage requirement.
          b) Recording resolution to match resolution of supplied cameras.
          c) 10 frame per second motion recording minimum

2) Minimum RAID Architecture:
a) As required by the VMS Manufacturer, but in no case less than RAID 5.
3) Minimum Construction and Performance
a) As required by the VMS Manufacturer.
e. Rack mountable, EIA 19", including all necessary mounting rails and hardware to mount in square hole) 4 post racks with DIN (square) openings
24. Manufacturer, NVMS/NVR:
a. Latest version of Avigilon Unity 8
1) Two (2) Network Video Recorders (Primary & Secondary) to meet the storage requirements, e.g. NVR6-PRM-PLUS-FORM-H-440TB-S22
2) Two (2) Workstations with two (2) 32” touch screen monitors RM7-WKS-2MN

C. Rack Mount Monitor, Keyboard and 19” Display Console

1. Drawing Reference: CONSOLE KVMS
2. Minimum Features, Functions, Performance, Construction
a. Combines an 8-port KVM switch, 19” LCD screen, full keyboard and touchpad in a 1U rack-mountable drawer assembly.
b. Mounts into 19”-wide rack, 26”-38” deep.
c. Control up to 8 servers from a single, easily accessible console.
d. Includes eight cables that support computers with either PS/2 or USB connections
e. Flip-up/fold-down screen keeps the console from blocking access to rack equipment when not in use:
f. 19” monitor supports video resolutions up to 1280 x 1024
g. DDC emulation allows optimal output to the LCD
h. Multi-Level Password Security
i. Enhances security by limiting access to an administrator and up to 4 local users
j. Two-level log-out allows for manual log-out or automatic log-out after a user-defined period of time has passed.
3. Manufacturers:
a. Tripp Lite NetDirector 8-Port Console KVM Switch B020-U08-19-IP
b. APC
c. Or equal.

2.2 CAMERAS AND RELATED

A. IP Surveillance Indoor Dome Camera, Fixed, Corner Camera:

1. Drawing References:
a. Interior Cameras, Circle with 1 in center and one arrowhead, subscript D
2. Minimum Features, Functions, Performance, Construction
a. Housing: Provide stainless steel enclosure with environmental rating sufficient to withstand high pressure washing.
b. Performance:
1) Image Sensor: 1/2.8 inch progressive scan CMOS.
2) Maximum Resolution:
a) Aspect Ratio: 16:9: 2560 x 1440.
b) Aspect Ratio: 4:3: 2592 x 1944.
c. Imaging Rate:
1) WDR Off: (50 Hz/60 Hz): 25 fps/30 fps.
2) WDR On: (50 Hz/60 Hz): 20 fps/20 fps.
d. Dynamic Range:
1) WDR Off: 83 dB.

2) WDR On: 126 dB.

e. Minimum Illumination:
1) Color: 0.027 lux.
2) Monochrome: 0.014 lux.
3) IR: 0.0 lux.

f. Field of View:
1) Horizontal angle: 16:9: 133 degrees.
2) Horizontal angle: 4:3: 135 degrees.
3) Vertical angle: 16:9: 74 degrees.
4) Vertical angle: 4:3: 95 degrees.

3. Manufacturer:
a. Avigilon 5.0C-H5A-CR2-IR-SS

B. IP Surveillance Interior/Exterior Dome Camera, Three Camera Sensors minimum, Fixed, 180° Combined Horizontal Angle:

1. Drawing References:
a. Interior Cameras, Circle with 3 in center and three arrowheads, subscript CI
b. Exterior Cameras, Circle with 3 in center and three arrowheads, subscript CE

2. Minimum Features, Functions, Performance, Construction
1) Image Sensor 1/2.5” progressive scan CMOS
2) Aspect Ratio 16:9
3) Active Pixels 3840 x 2160
4) 3x Image Sensor Max Resolution (per image sensor) 11520 x 2160
5) Minimum Illumination
a) 0.02 lux (F1.8)in colo rmode
b) 0.04lux(F1.8)in mon omode
c) 0 lux with optional IR illuminator
6) Image Rate-High Frame rate Mode:
a) 3x Image Sensor (60Hz, 50Hz) 15/14fps
7) Dynamic Range 100dB,true WDR,dual exposure

b. Image Compression Method
1) H.264 HDSM Smart Codec
2) H.265 HDSM Smart Codec
3) Motion JPEG

c. Streaming
1) Multi-streamH.264
2) Multi-streamH.265
3) Motion JPEG

d. Motion Detection Selectable sensitivity and threshold
e. Electronic Shutter Control
1) Automatic
2) Manual (1/8 to 1/8000sec)

f. Iris Control Fixed
g. Day/Night Control
1) Automatic
2) Manual

h. Lens (Per Image Sensor)
1) 4mmF1.8-101°
2) 5.2mmF1.8-70°

3) Remote Focus

i. Image Control
1) Image Compression Method H.264 (MPEG-4 Part 10/AVC), Motion JPEG
2) Streaming Multi-stream H.264 and Motion JPEG
3) Motion Detection Selectable sensitivity and threshold
4) Electronic Shutter Control Automatic, Manual (1/6 to 1/8000 sec)
5) Iris Control Automatic, Manual
6) Day/Night Control Automatic, Manual
7) Flicker Control 50 Hz, 60 Hz
8) White Balance Automatic, Manual
9) Backlight Compensation Adjustable
10) Privacy Zones Up to 64 zones
11) Audio Compression Method G.711 PCM 8 kHz
12) Audio Input/Output Line level input and output
13) External I/O Terminals Alarm In, Alarm Out

j. Network
1) Network 100BASE-TX
2) Cabling Type CAT5
3) Connector RJ-45
4) API ONVIF compliance version 1.02, 2.00, Profile S (www.onvif.org)
5) Security Password protection, HTTPS encryption, digest authentication, WS authentication, user access log, 802.1x port based authentication
6) Protocol IPv4, HTTP, HTTPS, SOAP, DNS, NTP, RTSP, RTCP, RTP, TCP,UDP, IGMP, ICMP, DHCP, Zeroconf, ARP,
7) Streaming Protocols RTP/UDP, RTP/UDP multicast, RTP/RTSP/TCP, RTP/RTSP/HTTP/TCP, RTP/RTSP/HTTPS/TCP, HTTP

k. Mounting hardware: Contractor to select to suit application, with manufacturer accessory mounting plates, pipe mounts, pendant adapters, parapet mounts, corner mounts and backboxes as necessary to mount to rough-in conditions.

3. Manufacturers:
a. Avigilon
1) 3 Imager:
a) 24C-H5A-3MH [3 x 4K (8MP)]
b) Clear cover
c) Select In-ceiling mount, surface mount or pendant mount to suit mounting conditions.

