ADDENDUM NO. 3

PROJECT: 5524
February 5, 2024

BACKERSFIELD CITY SCHOOL DISRICT
MUNSEY ELEMENTARY SCHOOL
HVAC REPLACEMENT
3801 BRAVE AVENUE
BAKERSFIELD, CA 93309

DSA APP# 03-122489

This Addendum and Addendum drawings form a part of the Contract Documents. It modifies the original Project Manual and Drawings. Bidders are required to acknowledge receipt of this Addendum in the space provided in the Bid Form. Failure to acknowledge receipt of each addendum may subject bidder to disqualification.

Division 0 Bidding Manual

1. 00 21 13 Instructions to Bidders:

    a. The following bid packages have been updated with all changes shown in **red**. Replace the following Bid Packages in their entirety with those attached:
        i. 00 21 13.00 BP00 Standard Project Requirements – Addendum No. 3
        ii. 00 21 13.01 BP01 Selective Demolition & Abatement – Addendum No. 3
        iii. 00 21 13.02 BP02 Rough Carpentry – Addendum No. 3
        iv. 00 21 13.03 BP03 Roofing – Addendum No. 3
        v. 00 21 13.05 BP05 Cement Plaster & Drywall – Addendum No. 3
        vi. 00 21 13.06 BP06 Acoustical Ceilings – Addendum No. 3
        vii. 00 21 13.07 BP07 Floor Covering – Addendum No. 3
        viii. 00 21 13.08 BP08 Painting – Addendum No. 3
        ix. 00 21 13.09 BP09 Mechanical – Addendum No. 3
        x. 00 21 13.10 BP10 Electrical – Addendum No. 3
        xi. 00 21 13.12 BP12 Asphalt Concrete Paving – Addendum No. 3

GENERAL

3-01 **JOB WALK SIGN-IN SHEET:** Sign-in sheet from mandatory job walk on January 25, 2024.

3-02 **RESPONSES TO RFI #03:** Response to RFI #03 questions generated during the job walk of January 25, 2024.

3-03 **SC ANDERSON'S PHASING PLAN:** This plan is intended to show the proposed contained laydown areas for Contractor's use. Materials, supplies, dumpsters, etc. can be stored within each Phase's fenced area.

3-04 **SURVEILLANCE CAMARAS PLAN:** Surveillance camera plot plan indicating the approximate location of OFCI cameras and IDF to be replaced withRE4x cabinets.

3-05 **INTERNET-ENABLED THERMOSTAT:** Cut sheet for Pelican DS-TS250-02-T-Stat-CO2-Datasheet. Contractor to install Owner furnished Pelican Wireless thermostat with integrated CO2 sensor.

PROJECT MANUAL

3-06 **PROJECT MANUAL, SPECIFICATION SECTION 27 0000 – COMMUNICATIONS GENERAL:** Add specification section 27 0000 in its entirety.

3-07 **PROJECT MANUAL, SPECIFICATION SECTION 27 0258 – COMMUNICATION INFRASTRUCTURE SYSTEMS:** Add specification section 27 0258 in its entirety.

3-08 **PROJECT MANUAL, SPECIFICATION SECTION 27 1000 – STRUCTURE CABILING SYSTEM:** Add specification section 27 1000 in its entirety.

3-09 **PROJECT MANUAL, SPECIFICATION SECTION 27 2000 – NETWORK ELECTRONICS – OWNER PROVIDED:** Add specification section 27 2000 in its entirety.

3-10 **PROJECT MANUAL, SPECIFICATION SECTION 27 2300 – UNINTERRUPTIBLE POWER SUPPLY SYSTEM:** Add specification section 27 2300 in its entirety.

3-11 **PROJECT MANUAL, SPECIFICATION SECTION 27 3000 – TELEPHONE/VOICE SYSTEM – OWNER PROVIDED:** Add specification section 27 3000 in its entirety.

3-12 **PROJECT MANUAL, SPECIFICATION SECTION 27 4100 – CLASSROOM AUDIO VISUAL SYSTEMS – OWNER PROVIDED:** Add specification section 321216 in its entirety.

3-13 **PROJECT MANUAL, SPECIFICATION SECTION 27 5100 – INTERCOM / PAGING / CLOCK SYSTEM:** Add specification section 27 5100 in its entirety.

3-14 **PROJECT MANUAL, SPECIFICATION SECTION 27 5200 – ASSISTIVE LISTENING SYSTEMS:** Add specification section 27 5200 in its entirety.

3-15 **PROJECT MANUAL, SPECIFICATION SECTION 28 1600 – INTRUSION DETECTION / ALARM SYSTEM:** Add specification section 28 1600 in its entirety.

3-16 **PROJECT MANUAL, SPECIFICATION SECTION 28 2300 – SURVEILLANCE CAMERA SYSTEMS – OWNER PROVIDED:** Add specification section 28 2300 in its entirety.

DRAWINGS

ARCHITECTURAL

3-17 **DRAWINGS, A2.10 – DEMOLITION PLANS – BUILDINGS A & C:** Replace sheet A2.10 in its entirety with Addendum 3 sheet A2.10 Exhibit 3-17.

3-18 **DRAWINGS, A2.11 – DEMOLITION PLANS – BUILDINGS D & E:** Replace sheet A2.11 in its entirety with Addendum 3 sheet A2.11 Exhibit 3-18.

3-19 **DRAWINGS, A2.20 – FLOOR PLANS IMPROVEMENTS – BUILDINGS A & C:** Replace sheet A2.20 in its entirety with Addendum 3 sheet A2.20 Exhibit 3-19.

3-20 **DRAWINGS, A2.21 – FLOOR PLANS IMPROVEMENTS – BUILDINGS D & E:** Replace sheet A2.21 in its entirety with Addendum 3 sheet A2.21 Exhibit 3-20.

3-21 **DRAWINGS, A6.10 – DEMOLITION REFLECTED CEILING PLANS - BUILDINGS A & C:** Replace sheet A6.10 in its entirety with Addendum 3 sheet A6.10 Exhibit 3-21.

3-22 **DRAWINGS, A6.20 – REFLECTED CEILING PLANS IMPROVEMENTS – BUILDINGS A & C:** Replace sheet A6.20 in its entirety with Addendum 3 sheet A6.20 Exhibit 3-22.

MECHANICAL

3-23 **DRAWINGS, M2.31 – MECHANICAL PLAN – BUILDING C:** Replace sheet M2.31 in its entirety with Addendum 3 sheet M2.31 Exhibit 3-23.

3-24 **DRAWINGS, M2.41 – MECHANICAL PLAN – BUILDING D:** Replace sheet M2.41 in its entirety with Addendum 3 sheet M2.41 Exhibit 3-24.

3-25 **DRAWINGS, M2.51 – MECHANICAL PLAN – BUILDING E:** Replace sheet M2.51 in its entirety with Addendum 3 sheet M2.51 Exhibit 3-25.

ELECTRICAL

3-26 **DRAWINGS, E2.02 –DEMOLITION LIGHTING PLANS – BUILDINGS A & C:** Replace sheet E2.02 in its entirety with Addendum 3 sheet E2.02 Exhibit 3-26.

3-27 **DRAWINGS, E2.10 – NEW POWER PLANS – BUILDINGS A & C:** Replace sheet E2.10 in its entirety with Addendum 3 sheet E2.10 Exhibit 3-27.

3-28 **DRAWINGS, E2.11 – NEW POWER PLANS – BUILDINGS D, E & ME:** Replace sheet E2.11 in its entirety with Addendum 3 sheet E2.11 Exhibit 3-28.

3-29 **DRAWINGS, E2.20 – NEW LIGHTING PLANS – BUILDINGS A & C:** Replace sheet E2.20 in its entirety with Addendum 3 sheet E2.20 Exhibit 3-29.

3-30 **DRAWINGS, E4.02 – PANEL SCHEDULES:** Replace sheet E4.02 in its entirety with Addendum 3 sheet E4.02 Exhibit 1-30

3-31 **DRAWINGS, E5.01 – DETAILS:** Replace sheet E5.01 in its entirety with Addendum 3 sheet E5.01 Exhibit 3-31.

END ADDENDUM NO. 3

Bid Package 00 - Standard Project Requirements – Addendum No. 3

PROJECT: **Munsey Elementary School HVAC Replacement**
3801 Brave Avenue
Bakersfield, CA 93309

DSA NUMBER: 03-122489

OWNER: Bakersfield City School District
1300 Baker St.
Bakersfield, CA 93305

This Standard Project Requirement Bid Package shall be applicable to **ALL** Construction Bid Packages provided by S.C. Anderson, Inc. for this project. Contractors shall review all sections below and include any costs to comply in their base Bid.

This Bid Package is for the HVAC Replacement at Munsey Elementary School as part of the Construction Manager delivery method. All Bids will be addressed and delivered to Bakersfield City School District as noted in the Instructions to Bidders in the Construction Manual. Once presented, the bids will be opened and evaluated by the District and the Construction Manager. Any contract awarded by the District, and the work thereafter, will be managed, directed, and overseen by the Construction Manager. All work shall be performed in accordance with All Contract Documents, Pre-Bid Information, Bid Documents, Addenda, Construction Agreement, General Conditions, Special Conditions, Environmental Reports, Contract, Project Schedule, Project Manual, Construction Manual, the requirements of the General Requirements/Specifications (Division 00 thru 33), and Contract Drawings (Here after referred to as “contract documents") which are hereby incorporated into this and all other Bid packages by their reference. The work under any Bid Package shall include the furnishing and installing of all material, equipment, procedures, means, methods, items and labor required to complete the work described in this Bid Package. The work shall be completed as shown on the drawings and specified in any applicable technical specification sections.