C. IP Surveillance Interior/Exterior Dome Camera, Four Camera Sensors, Fixed, 360° Combined Horizontal Angle:

1. Drawing References:
a. Interior Cameras, Circle with 4 in center and four arrowheads, subscript CI
b. Exterior Cameras, Circle with 4 in center and four arrowheads, subscript CE
2. Minimum Features, Functions, Performance, Construction
1) Image Sensor 1/2.5” progressive scan CMOS
2) Aspect Ratio 16:9
3) Active Pixels 3840 x 2160
4) 4x Image Sensor Max Resolution (per image sensor) 15360 x 2160
5) Minimum Illumination

a) 0.02 lux (F1.8)in colo rmode
b) 0.04lux(F1.8)in mon omode
c) 0 lux with optional IR illuminator

6) Image Rate-High Frame rate Mode:
a) 4x Image Sensor (60Hz, 50Hz) 10/10fps

7) Dynamic Range 100dB,true WDR,dual exposure

b. Image Compression Method
1) H.264 HDSM Smart Codec
2) H.265 HDSM Smart Codec
3) Motion JPEG

c. Streaming
1) Multi-streamH.264
2) Multi-streamH.265
3) Motion JPEG

d. Motion Detection Selectable sensitivity and threshold

e. Electronic Shutter Control
1) Automatic
2) Manual (1/8 to 1/8000sec)

f. Iris Control Fixed

g. Day/Night Control
1) Automatic
2) Manual

h. Lens (Per Image Sensor)
1) 4mmF1.8-101°
2) 5.2mmF1.8-70°
3) RemoteFocus

i. Image Control
1) Image Compression Method H.264 (MPEG-4 Part 10/AVC), Motion JPEG
2) Streaming Multi-stream H.264 and Motion JPEG
3) Motion Detection Selectable sensitivity and threshold
4) Electronic Shutter Control Automatic, Manual (1/6 to 1/8000 sec)
5) Iris Control Automatic, Manual
6) Day/Night Control Automatic, Manual
7) Flicker Control 50 Hz, 60 Hz
8) White Balance Automatic, Manual
9) Backlight Compensation Adjustable
10) Privacy Zones Up to 64 zones
11) Audio Compression Method G.711 PCM 8 kHz
12) Audio Input/Output Line level input and output
13) External I/O Terminals Alarm In, Alarm Out

j. Network
1) Network 100BASE-TX
2) Cabling Type CAT5
3) Connector RJ-45
4) API ONVIF compliance version 1.02, 2.00, Profile S (www.onvif.org)
5) Security Password protection, HTTPS encryption, digest authentication, WS authentication, user access log, 802.1x port based authentication

6) Protocol IPv4, HTTP, HTTPS, SOAP, DNS, NTP, RTSP, RTCP, RTP, TCP,UDP, IGMP, ICMP, DHCP, Zeroconf, ARP,
7) Streaming Protocols RTP/UDP, RTP/UDP multicast, RTP/RTSP/TCP, RTP/RTSP/HTTP/TCP, RTP/RTSP/HTTPS/TCP, HTTP

k. Mounting hardware: Contractor to select to suit application, with manufacturer accessory mounting plates, pipe mounts, pendant adapters, parapet mounts, corner mounts and backboxes as necessary to mount to rough-in conditions.

3. Manufacturers:
   a. Avigilon
      1) 4 Imager:
         a) 32C-H5A-4MH [4 x 4K (8MP)]
         b) Clear cover
         c) Select In-ceiling mount, surface mount or pendant mount to suit mounting conditions.

2.3 POWER SUPPLIES

A. Computer Grade Uninterruptible Power System, UL Listed

1. Drawing Reference: 5 KVA UPS + (2) BATTERY PACKS
2. Features/Functions/Performance:
   a. Provide continuous, no-break power with sine wave output.
   b. Size to carry connected load.
   c. Provide Transient Over-Voltage (TOV) Surge Suppression; comply with ANSI/IEEE C62.41-1980, Category A and Category B.
   d. Provide complete isolation from Line.
   e. Provide output voltage regulation to ANSI C84.1 for computing equipment.
   f. SNMP manageable and status reporting to City's Management console. Provide Ethernet network interface on UPS.
   g. Provide output KVA, switch-mode power supply rated, not less than 150% of connected load indicated.
   h. Rack Mounted - at full height racks, provide rack mounted equipment.
3. Acceptable:
   a. APC Smart-UPS SRT 5000VA RM 208V, model number: SRT5KRMXLTUS with two (2) APC Smart-UPS SRT 192V, 3RU Battery Pack, model number: SRT192RMBP

2.4 VIDEO TERMINAL EQUIPMENT

A. LCD TV, 65 in. Diagonal

1. Drawing Reference: None
   a. Commercial grade 24/7 duty cycle
   b. Network (RJ45) Port
   c. RS232/IP/Serial means of control
   d. 330 Nit
   e. 1300:1 Contrast Ratio
   f. 3840x2160 Max. Resolution
   g. HDMI In x 3
   h. Support for SmartThings Apps
2. Features/Functions:
3. Manufacturer:
   a. Samsung TU690T UHD Smart TV.

b. Or equal

B. Flat-Panel Display Wall Mount

1. Drawing Reference: None
2. Functions:
   a. Can support the required LCD and Plasma Panels supplied by the work of this Project.
   b. Holds rear of panel away from wall ~2 in. to permit A/V interface mounting behind display.
   c. Permits display to be tilted in the vertical plane for optimum viewing as directed by the City's Representative.
   d. Allows the complete mount and display assembly to not protrude more than 4 in. out from wall surface.
   e. Designed to mount to 16 in., 20 in., 24 in. center stud systems
   f. Panel can be securely fastened to mount using to prevent theft by adding a City furnished padlock.
   g. Where mounting fasteners are exposed during normal operations, secure mount with tamper-resistant fasteners.
   h. Designed to accommodate panels from at least Pioneer, Panasonic, Sharp, Samsung, & LG Electronics
   i. Heavy duty construction with steel components
   j. UL or ETL listed
   k. California OSHPD OPA (seismic restraint pre-approval). Installation to be accordance with OPA.
3. Manufacturers:
   a. Chief PDRUB Large Flat Panel Swing Arm Wall Mount, 37" Extension
   b. Or approved equal.

2.5 POE NETWORK SWITCH

1. Port Count:
   a. 24 or 48
2. Construction:
   a. 1 Rack Unit
   b. Provide accessories as required to rack mount.
3. Manufacturers:
   a. Cisco Catalyst 9300 Series
   b. Hewlett Packard
   c. Or equal

4 Addendum 4

2.6 WORKSTATION FURNITURE

A. **Components**

1. **Frame: Steel**
2. **Base: Open stationary**
3. **Work Surface**
   a. **Type: Single**
   b. **Construction: 1-1/4 inch Solid Surface with bullnose edge.**
   c. **Faces: Laminate**
   d. **Edge type: Comfort Edge, 1-1/8 inch molded urethane shaped edge**
   e. **Laminate face color: Black**
   f. **Solid surface color. Black**
4. **Manufacturers:**

a. **Winsted Vue-L 99” Stationary Open Base**
b. **Or equal**

PART 3 - EXECUTION

3.1 PROGRAMMING AND INSTALLATION

A. Initial Systems Programming

1. Meet with City’s Representative to establish functional requirements for surveillance systems, including but not limited to the following:
   a. Camera Views
      1) Define in conjunction with the City’s representatives the minimum field of view to be provided at each fixed cameras. Contractor to review the target for each camera at the Initial Systems Programming Meeting with the City’s Representative and adjust the target view areas, and where required, the mounting location to provide the view currently required by the City’s Representative. Where the mounting location requires adjustment, Contractor to coordinate related changes required with City’s Representative.
2. Document and submit in accordance with the requirements of Section 28 05 00.
3. Provide initial systems programming in accordance with the preceding.

B. Installation

1. General
   a. Conform to the manufacturer’s recommendations and instructions regarding:
      1) camera mounting and adjustment.
      2) power and video cable sizing for length of indicated run.
2. Camera Installation
   a. Locate the cameras in accordance with the plans and as required to provide the target images noted on the plans, except where modified through the pre-construction meeting described above.
   b. Do not place cameras where they will be subject to ready access or tampering from persons in public access areas of the sites.
      1) Bring to the City’s Representative attention through an RFI any proposed location that does not require a ladder or similar means of access from the public space.
      2) Obtain City’s Representative's resolution of the RFI prior to proceeding with the installation.
   c. Secure cameras to structure so that they cannot be readily removed, including with use tools or by force.
      1) Cameras are to be mounted to flush mounted backboxes at fed through rear of camera body, except where surface mounting is explicitly called for.
      2) Where surface mounting is indicated, use knock-outs on side of camera housing to connect to conduit. Install backbox containing required structured cabling biscuit box at remote location hidden from view and secure cover with tamperproof fasteners.
      3) Select fastening means appropriate to the mounting surface and its underlying framing system and fasten securely to the structure and not to lightweight surface materials. Removal of cameras following successful fastening shall require use of tamper fastener tooling or application of destructive force. City’s Representative

reserves the right to request remounting of any camera not found to meet this standard at no additional cost.

d. Where mounting to pipe mount indicated/or required by field conditions, select materials to maintain stability of camera image under environmental conditions associated with installation location, including wind load and potential for impact.
e. At exterior cameras, seal openings as directed by the manufacturer's instructions.
f. Apply manufacturer's recommended anti-graffiti coating to camera housings and domes.
g. Provide cameras with lensing as required to cover area of coverage indicated on the plans.
h. Adjust auto-iris systems at night to gain maximum depth of field under low light conditions.
i. Using a precision display portable video monitor and/or laptop, adjust each camera's angle and field of view as directed by the City's Representative.

3.2 SYSTEM STARTUP

A. The Contractor shall not apply power to the CCTV system until the following items have been completed:

1. CCTV system equipment items and NVR interface have been set up in accordance with manufacturer's instructions.
2. A visual inspection of the CCTV system has been conducted to ensure that defective equipment items have not been installed and that there are no loose connections.
3. System wiring has been tested and verified as correctly connected as indicated.
4. All system grounding and transient protection systems have been verified as properly installed and connected as indicated.
5. Power supplies to be connected to the CCTV system have been verified as the correct voltage, phasing, and frequency as indicated.

B. Satisfaction of the above requirements shall not relieve the Contractor of responsibility for incorrect installation, defective equipment items, or collateral damage as a result of Contractor work/equipment.

3.3 SYSTEMS PERFORMANCE TESTING AND ADJUSTING PROCEDURES

A. The Contractor shall provide all personnel, equipment, instrumentation, and supplies necessary to perform all site testing. The City's Representative will witness all performance verification and endurance testing. Written permission shall be obtained from the City's Representative before proceeding with the next phase of testing. Original copies of all data produced during performance verification and endurance testing shall be turned over to the City's Representative at the conclusion of each phase of testing prior to City's Representative approval of the test.

B. Contractor's Field Testing.

1. The Contractor shall calibrate and test all equipment, verify system operation, place the integrated system in service, and test the integrated system. Ground rods installed by the Contractor shall be tested as specified in IEEE Std 142. The Contractor shall deliver a report describing results of functional tests, diagnostics, and calibrations including written certification to the City's Representative that the installed complete system has been calibrated, tested, and is ready to begin performance verification testing. The report shall also include a copy of the approved performance verification test procedure. In addition, the Contractor shall make a master video tape recording to DVD showing typical day and

night views of each camera in the system and shall deliver the DVD with the report. Note any objects in the field of view that might produce highlights that could cause camera blinding. Note any objects in the field of view or anomalies in the terrain which may cause blind spots. Note if a camera cannot be aimed to cover the zone and exclude the rising or setting sun from the picture. Note night assessment capabilities and whether lights or vehicle headlights cause blooming or picture degradation. If any of the above conditions or other conditions exist that cause picture degradation or interfere with the camera field of view, the Contractor shall inform the City's Representative. The DVD shall be recorded using the video recorder installed as part of the CCTV system. If a recorder is not part of the CCTV system, the DVD prepared using the Video Management System installed under the work of this Section. The Contractor shall provide the City's Representative with the original tape as part of the documentation of the system and shall submit a letter certifying that the CCTV system is ready for performance verification testing. The field testing shall as a minimum include:

a. Verification that the video transmission system and any signal or control cabling have been installed, tested, and approved as specified.
b. When the system includes remote control/monitoring stations or remote switch panels, verification that the remote devices are functional, communicate with the security center, and perform all functions as specified.
c. Verification that all cameras are aimed and focused properly. The Contractor shall conduct a walk test of the area covered by each camera to verify the field of view.
d. Verification that cameras facing the direction of rising or setting sun are aimed sufficiently below the horizon so that the camera does not view the sun directly.
e. When dome camera mounts are used in the system, verify that all preset positions are correct and that the dome also operates correctly in a manual control mode.

2. The Contractor shall deliver a report describing results of functional tests, diagnostics, and calibrations including written certification to the City's Representative that the installed complete system has been calibrated, tested, and is ready to begin performance verification testing. The report shall also include a copy of the approved performance verification test procedure.