This bid scope of work consists of replacing existing unit ventilators, air handlers, and make-up air units in Buildings A, C, D, and E with modern, more efficient rooftop package units including removal of all existing outdated, central plant equipment from the chiller yard after the new equipment is approved and fully operational. Scope also includes fire alarm system upgrade at buildings previously mentioned along with new flooring, ceilings, and replacement of patches due to the modernization. Scope of work includes abatement as specified in the Environmental Reports provided. All contractors must adhere to the following:

In order for the contractor to enter sections of the building included in this scope of work in which has asbestos-containing materials in them, they shall have, at a minimum the 2-Hour Asbestos Awareness Training. (this training is for those who may encounter asbestos but will not be intentionally disturbing it.

Work is scheduled to commence March 25, 2024. The work of this or any other bid package must be completed according to the construction schedule included with contract documents. The construction schedule prepared by the Construction Manager, or other target dates pertaining to any work must be adhered to by the Contractor. Procurement of materials and/or equipment shall be done in a timely manner to comply with the project schedule. No extension of time will be granted unless the circumstances are within the stipulations of the General Conditions. All bid packages are contained in the Construction Manual. These standard Project Standards are to made part of every Contractor's scope of work in addition to their applicable bid package.

In addition to the above, work for each specific Bid package shall include the furnishing of all labor, materials, processes, equipment, means and methods and related items required to complete the work as shown on the drawings and set forth in the specifications referred to herein or elsewhere in the Contact Documents.

The Scope of the Work for each Contractor awarded a contract shall include, but not necessarily be limited to, the items listed below and those listed in the specific Bid Package(s) awarded to that Contractor in accordance with the applicable drawings and specification section(s). NOTE: The term "Provide" is defined as "to furnish and install, complete and ready for the intended use."

In addition to the work noted in the successful Contractor's Bid Package, each Contractor must also adhere to the following:

1. Project General Provisions noted in this manual, and all items in Division 01 (General Requirements) in the project manual shall apply to all Contractors performing any work on this project.
2. Each Contractor shall review and abide by the General Rules of Conduct located in the Construction Manual. The plan outlines requirements for fingerprinting and background checks.
3. Mandatory weekly coordination meetings will be held for all Contractors performing work on site. It is each Contractor's responsibility to attend such meetings beginning two weeks prior to start work.
4. At times conflicts within the contract documents may be discovered as the work progresses. Should such a conflict occur, it is each Contractor's responsibility to seek resolution by submitting a request for information (RFI) requesting clarification. RFI's shall be submitted in the S. C. Anderson Inc. project Procore system.
5. Working hours shall be 6:00am - 4:00pm Monday thru Friday. To perform work outside of these hours must be approved prior to commencing that work. Contractors shall man the project appropriately to meet the CPM schedule.
6. Each Contractor shall provide for the appropriate number of move ins to perform the work noted in their specific Bid package and CPM schedule.
7. Each Contractor shall provide a full time, onsite superintendent/foreman. Said superintendent must possess the ability to communicate plainly with on-site staff.
8. As it pertains to each specific Bid package, each Contractor shall provide off site removal and proper disposal of all spoils.
9. The Base Bid pricing for any Bid over $25,000 shall include the cost of 100% payment and performance bonds.
10. Each Contractor shall provide all any and all scaffolding (except as noted), shoring, trench plates, ladders, lifts, cranes or any other equipment required to perform the work required under each Bid package.
11. Provide access as required to allow inspectors, Owner, Architect, and Construction Manager to perform inspections.
12. Provide pot holing and locating of existing underground utilities if needed under each Bid package.
13. Each Contractor shall be responsible for temporary power within the buildings. Temporary power will be provided to a temporary power pole within the limits of construction. Each Contractor must supply their own method to get the power from that pole to their working condition or provide their own generator. Spider boxes or cords will not be supplied during construction. Additionally, neither

the District nor Construction Manager will be responsible for any delays due to outages, overuse, or non-availability of power.

14. Each Contractor shall provide for temporary construction work lighting as needed to perform their work.

15. Each Contractor shall be responsible to take and verify field dimensions.

16. Each Contractor must provide any layout (from benchmarks and staking) necessary to complete the scope of work listed in each Bid package. Initial surveying and staking will be provided by the Construction Manager. However, should any re-staking be required as a result of a Contractor destroying, removing or otherwise disrupting the credibility of the staking, the cost for such re-staking will be the responsibility of the Contractor.