C. Performance Verification Test

1. The Contractor shall demonstrate that the completed CCTV system complies with the contract requirements. Using approved test procedures, all physical and functional requirements of the project shall be demonstrated and shown. The performance verification test, as specified, shall not be started until receipt by the Contractor of written permission from the City's Representative, based on the Contractor's written report. This shall include certification of successful completion of Contractor Field Testing as specified in paragraph "Contractor's Field Testing," and upon successful completion of training as specified. If the CCTV system is being installed in conjunction with an ESS, the CCTV performance verification test shall be run simultaneously with the ESS performance verification test. The City's Representative may terminate testing at any time when the system fails to perform as specified. Upon successful completion of the performance verification test, the Contractor shall deliver test reports and other documentation as specified to the City's Representative prior to commencing the endurance test.
2. Testing
   a. Picture Monitors:
      1) Using indicated video test source, verify linearity and adjust as required.
   b. Camera Operation: Demonstrate that each camera:
      1) Produces images in conformance with specifications and as defined in the initial systems programming requirements.
      2) Includes date/time/camera number identification.

c. Uninterrupted Power Systems: Disconnect normal power service. Demonstrate that the system remains in full operation for the specified time.

3.4 LABELING

A. Conform with the requirements of Section 27 05 53 – Identification for Communications Systems and for field devices, use the device label assigned per the requirements of Section 28 05 00 - Common Work Results for Electronic Safety and Security.

3.5 VIDEO INTERCOM SYSTEM

A. Installation

1. Install hands-free color video intercom system in accordance with manufacturer's instructions at locations indicated on the Drawings.
2. Mount equipment plumb, level, square, and secure.

B. Adjusting

1. Adjust hands-free color video intercom system for proper operation in accordance with manufacturer's instructions.

C. Demonstration And Training

1. Demonstration:
   a. Demonstrate that hands-free color video intercom system functions properly.
   b. Perform demonstration at final system inspection by qualified representative of manufacturer.
2. Instruction and Training:
   a. Provide instruction and training of City 's personnel as required for operation of hands-free color video intercom system.
   b. Provide hands-on demonstration of operation of system components and complete system, including user-level program changes and functions.
   c. Provide instruction and training by qualified representative of manufacturer.

3.6 WARRANTY

A. The product shall perform in all material respects in accordance with the accompanying user manual, and the media on which the Software Product resides will be free from defects in materials and workmanship under normal use.

3.7 OPTIONAL PREVENTATIVE MAINTENANCE SERVICE CONTRACT

A. The Contractor shall provide optional pricing for a planned preventative maintenance service contract covering 3 (three) years from end of system warranty (years two through four).

B. The Contractor's proposal shall clearly define all Security Contractor and manufacturer costs expected over the life of the Preventative Maintenance Service Contract

C. The City reserves the first to exercise the option for the Preventative Maintenance Service Contract at any time up to the end of the initial systems warranty (end of year one operations).

END OF SECTION

SECTION 28 46 13

INTEGRATED SEQUENCES OF OPERATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Software Development.
2. Control Electronic System Software
3. Sequences of Operation

B. Related Work Under Other Sections

1. Section 28 05 00 – Common Work Results for Electronic Safety and Security.
2. Section 28 05 28 – Pathways for Electronic Safety and Security
3. Section 28 15 00 - Intercom System
4. Section 28 23 00 - Video Surveillance
5. Section 28 46 19 - PLC Integrated Control

1.3 DEFINITIONS

A. Control System Software: A software application program that performs logic and control functions based on programmable criteria.

B. Programming Workstation: Graphic icon display that allows the operator to monitor system activity and alarm conditions on a real-time basis, and presents the operator with a selection of functions. Typically this portion of the screen/graphics is displayed in all operating modes allowing alarms to be monitored while using other system features.

C. Icon: Pictorial graphic display of a symbol or devices such as doors, locks, buttons

D. Operator Interface (OI): Used to generally define computer monitor, mouse, audio, button, or any other devices used for Human-Machine Interfacing.

1.4 SYSTEM DESCRIPTION

A. Provide software development and programming for workstations, control panels, and each system as defined in each respective Section and described in this Section. Sample sequences of operations have been established to provide a base understanding of the project requirements.

B. Provide separate screens that are graphical based (using customized building/site maps) to indicate respective controlled areas for each control station. Sample screen layouts are provided in the Drawings to indicate the level of complexity and minimum functions.

1.5 SUBMITTALS

A. Comply with Section 28 05 00.

B. Theory of Operation: Develop and submit functional narratives supported by full-size, color state diagrams for the various combinations of icons and buttons in each operational state. Submit 14 calendar days prior to Review Meeting.

C. Review Workshop: Attend a review workshop to receive Owner comments on the theory of operation and preliminary development submittal.

D. Full Development: Incorporate all Owner review comments and resubmit the theory of operation submittal along with full-size, graphic layouts panel. Submit 14 calendar days prior to Owner Workshop and Demonstration.

E. Control Electronics Software: Develop and submit control electronics software (logic) for each typical function. Submit 14 calendar days prior to Owner Workshop and Demonstration.

F. Owner Workshop and Demonstration: Attend submittal review meeting along with a complete HMI training/demonstration. After demonstrating the HMI touchscreen and functions and recording all Owner comments, incorporate as many Owner review comments as possible before re-demonstrating the following day.

G. Record Documents

1. Compile a list giving each PLC program name, its installed version number, the number of copies installed, the serial number of each copy, the publisher’s name and address, and the publisher’s customer support telephone number.

2. Prepare and submit complete documentation of the final installed runtime versions of the operator interface software, including a diagram of its component modules, subroutines, ladder logic, databases, libraries, drivers, and other parts. Narrative descriptions shall accompany the diagram, giving basic descriptions of each component and describing the interaction between components. Provide complete, annotated program listings of all custom scripts, macros, and subroutines.

3. Provide the Owner with all original installation DVDs or CD-ROMs and all software manuals for every software program installed on the system. Provide one complete copy of the full development environment for the operator interface software installed on the programming laptop (refer to Section 28 23 00).

1.6 **WARRANTY**

A. Comply with Section 28 05 00.

B. Warrant all software development and programming to be free of defects for a period of one-year from the date of final acceptance. For warranty purposes, consider a defect to be any programming error or errant software behavior not explicitly agreed upon by the Owner, either intermittent or continuous, and all unincorporated Owner comments.

C. Respond to reported defects with on-site personnel within the response times specified in Section 28 05 00.

PART 2 - PRODUCTS

2.1 **SOURCE QUALITY CONTROL**

A. Factory Test:

1. Comply with the requirements of Section 28 05 00.

2. Functional Testing: Thoroughly test every function under all operating sequences and operating modes. Activate system outputs in response operations and test reactions to test inputs.

PART 3 - EXECUTION

3.1 **CUSTOMIZABILITY OF THE TOUCHSCREEN CONTROL SYSTEM**

A. The sequence of operations presented in this Specification shall be open to customization by the City. Shapes of icons, size, arrangement, color, and even functionality shall be changeable as required by the City at no additional cost. Contractor shall submit a proposed design, including sample colored screen layouts, of how he/she intends on installing the Touchscreen controls interface. The included sequence of operations herein shall serve only as a basis of design, and does not exclude further development and customization required by the City.

END OF SECTION

SECTION 28 46 19

PLC INTEGRATED CONTROL SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Programmable Logic Controllers (PLC)
2. Power Supplies

B. Related Work Under Other Sections

1. Section 28 05 00 – Common Work Results for Electronic Safety and Security.
2. Section 28 05 28 – Pathways for Electronic Safety and Security
3. Section 28 15 00 - Intercom System
4. Section 28 23 00 - Video Surveillance

1.3 SYSTEM DESCRIPTION

A. The control electronics shall provide control and monitoring functions for systems and interfaces as described on the Drawings and in these Specifications.

B. The controllers shall provide all necessary logic functions, timing functions, memory, software, input/output points and communication capabilities for the operating features required to meet all of the requirements of the Specifications and Drawings.

C. The controller shall be general purpose in nature and not custom designed and built for this isolated application. The controller shall be generally non-location specific in its construction. The controller shall be made location specific and operationally customized by installing EPROM with applicable software, and making the I/O interface boards system specific and installing the proper I/O modules.

D. Logic functions shall include, but not be limited to, AND, OR and INVERT functions with sufficient levels to provide operating features required to perform all of the functions required by the Specifications and Drawings.

E. Timing functions shall include, but not be limited to, on-delay, off-delay, stepping and pulsing. Sufficient variations of programmable timing shall be available to provide all the operating features as required by the Specifications and Drawings.

F. Provide a daisy chain configuration network of PLCs to communicate all signals, between indicated PLC's in areas as shown on drawings.

G. Provide a hot backup of all PLC CPUs for automatic switching upon primary CPU failure.

H. The existing Jail has a Server Based PLC/HMI platform. Provide Schneider Electric Modicon M340 PLC platform with Ignition Server Based PLC/HMI. Provide with redundant servers (primary and failover).

1.4 **EXTRA MATERIALS**

A. Deliver the following spare parts at a location to be designated:

1. (1) PLC CPUs
2. (1) input module per Chassis – minimum 64 point module installed in Chassis.
3. (1) output module per Chassis – minimum 64 point module installed in Chassis.
4. (1) network modules
5. (1) PLC power supplies

PART 2 - PRODUCTS

2.1 **MANUFACTURERS**

A. The control electronics shall be the product of a manufacturer engaged in the production of controllers for industrial applications for a minimum of ten (10) years. Only manufacturers with national distribution will be considered.

B. Subject to compliance with requirements, provide video surveillance system equipment and components including, but not limited to, the following, without substitution. Provide the equipment shown below. The Contractor will be responsible for the design and operability of all system components of the final approved system. If any of the below components are no longer in production by the manufacturer, replace with an equivalent or better component. If any of the components cannot be found or are in question, provide and submit for approval a component of equal or better quality.

1. PLC CPU and Controller - Schneider Modicon M580 Series
2. PLC Input Module - Schneider Modicon X80 Series
3. PLC Output Module - Schneider Modicon X80
4. PLC Network Module - Schneider Modicon
5. HMI Control Station - Elo 2770L and Dell Optiplex 7080/ Dell Precision 3460
6. Server - Dell R330
7. HMI Software - Ignition
8. Monitor Mounts – Equal by Workrite Sequoia, Xybix

2.2 PLC GENERAL DESCRIPTION

A. General Description:

1. Environmental ratings for all components of the PLC system, except programming equipment, shall meet or exceed the following requirements:
    a. Ambient Temperature rating of 0 to 60 C (32 to 140 F) operational and -20 to 70 C (-4 to 158 F) storage.
    b. Humidity rating of 10% to 90% Relative Humidity (non-condensing).
    c. c. All system modules shall be designed so as to provide for free airflow convection cooling. No internal fans or other means of cooling except heat sinks shall be required.
2. The PLC shall meet the following standards: UL Listed, CSA Certified, and CE.
3. The PLC and I/O modules shall be of modular and rack mounted construction.
4. The system power supplies shall be protected against short circuits.
5. Programmable controller manufacturer must guarantee the availability of replacement/spare parts for a minimum of ten (10) years.
6. All I/O modules and housings must be of a standard type and fully interchangeable with previous PLC series.
7. All controllers and I/O structures of a single manufacturer shall be capable of being mounted on the same size fixing centers to allow for larger capacity controllers to be installed in the future should the facility require an expansion beyond the limits specified in the original contract documents.
8. Controllers must be capable of driving local I/O racks, where local is defined as up to one hundred (100) feet from the control unit, without the need for further intelligent interface modules.
9. When required, the system must be capable of controlling remote I/O up to a distance of 500 meters (1,640 feet) from the controller, using high-speed links with a minimum data rate of one hundred and eighty seven (187) Kbaud. Communications over this link shall be accomplished using twisted-pair wires with an overall shield.

2.3 PLC CENTRAL PROCESSING UNIT

A. The central processing unit (CPU) shall be microprocessor based, encased in a shielded enclosure to provide RFI protection, and shall provide the logic control functions and date transfer based upon the program stored in memory and the status of the inputs and outputs. The controller must be able to support up to 5,120 local I/O.

B. The minimum standard control functions of the CPU shall include:

1. Relay Ladder Logic
2. Latching relays
3. Timer clock pulses (.02s, 0.1s, 0.2s, 1s & 1m) and timers (.01 & 0.1 sec. Increments).

4. Counters (up/down)
5. Data comparison (=, <, >), data range comparison, and data table comparison.
6. Data transfers (single register, blocks of registers, data distribution and collection using pointer).
7. Synchronous shift registers forward and reverse (multiple channel length bit shifts).
8. One-shot output and input controls.
9. Master control relays (interlocks).
10. Bit reads and moves.
11. I/O forcing and setting
12. BCD to Binary or Hexadecimal conversion.
13. Binary or Hexadecimal to BCD conversion.
14. I/O Refresh on command, immediate I/O inputs, and scheduled interrupt on command.
15. On-line program editing.

C. The following minimum modes of operation of the CPU must be selectable via a key operated switch or programming software commands:

1. PROGRAM – Processor is not scanning program in memory and all outputs are held OFF.
2. MONITOR – Processor is executing program and changes in user memory and data memory are allowed.
3. RUN – Processor is executing program in memory and outputs are controlling to the program. No editing of program or data registers is allowed.

D. The above settings shall require either a key, a programming console with a key, or programming software loaded on a computer to change the operating mode of the CPU.

E. The processor shall incorporate extensive self-diagnostic, which will not half the processor. In addition, separate visual indicators will annunciate at the following conditions:

1. POWER – Logic power is applied to the CPU and I/O rack from the power supply.
2. RUN – Processor is executing the program in memory outputs are being controlled according to the program.
3. OUTPUT INHIBIT – Processor is executing program in memory according to input status, but, outputs are being held in the OFF-state.
4. ALARM – A non-fatal error (such as a low memory battery condition) has occurred in the PLC hardware or program software. The PLC is still running and the outputs are being controlled according to the program.