17. Each Contractor shall provide a dimensioned layout for all backing, penetrations, and openings required to install any of the work noted in an awarded Bid package. Should a Contractor fail to provide this layout, the responsibility to install any missed backing shall be the responsibility of that Contractor with no additional compensation This includes any and all cutting/patching, moving of piping, conduits or any other installed item that may be required to install any missed backing due to the failure to supply the layout.

18. As applicable to each Bid Package, each Contractor shall provide all excavation, shading, bedding, backfill and compaction as noted in the contract documents, for any work provided under this their package.

19. Provide dewatering and mucking out as associated with the performance of the work (as applicable) to each Bid Package.

20. As applicable to each Bid Package, each Contractor shall, with the involvement of the Construction Manager overlay their scope of rough in with the others for coordination to avoid conflicts in the field.

21. Each Contractor shall route all conduits, piping, ducting etc. to avoid interference with other piping, footings or other portions of the building. Drawings are diagrammatic and alternate routing, transitions and fittings may be required due to building and site constraints and adjacent utilities. Cost of utility route adjustments to be included in each Contractor's Bid.

22. Each Contractor shall provide a contained clean out area for cleaning of trucks, tools, spray guns, hoses, brushes, buckets, pumps, wheelbarrows, or any other tool, container or device use to perform work on this site. At no time will any such vehicle/device/tool be cleaned out and dumped, sprayed, splashed or shaken directly onto or into the ground. All cleaned debris and rinse water shall be removed and properly disposed of offsite.

23. Each Contactor must provide any special testing or inspections and certification as required by the work of the specific Bid package, including inspections required by any other agency or municipality.

24. Each Contractor shall provide, at a minimum, weekly clean up and off-site removal of trash, debris, unused construction materials and lunch debris generated by their crew. The costs for hauling off each Contractor's dumpsters are to be included in the price for their Bid Package. It is recommended that each contractor provide a lockable trash container for their own use. In the absence of a clean construction site, each contractor will be required to provide at least one person per week to perform clean up as Directed by the Construction Manager. Should a Contractor fail to provide the manpower noted above, the Construction Manager may seek other means to complete this clean up and that Contractor will be back-charged accordingly. To Clarify: Any clean up performed on behalf of a Contractor by Construction Manager, Owner or District, will be back charged to and deducted from their contract.

25. Each Contractor must provide final clean up and offsite disposal of any debris or unused construction material in one area before moving to another area to perform work. Such clean up and disposal shall comply with all federal, state, and local ordinances and codes. Note: Any clean up performed on behalf of this Contractor, will be back charged to and deducted from each Contractor's contract.

26. Each Contractor must provide dust control and street clean up, meeting or exceeding the local governing agency's requirements or any other applicable code or regulation (as required for this

project), for all generated airborne particles and/or mud/debris that may be deemed unhealthy and/or a nuisance to the public. Any fines received as a result of any Contractor's failure to meet these codes or regulations will be the responsibility that Contractor.

27. Dust control shall be provided by the Contractor whenever earthmoving; excavation, backfilling or compacting activities are taking place. SCA will provide a water meter at a point to be determined. **Each Contractor will be charged the current local municipality's water rate plus 10% for SCA markup for their water usage.**

28. All work must conform to all Federal, State, County, City or Local Codes, Regulations, Ordinances and Standards.

29. Each Contractor is responsible for compliance with all applicable public utility and municipal codes and standards.

30. All non-compliant materials shall be immediately removed from the Project Site.

31. Each Contractor shall provide certified payroll reports, for their work force and any sub tier contractor to Construction Manager on a weekly basis. Pay applications/payments will be held for failure to provide these certified reports. Please note the DIR is now requiring that Certified payroll be entered into their system. Hard copies will still need to be provided to the jobsite.

32. Each Contractor shall provide a notice of non-performance when workers are not on site. Non-performance notifications shall be provided until a notice of completion is filed with the local jurisdiction by the District.

33. Each Contractor must provide proper submittals, shop drawings, mockups, product data, samples, SDS's, as noted it the contract documents, included color samples as/if required.

34. Each Contractor must update the As-Built drawings weekly in the Project Office. Pay applications/payments may be held for failure to update drawings.

35. Each Contractor shall provide a detailed and accurate schedule of values for the work included in any awarded Bid Package. Schedule of values to include labor, material, and equipment costs and be broken down for each area. The schedule of values must be submitted for approval prior to commencement of work and/or payment.

36. Each Contractor shall comply with any and all requirements to use state approved apprentices and paying into approved apprenticeship programs.

37. Each Contractor shall have their Foreman/Superintendent attend a weekly Contractors meeting at the Construction Manager's job trailer.

38. Each Contractors shall provide daily reports at the end of each workday to Construction Manager. Failure to submit daily reports may delay progress payments.