5. ERROR – A fatal error (such as a memory parity error) has occurred, the CPU is not scanning the program, and the outputs are held in the OFF-state.

6. COMM – Indicating the CPU is communicating with the device connected to the peripheral port or RS-232C port.

F. In addition to visual self-diagnostic indicators (LED's) the processor shall have a specifically designated block of a least 100 words of internal diagnostic words and bits. These shall provide more detailed system status and fault diagnostic information accessible by programming equipment or intelligent peripherals.

G. The processor must contain an error log area. This area must be able to log what error occurred and when the error happened, giving exact time and date. This area must be able to store a minimum of 1000 records.

H. At a minimum, the internal diagnostic registers shall the following information:

1. Type of digital (input or output) or intelligent (analog, ASCII, etc.) I/O unit inserted in a particular slot (I/O table listing). This data should be accessible via programming console or programming software.

2. If an I/O module is improperly mounted (wrong slot) or not in a slot (I/O verify or I/O bus error).

3. Error codes for intelligent I/O module errors.

4. PLC operation mode.

5. Present and maximum scan time.

6. Local Area Network operation status and error status.

7. Local Area Network data Send and Receive verification and error status.

8. Serial Host Computer interface operation and error status.

9. Remote I/O rack operation and error status.

10. Memory Error Area.

11. Startup time. The start time should be updated every time the power is turned ON.

12. Power Interruption Time.

I. A single RS232 or RS422 compatible or Fiber Optic

J. Differential communication port shall be used for software based ladder logic programming and communications to other compatible devices. The PLC system must support up to three of these ports simultaneously.

K. The data rate of the serial communications port shall be switch selectable. The following shall be the minimum available data rates: 300, 1200, 2400, 4800, 9600 and 19,200 baud.

2.4 INPUT/OUTPUT MODULES

A. Each input or output module shall be a self-contained unit housed within an enclosure so that no part of its circuit board is exposed to contact by handling.

B. Input and output units shall be UL listed, CSA certified and CE.

C. Pressure type screw terminals will accept one No. 12 or two No. 14 stranded or solid wires.

D. Convenience marker strips shall be provided adjacent to the I/O field wiring terminals for user labeling of all I/O points.

E. It shall be possible to replace any I/O module without or disturbing user field wiring.

F. Input and output modules shall be available in 8,16, 32, 64, and 96 points per unit. The 32, 64, and 96-point units shall not be multiplexed I/O and shall have a thumbscrew secured, high density connector capable of accepting individual soldered or crimped connector pins or ribbon cable via IDC type connector configuration.

G. All high-density DC input or output units shall be solid state in nature. The output units shall be transistor type for long life and high DC reliability. Reed relays are not acceptable.

2.5 NETWORK OPTIONS

A. Networking options must include Ethernet, Ethernet IP, Profibus DP, DeviceNet and Omron's SYSMAC bus remote I/O and ControllerLink network. Ethernet communications must support TCP, UDP, and FTP protocols. The PLC should have the ability to generate e-mail messages to be sent via WAN or LAN, to report errors, provide scheduled maintenance and status reports. In addition, FTP (file transfer protocol) can be used to transfer data files between a host computer and or FLASH memory card and the PLC's memory.

2.6 HMI CONTROL STATION PC

A. Each Control Station PC shall function as the primary means of overall system control and monitoring. The computer equipment shall be arranged to present an efficient and organized appearance.

B. The computer equipment shall be arranged to present an efficient and organized appearance. The following components shall be located with the workstation:

1. PC based computer (with mouse and keyboard).
2. 27" Touchscreen Monitor.
3. Speakers.

C. Provide computer equipment that meets the following minimum specification requirements

1. Windows 11 Professional 64bit
2. Intel® Core™ i7-6700 Processor (Quad Core, 8MB, 3.4GHz)
3. 16GB (2X8GB) 2133MHz DDR4 Memory.

4. M.2 512GB PCIe NVMe Class 40 Solid State Drive
5. Graphics – AMD Radeon R7 350X (4GB DP/DVI-I)
6. 48X CD-RW and 8x DVD+/-RW 9.5mm Optical Disk Drive and fifty (50) CD's.
7. Harman/Kardon HK-206 speakers, 3 watts each, 3 in. full range driver, 90 Hz-20Hz frequency response.
8. Tower type chassis including high capacity power supply with surge suppressor.
9. 101 key keyboard.
10. Microsoft mouse.
11. Communications – Integrated Gigabit Ethernet
12. 3 PCI Expansion Slots
13. (4) USB ports
14. Parallel Printer Port

D. Audio tone generator to activate on reception of an alarm. Audio tone shall be capable of being enabled or disabled on operator command.

E. A touchscreen panel (monitor) shall be the primary means of operator access to the system. They shall provide the operator interface for control of the entire system. The touchscreen panel may be an "off-the-shelf" consumer grade panel, but must be secured using custom mounting for adjustable (horizontal, vertical, tilt, with lockable position) movement and minimize shake/torque while in normal operation.

F. A keyboard and mouse are the secondary means of operator access to the system. To communicate with the direct digital control system, the operator shall input via the keyboard or mouse a command along with a proper alphanumeric identification of the system. Keyboard shall have standard ASCII coded logic outputs, providing full International English language displays and printouts. Auxiliary function keys shall be provided for various functions. These keys shall allow common operations to be performed by punching a single key instead of having to type out the command on the keyboard.

G. A digital display clock shall display on the monitor at all times. Provision for manually resetting it shall be provided. It shall be a 24 hour real-time clock and seven-day calendar to provide data for logging.

H. A network control key or software passwords shall allow automatic functions of the system to continue, but prevent unauthorized tampering with any computer pushbuttons or controls while the computer is unattended. This shall not disable the scanning or alarming functions.

2.7 SERVERS (PRIMARY AND FAILOVER)

A. Provide server components that meet the following minimum specification requirements:

1. Intel Xeon E3-1220 CPU, 4 core, 3Ghz, 8M cache
2. 8GB ECC RAM

3. 1TB 7200 RPM hard drive
4. Dual 1gb ethernet
5. iDRAC 8 basic
6. DVD ROM
7. Redundant power supplies

2.8 **HUMAN MACHINE INTERFACE (HMI) SOFTWARE:**

A. Provide Software package with the following minimum requirements:

1. 5 client access licenses
2. Tag Historian Module
3. OPC/UA Module
4. Modbus Driver
5. Redundant Server License for hot standby server with the same configuration as primary server.

B. Software Architecture General Design Features:

1. The HMI package shall:
2. Be 64-bit software capable of running on operating systems currently supported by the latest 5 Microsoft operating system platforms.
3. Support and take advantage of multiple processors on the same machine (symmetric multiprocessor design). For example, adding another chip to the computer should distribute the load of the HMI software across both chips, thereby increasing performance, etc.
4. Support and take advantage of multiple threads within the CPU. This multi-threading, among other benefits, aids in multi-tasking for CPU optimization, dependencies, and the like.
5. Have a scalable architecture such that the user can start with a small application and later grow the application database to any size by upgrading the license.
6. Embrace and integrate Microsoft Standards including:
    a. Microsoft Access
    b. Microsoft SQL Server
    c. Microsoft Data Engine (MSDE)
    d. Open Database Connectivity (ODBC)
    e. ADO, OLE-DB for Database Interface
    f. Object Linking and Embedding (OLE)
    g. ActiveX Technologies

h. OLE for Process Control (OPC)

7. Have the ability to write scripts within the package using a non-proprietary language (e.g.: VBScript).

8. Must support modifications in the driver worksheet to allocate addresses in the PLC (to maintain flexibility on the PLC supplier).

C. Must be supported and have recognized partnership with over 10 different PLC Controllers.

D. Must have at minimum 10 certified distinct system integrator companies in the State of California on the HMI solution.

E. Must have at minimum 10 distinct distributors in the United States.

F. Networking:

1. The HMI package shall:

a. Implement Client / Server Distributed Networking.

b. Support industry standard network protocols such as Ethernet (TCP/IP and UDP/IP) and EthernetIP as well as all Omron legacy networks (Controller Link, SYSNET, etc.), without any OPC interface.

c. Operate on a network with multiple protocol stacks.

d. Plug and Play with standard routers, switches, network Intranets and the Internet.

2. Support, where applicable, a Web based Browser Plug-in so that Alarming, Graphics, Trends can be viewed from any Internet Explorer station in addition to alarming through any Microsoft based operating system. Also, it will permit interaction (e.g., changing set point, switching screens, etc.) from these dedicated Internet Explorer stations.

3. Be configurable as an independent distributed database regardless of the number of nodes in the system.

4. Support at least 256 workstations (nodes) simultaneously.

5. Expansion of the system shall be possible with the addition of non-proprietary PC based off the shelf hardware.

6. Connect to a large number of I/O Device Interfaces via OPC Servers across the network.

7. Allow different versions of the development environment to reside simultaneously on the same computer, under different directories.

8. Have the ability to exchange data with external SQL Relational Databases, via 3rd party ADO providers, without the addition of any add-on packages.

9. Have the ability to save alarm history and event history to any SQL Relational Database, via 3rd party ADO providers, without the addition of any add-on packages.

G. Graphic Display Software Module:

1. The graphical display module shall have the ability to:
    a. Allow configuration of highly detailed screens with animation.
    b. Use an object-oriented design.
    c. Permit using the mouse for object creation, editing, and placing on the screen.
    d. Show object properties for customization with either menu choices, right-clicking, pop-up menus, or double-click shortcuts.
    e. Offer floating, dockable tool bars with drawing and animation tools for building the display.
    f. Provide a grid that can be displayed on screen to assist in aligning objects precisely.
    g. Permit re-sizing of the grid in both the X and Y direction (independently) in one-pixel increments.
    h. Allow "Snap to Grid" functionality to be turned on/off during configuration.
    i. Not require compilation of the displays before use; a simple "save" is all that is needed for use.
    j. Offer Password Protection of displays created.
    k. Provide language switching "on the fly"; with the ability for user-created displays to change languages, as well as the menus and tools employed by the graphics package itself.
    l. Display the graphic interface in 2 monitors connected to the same computer (CPU). The graphic interface available on each monitor must provide independent screen navigation.
    m. Run more than one instance of the graphic interface on the same computer (Thin Client solution) without any additional configuration on the Server station.
    n. Create tags as structures/classes of at least on member.
    o. Create array tags and configure another tag as its index when configuring objects on the screen.

H. Alarms and Events:
1. The alarm system shall provide complete alarm and event management with a user-definable message structure.
2. The alarm system shall provide 16 message sub-classes and 16 message types.
3. 3. The alarm system shall provide the ability to condense system alarming by the provision of group messages/alarms.
4. The alarm system shall be programmed to alarm any change of state that the system detects, including:
    a. The failure of communications channels used by the system.
    b. The failure of system’s hardware which results in an automatic fail-over of the system’s functions from the active to standby server.

5. The alarm system shall be capable of annunciating alarms, including, but not limited to:
    a. Activation of an audible alarm or light.
    b. Alarm display updated with the current alarm.
    c. Alarm banner updated on configured process displays.
6. The alarm system shall display alarm messages in a manner to facilitate easy interpretation of current alarms, including, but not limited to:
    a. Different text color and background color for those points that are in alarm, those that have been acknowledged, and those that are no longer in alarm.
    b. Flashing of the current alarm message(s) in the alarm list.
7. The alarm system shall provide capability to acknowledge alarm message when data point enters and/or exits alarm state. The system shall permit alarm acknowledgement, including, but not limited to:
    a. On an individual point.
    b. On a filtered group of points.
    c. On all alarms.
8. The alarm system shall provide filtering to control the alarms display. The filtering shall include, but not be limited to:
    a. Date.
    b. Time.
    c. Alarm class.
    d. Alarm type.
    e. Alarm priority.
    f. Status (in alarm, out of alarm, or acknowledged).
    g. Any defined alarm message field.
9. Alarm colors vary by equipment served. Alarms colors shall visually annunciate to meet site requirements.

I. Security:

1. The software shall provide a security component for restricting access to different areas of the system.
2. It shall be possible to configure different sets of individual users (range at least 1 to 1000 users) as well as categorizing those users (e.g., engineers, operators, supervisors, etc.) into groups (range at least 1 to 100 groups).
3. It shall be possible to assign a person to more than one group (e.g., Engineer and a Supervisor).
4. For each individual user, and for each group, it shall be possible to define:
    a. Name.

b. Password, including such parameters as minimum length required, time allowed before it must be changed, and uniqueness over time).

c. Data Points which can and cannot be written to.

d. Which screens they have access to.

5. It shall be possible to configure an Auto-Logout period, whereby the user is automatically logged out of the system after a specified amount of time has elapsed.

6. Restrictions on software module interaction shall be configured on a per-user and per-group basis. Items to lock out include:

a. Exiting the applications.

b. Printing.

c. Entering Configuration Mode.

d. Switching Languages.

e. Starting/Stopping of Alarm and/or Data Logging.

f. Acknowledgement of Alarms.

g. Alarm Filtering.

h. Changing Zoom Factors in Graphics and Trends.

i. Modifying and Executing Trend Reports.

j. Adding, Editing and/or Deleting Trend Pens.

k. Running a Script.

l. Accessing the Windows Desktop.