39. Each Contractors must coordinate the work of each Bid package with the architect's approved submittals and/or shop drawings as it pertains to the work outlined in each Bid Package.

40. Each Contractor shall coordinate all work with governmental agency engineers, testing laboratory technicians, Construction Manager, Inspector of Record, private property owners and other Contractors.

41. Each Contractor is responsible for coordination of work with governmental agency engineers, testing laboratory technicians, Construction Manager, Inspector of Record, any appropriate utility companies, private property owners and all other Contractors as applicable. Coordination drawings will be required for all installations near or adjacent to new utilities and structures.

42. Each Contractor is responsible for coordination of any of their work that involves interruptions of utility services. Interruptions shall not impact the site during hours of operation. Contractor shall schedule work afterhours and/or on weekends as required to accommodate the Project Schedule. Note: service interruptions may or may not be included into the CPM schedule.

43. Each Contractor shall provide any and all bonds, insurance, traffic plans, and permits (including any encroachment permits) as required by the District, County, City, State or federal agency.

44. Each Contractor must obtain and pay for a Business Tax Certificate from the City of Bakersfield or any other city having jurisdiction as/if required.

45. Each Contractor shall schedule survey requests with the Construction Manager 48 hours' notice shall be provided for all such requests. Survey requests shall include very specific descriptions of areas to be surveyed or a marked-up plan showing the location(s).

46. Each Contractor is responsible to conduct an inspection of existing conditions prior to commencing work.
47. Each Contractor is responsible for coordinating all required inspections with the Construction Manager and Inspector of record. Written inspection requests must be submitted 48 hours in advance.
48. Each Contractors shall review and comply with any testing requirements listed in the contract documents.
49. Each Contractor shall review and comply with any commissioning requirements.
50. Coordination drawings and a task specific work plan may be required for any construction related activity, which will directly affect safety, campus systems, activities, staff or students. Construction Manager will advise the Contractor when a plan is required. Each plan must be submitted with sufficient time for review/approval by Construction Manager.
51. Coordinate soil compaction testing with Construction Manager. Note: Initial compaction test will be provided at no cost to the Contractor. Any costs or lost critical path time, associated with retesting of soil compaction in areas that failed previously are the responsibility of that Contractor.
52. Provide Inspection and repair of all defective work for a period of one year from the date of Notice of Completion, or if subsequent repairs are required, one year from the date the repairs are complete. This requirement is not in lieu of any extended warranties.
53. Provide owner with specified contract closeout documents, including but not limited to, complete "As Built drawings", Operations and Maintenance Manuals, Guarantees and Warranties (including manufacturer's extended warranties) at conclusion of contract.
54. Each Contractor must supply waiver and releases upon progress payment and final payment. This includes waivers and release from tiered subcontractor or supplier. Failure to provide required releases may delay processing of payment.
55. Each Contractor shall provide Personal Protective Equipment (PPE) for each employee on site. PPE shall consist of Safety vests, hardhats, safety glasses, work boots, long pants and sleeved shirts. Failure to wear the minimum required safety equipment for the task being performed will result at minimum in stoppage of the work task. Safety equipment must be worn at all times while on site. This requirement applies to delivery drivers entering the site.
56. Deliveries may be rejected if proper PPE is not worn.
57. Each Contractor shall provide appropriate drinking water and shade (when necessary) for all of their own staff and workers as required by current OSHA/CAL-OSHA regulations related to heat illness.
58. Each Contractor must provide all traffic control and protection as may be required to meet Federal, State, City or local codes regulations in the performance of their own work. At no time are obstructions of roadways and/or sidewalks allowed without the appropriate permits. It is the responsibility of each Contractor to obtain (and pay for) any such required permits. When traffic control is being provided, certified flagmen should be utilized.
59. **Each Contractor shall comply with the requirements of AB 219 as it pertains to the related scope of work.**
60. Provide protection for public and worker safety (barricades, harness, shoring, etc.) as required to meet applicable Federal, State, City or Local Codes. Engineering shoring plan must be submitted for approval for excavations greater than 5' or at excavations impacting existing structures prior to commencing work.
61. Each Contractor shall provide weekly safety meeting reports to the Construction Manager. Meeting reports with attendee signatures shall be turned in no later than each Friday for that week.
62. Provide protection of contiguous work to prevent damage when performing work under each respective contract. Repair of any work damaged under each contract will be performed by the responsible Contractor with no additional cost to the owner, District or Construction Manager.
63. Each Contractor must contact Underground Service Alert before digging.
64. Provide protection, security, theft and proper storage for all construction materials related to each Contractor's Bid package to eliminate damage during shipping, delivery, handling, storage and installation.