7. If a user fails to successfully log in after a configurable number of times, it shall be possible to lock that account out until either an administrator clears it, or after a preset amount of time has elapsed.

8. A utility shall be provided to show which users are logged into the system (both on the local machine, and on networked machines).

J. Internet Connectivity:

1. A stand-alone Web Server software module shall be provided so the HMI software can be accessed over the Internet.

2. The Web Server module shall run under Windows NT, embedded NT, and Windows 2000.

3. A user shall only require Internet Explorer to be installed on their machine (Thin Client) to access the system, with any “Plug-ins” automatically installed for them by the Server when they first access a graphic, trend, or alarm screen.

4. A mechanism shall be provided to deliver the software and data updates through firewalls.

5. The Web Server module shall manage the number of concurrent users of the Internet connection. Software licensing agreements shall be provided to allow for six (6) concurrent users.

6. It shall be possible to have “floating” web licenses, whereby if one user logs off, that license is freed up so that another user can log in.

7. The same security system employed by the HMI software shall also manage users connecting via the web.

8. The graphics files shall be represented over the web in the same manner as shown on a “standard” HMI workstation (i.e., close-approximations via HTML are NOT acceptable: the graphics should look and interact the same as a regular station).

9. Anywhere a file path name can be used within the graphics software, a URL shall also be able to be specified.

10. Alarms on a web station shall look and interact the same as a standard workstation.

11. Trend View windows on a web station shall look and interact the same as a standard workstation.

12. A “standard” workstation user shall also be able to connect to a networked system of other “standard” workstations via the Internet.

K. OPC Data:

1. If OPC databases are used, must be able to import OPC tags

2. The OPC Browser shall list all registered OPC Data Servers when making a connection to I/O data, and OPC Alarm and Event Servers when configuring alarms, and OPC Historical Data Access servers when configuring trending applications.

3. It shall be possible to browse OPC Servers installed on the local machine as well as those installed on any node visible on the network.

4. Ability to keep OPC tags on scan to optimize communications to commonly used data items.

5. On-line OPC Data Configuration changes (e.g., adding a new tag on-line) shall be supported by the HMI package.

6. OPC Data Ranges shall be read in and used to configure limits on graphic dynamics, trend limits, data entry field ranges, and so on.

7. OPC Quality Flags shall be used in graphic dynamics (degrees of communication quality shall be indicated by change in color used for objects), data logging, and alarm presentation.

8. A component for bridging/mapping OPC Data from one server to another shall be provided (e.g., map an PLC data point to a Modbus register).

L. Historical Data:

1. The system shall provide a complete historical subsystem providing the user the capability to capture and analyze historical data.

2. There shall be no limit (other than storage capacity) on the number of archives that can be created. The system shall also allow selection of any point in the system to be added/configured for archiving.

3. The historical subsystem shall use standard Windows tree/list view presentation techniques to facilitate the display and editing of archive timers, archive types, graphical data displays and tabular data displays.

4. The historical subsystem shall promote the visualization of historical data in both tabular and graphical form. This includes the capability to view historical data via a web-enabled interface as specified herein.

M. Reports:

1. 1. The system shall provide an integral reporting subsystem used to report both current and archived data.

2. The reporting subsystem shall provide the capability define reports for both visualization and printed format.

3. The reporting subsystem shall provide the capability to define both the dynamic and static properties reports, including, but not limited to:

   a. Inclusion of archived data, alarm data or event data.

   b. Customization of the format, layout, and graphical images, included on a report.

4. Configuration of automatic report generation, including frequency, destination of the report, and a prioritized list of alternate system resources should problems be encountered during automatic production.

5. The system shall be supplied with pre-configured reports, including, but not limited to:

   a. Graphic display documentation.

   b. Historical archiving.

   c. Alarm archiving.

   d. Control logic/scripting configuration.

   e. User and group security configuration

6. The reporting subsystem shall not impose limits on the number of reports that can be configured.

N. Database:

1. The system shall utilize a real-time relational database for storage of all process related data.

2. The database shall be based on an accepted industry standard database technology.

3. Tag names should be able to support up to 255 characters

4. The database subsystem shall provide the capability of “browsing” an application database, independent of the application.

5. The database system shall support both internal (computational) and external tags (real world). Use of internal tags shall be unlimited.

6. The database system shall provide the ability for each tag (dependant on type) to have high and low limits, start and substitute values.

7. The database system shall provide for event driven execution for data processing. Systems that require external data sources (PLCs) be polled for complete database update shall not be accepted.

O. Client/Server:

1. The software shall employ native client-server architecture. The architecture shall promote the use of multiple server and multiple client (i.e., workstation) configurations.

2. Any server computer shall be able to be dedicated to specific process functionality (i.e., Alarm Service, Historical Data Collection, etc.)

3. All clients shall have the capability to locally store and utilize process displays, as well as local control actions. Should a requested display and/or control action not exist locally at the client level; the client will access the data for the server. This operation will be transparent to the user.

4. All clients shall have complete visibility to all servers, and all servers shall have visibility at the peer level.

5. The software shall promote portability of applications between computers without any redevelopment or modification.

6. It shall be possible for the user to monitor and control the process from client or server. This includes, but is not limited to:

7. View the same or different displays simultaneously.

8. Make process adjustments and acknowledge alarms.

9. View alarms, events, trends, and reports.

10. The development and runtime environments shall be decoupled allowing the user to configure run-time only clients without any development capabilities. Modification of a client from run-time only, to runtime/development, shall be achieved as a simple license upgrade. Reinstallation or new installation of software will be permitted to achieve this functionality.

11. The system shall support implementation of thin-client technology.

12. The HMI system shall support thin-client platforms from PDAs to Industrialized PCs.

P. Redundancy:

1. To maximize data availability and integrity, the system shall provide the ability for configuration of system redundancy.

2. Configuration of system redundancy shall in no way limit or restrict the use of the client/server configuration and/or architecture.

3. Clients shall automatically “failover” to the backup or redundant server. This operation shall not require any application reprogramming or reconfiguration.

4. Once a failed server becomes available, the active server shall checkpoint data missing data to the previously failed server. This operation shall occur in the background, and shall not effect the operation of the on-line server.

2.9 **CPU CABINET**

A. CPU Cabinet shall be a fully enclosed cabinet to house the CPU.

B. Shall have fans for ventilation.

C. Shall be lockable.

D. Shall be off-the-shelf (not custom sized).

PART 3 - EXECUTION

3.1 **INSTALLATION**

A. Comply with Section 28 05 00.

B. Comply with manufacturer's recommendations, procedures and standards for the assembly and operation of the Control Electronics.

C. Common functions such as sallyport interlocks shall be wired to a single system. This type of function shall not be networked.

3.2 **TRAINING**

A. Comply with Section 28 05 00, TRAINING.

END OF SECTION