65. Each Contractor is responsible for locating and protecting existing public and private utility, facilities and other property improvements and to locate and protect all work in place.
66. Each Contractor will be responsible for all billings, submittals, schedule updates, drawing updates and required documents, as may be applicable to the project, through our cloud-based project management program, Procore.
67. Off-site parking will be available to all contractors. On-site vehicle parking is extremely limited due to the nature of the project site and will only be available via prior authorization from Construction Manager on site staff.
68. **Lean Last Planner – The scheduling of the project shall be provided using a combination of the (P6) critical path method to track the project at the milestone level and the Last Planner® System. Milestone schedules shall represent hard dates for major project milestones that will guide the Contractor Last Planner® phase planning, 6-week make work ready planning, and weekly work planning sessions. Construction Manager shall require each of its Contractors & Subcontractor and Material Suppliers to participate in the pull planning scheduling sessions for the project as necessary according to their work. The following items will be discussed in the weekly Pull planning meetings.**
69. Specification Section 017419 – Construction Waste Management added via Addendum No. 1: this specification section shall apply to all Bid Packages 01 through 12.
70. Each worker on site is required to obtain Two Hour Asbestos Awareness Training or provide proof of training within the last year. Two Hour Asbestos Training is an annual training.

Pull Planning Implementation

- Milestone Schedule
- Milestones (Schedule) – Set milestones
- Construction Strategy
- Identify construction activities & durations for each milestone
- Identify manpower required to meet commitment dates
- Specify predecessor and successor activities
- Identify operational control
- Identify pre-requisites and constraints
- Weekly Work Planning
- One tag per day, per activity
- Daily commitments from Last Planners
- Identifying and eliminating constraints
- Document progress daily/weekly
- Measuring & Evaluating
- Identify long lead items & stakeholder milestones
- Update Milestone schedule with Phase and Weekly Work Plan activities & durations
- Document commitments made/missed
- Measure Percent Plan Complete (PPC)
- Identify reasons for missed commitments
- Develop plan of action to correct missed commitments

Lean cores tools to be utilized are 5S, Teams, Standard Work, A3 Problem Solving, Error Proofing and BIM. The Pull Planning session commitments shall represent updates to the baseline schedule. contractors will be required to start attending Pull Planning a minimum of 4 weeks ahead of mobilization, or as the project requires for their scope.

On-Site Foreman of each Contractor on site, including subcontractors, will be required to attend daily 15-Minute Foreman's Huddles as part of the implementation of the pull plans.

Bid Submission:

It is the responsibility of each bidder to inspect the project site, review the complete set of plans, specifications, schedules, addenda, and city/county/state standards and the Construction Manual, prior to submitting a Bid.

Bidder is solely responsible for costs and expenses incurred in developing his Bid. Nothing within Bidding Documents shall be construed as establishing a relationship between the Owner or Construction Manager and Bidder wherein the owner or Construction Manager shall compensate Bidder for developing such Bid. The submission of a bid shall be taken as prima facie evidence that submitting party is aware of the site conditions and has read and acknowledges the foregoing.

Each Bid submitted must include the following items at the time of Bid:

1. 00 41 13 Bid Form and Proposal
2. 00 43 13 Bid Bond on District's form or other security
3. 00 43 36 Designated Subcontractor's List
4. 00 45 01 Site Visit Verification (mandatory for BP-01, BP-10, and BP-11)
5. 00 45 19 Non-Collusion Declaration
6. 00 45 19.01 Iran Contracting Act
7. 00 45 46.11 Federal Debarment Certification
8. 00 45 46.12 Federal Byrd Ant-Lobbying Certification

Bid Package 01 Selective Demolition & Abatement – Addendum No. 3

Project: **Munsey Elementary School HVAC Replacement**
3801 Brave Ave.
Bakersfield, CA 93309

DSA Number: 03-122489

Owner: Bakersfield City School District
1300 Baker St.
Bakersfield, CA 93305

In addition to the items noted in Bid Package 00 – Standard Project Requirements, which are applicable to ALL Contractors, the Specific Scope of the Work shall include, but not necessarily be limited to the items listed below in accordance with the applicable drawings and specification section(s). Contractors shall review all sections below and include any costs to comply in their base Bid. **NOTE**: The term "Provide" is defined as "to furnish and install, complete and ready for the intended use."

BASE PROPOSAL

1. Provide all work specified within the following specification sections and drawings with the exception of items listed as "Work by Others":
    a. **Section: 024119 – Selective Demolition**

2. Refer to the CPM schedule and phasing plans and provide multiple mobilizations as necessary to complete this work.

3. Provide abatement per the Provost & Pritchard / T. Brooks & Associates reports dated March 23, 2023 and December 4, 2023. Trade contractor to follow all recommendations and environmental regulations required for proper disposal of hazardous containing material.

4. Provide site demolition including chiller yard equipment, equipment pads & mounts, piping, CMU walls & footings, wood fence & gate, concrete slab, transformer & pad, garden planters, storage container, and shade structure. Cap and abandon utility pipes per detail 3 on A3.11.

5. Provide selective building demolition including sheet metal pipe covers with concrete pads, ~~roofing~~, flooring, glue-on ceiling tiles, glue-on ceiling tile substrate, nailers, stripping, acoustical T-Bar ceilings, drywall ceilings & walls and all other items scheduled to be demolished per the Architectural drawings. Roof demolition to be performed by Bid Package 03 Roofing.

6. Provide removal of ~~drywall finish~~ plywood wall finish at locations where conduit and piping are to be installed within the wall cavity. Coordinate with Mechanical and Electrical Contractor.

7. Provide razor scraping of flooring adhesive ready for Flooring Contractor.

8. Provide selective mechanical demolition including all unit ventilators, rooftop units, dampers, fan coils, louvers, ductwork, registers, conduit, piping, controls and all other items scheduled to be demolished per the Mechanical drawings. Coordinate with the Mechanical Trade Contractor.

9. Provide removal and salvage ceiling mounted strobes, sensors, speakers, and projectors for reinstallation by others. All salvaged items to be returned to the school district.

10. District to remove and salvage ceiling mounted ionizers prior to demolition contractor starting work.

11. Provide selective electrical demolition including receptacles, light fixtures, conduit, cabling, equipment, and all other items scheduled to be demolished per the Electrical Drawings. Properly dispose of all fluorescent bulbs and ballast. Coordinate with electrical Trade Contractor.

12. Provide demolition of fire alarm devices, conduit, and cabling. Coordinate with Electrical Trade Contractor.

13. Protect in place those finishes and fixtures that will remain.

14. Provide removal and proper offsite disposal of all demolition materials including any trash, loose debris etc., created because of this work. Note: Demolished material may not be stockpiled on site over weekends and holidays. The intent is to have all material removed from the site at the time of demolition to avoid potential safety issues.

15. This is a “Green Code” project: Provide Construction Waste Management Plan for this proposal package. Refer to Specification Section 01 74 00 (Construction Waste Management and Disposal) for more detailed information.

16. Provide all layout necessary to complete this scope of work. This contractor is responsible for taking, checking and verifying all field dimensions.

17. Provide dust control and street clean up, meeting or exceeding the San Joaquin Valley Air Board District or any other applicable code or regulation, for all generated airborne particles and/or mud/debris that may be deemed unhealthy and/or a nuisance to the public. Any fines received because of this Contractor’s failure to meet these codes or regulations will be the responsibility of this contractor.

18. Construction water will be supplied by the District. This contractor shall provide their water trucks, hoses, etc. and maintain appropriate wetting of the site throughout the duration of their contract while on-site. ~~The use of a water truck will be required.~~

19. Provide a written demolition plan which addresses major work activities. Plan shall coincide with CPM schedule dates. Intent is to coordinate items such as trucking haul routes, clean-up plan, BMP’s etc.

20. Provide demolition permit as required by code or governing agency before for work being performed. Copies of permits must be delivered to the site construction office prior to commencing any work.

21. Obtain an approved haul route permit complete with driving route, traffic control plan, and hours of approved work from the City Public Works and/or any other required agency prior to commencing demolition or hauling.

22. Contractor shall keep all access roads, haul roads, school parking lot and city or other public streets clean of any and all materials resulting from demolition and or track-out.

23. Coordinate and arrange for an acceptable queuing/staging area for any and all trucks used haul material to or from the site with any municipality having jurisdiction prior commencement of any hauling.

24. Remove and salvage one each television monitor and television monitor bracket at each classroom.

25. Cut opening in the hard lid ceiling at Building A, Rooms A-3 to allow for the installation of new HVAC equipment and ducting by the Mechanical Contractor.

26. Provide removal of classroom casework complete per plans.

27. Provide removal of classroom radiators and barometric relief assembly complete per plans.

28. Provide removal of two each white boards per classroom and salvage for reinstallation by others. Provide cutout of plywood wall finish as required; Coordinate with Rough Carpenter and District on blocking.

29. Note: the wall finish within classrooms is a plywood finish, not drywall.

30. Provide asphalt sawcut and demolition 5’ beyond the limits of the new asphalt paving as shown on The Partial Site Plan on A2.21.

Bid Package 02 Rough Carpentry – Addendum No. 3

Project: **Munsey Elementary School HVAC Replacement**
3801 Brave Avenue
Bakersfield, CA 93309

DSA Number: 03-122489

Owner: Bakersfield City School District
1300 Baker St.
Bakersfield, CA 93305

In addition to the items noted in Bid Package 00 – Standard Project Requirements, which are applicable to ALL Contractors, the Specific Scope of the Work shall include, but not necessarily be limited to the items listed below in accordance with the applicable drawings and specification section(s). Contractors shall review all sections below and include any costs to comply in their base Bid.
NOTE: The term "Provide" is defined as "to furnish and install, complete and ready for the intended use."

BASE PROPOSAL

1. Provide all work specified within the following specification sections and drawings with the exception of items listed as "Work by Others":
    a. **Section: 061000 – Rough Carpentry**
    b. **Section: 079200 – Joint Sealants (as pertains to this Bid Package)**

2. Refer to the CPM schedule and Area Phasing plans and provide multiple mobilizations as necessary to complete this work.

3. Provide all rough framing including wall infill, soffits, roof framing, rooftop platforms, bracing, wall & roof sheathing, nailers, blocking, backing, layout, attachment of wood to other materials, fire stopping as required by code, fastenings and accessories, cutting and patching required by the work of other trades, barricades and scaffolding.

4. Provide wall infill framing where louvers and ducts are being removed. Figure plywood finish on both exterior and interior side of wall infill.

5. Provide cutting and framing for new roof openings and platforms for new rooftop mechanical equipment. The cutting of any roof structure and roof decking will be the responsibility of this Bid Package.

6. Provide blocking, framing and supports required for any mechanical (both mechanical and plumbing) component, electrical component, required for completion of the mechanical and electrical work; provide backing for Owner provided TV brackets.

7. Provide all builders hardware (i.e. Simpson or similar) including all fasteners including bolt nuts washers, shot pins etc.

8. Provide all fasteners (nuts, bolts, washer, lock washers etc.) for any wood-to-wood, wood-to catalog hardware, wood-to-concrete connections.

9. Provide all fire treated backboards required to mount electrical, low voltage, or telephone items. Coordinate the location of these backboard with the other Contractor as appropriate.

10. Provide vertical and horizontal Firestopping at all required locations per specifications and plans.

11. Provide all layout necessary to complete this scope of work. This contractor is responsible for taking, checking and verifying all field dimensions.

12. Provide plywood sheathing at all outdoor unit curbs per detail 12 on M0.11.

13. Provide wall infill where barometric relief assemblies over classroom doors are figured to be removed.

14. Provide blocking for the smart board and two whiteboards at each classroom. Coordinate opening with Demolition Contractor and blocking with District.

Bid Package 05 Cement Plaster & Drywall – Addendum No. 3

Project: **Munsey Elementary School HVAC Replacement**
3801 Brave Avenue
Bakersfield, CA 93309

DSA Number: 03-122489

Owner: Bakersfield City School District
1300 Baker St.
Bakersfield, CA 93305

In addition to the items noted in Bid Package 00 – Standard Project Requirements, which are applicable to ALL Contractors, the Specific Scope of the Work shall include, but not necessarily be limited to the items listed below in accordance with the applicable drawings and specification section(s). Contractors shall review all sections below and include any costs to comply in their base Bid.
NOTE: The term "Provide" is defined as "to furnish and install, complete and ready for the intended use."

BASE PROPOSAL

1. Provide all work specified within the following specification sections and drawings apart from items listed as "Work by Others":
    a. **Section: 079200 – Joint Sealants (as applies to this Bid Package)**
    b. **Section: 092400 – Cement Plastering**
    c. **Section: 092900 – Gypsum Board Assemblies**

2. Refer to the CPM schedule and Area Phasing plans and provide multiple mobilizations as necessary to complete this work.

3. Provide all gypsum board, taping and accessories, trim, screws, staples, joint tape and compounds and texture finish for walls, ceilings, and soffits.

4. ~~Provide gypsum board patch back at new power and data locations at existing walls. Gypsum board finish to match existing.~~

5. ~~Provide gypsum board patch back at all mechanical louver and ducting infill locations; figure a minimum dimension of 3'x3'. Gypsum board finish to match existing.~~

   NOTE: the wall finish within classrooms is a plywood finish, not drywall.

6. Provide plaster patch back at all mechanical louver and ducting infill locations; figure a minimum dimension of 3'x3'. ~~Plaster color coat to match existing.~~ Plaster finish to match existing.

7. Provide all lath, paper, weather resistive barrier, self-adhered flashing, fasteners, edge metal, screed, expansion screed/metal, vent screeds, control joint metal, parting joint, expansion

joint, casing bead, door drips base screen, weep screed, and reveals for any plaster surface noted in the contract documents.

8. Patch all existing wall damaged during construction aligned with adjacent finish.

9. Provide a contained clean out area to be used for cleaning all trucks, mixers, tools, wheelbarrows, etc., used to apply any cementitious or gypsum-based material under this bid package. No such material will be cleaned out/rinsed onto bare soil on this site. All such material will be removed and properly disposed of offsite as part of this contract work. SCA requires the use of the below or similar product. **The cleanout shall be erected a minimum of 24 hours prior to anticipated use.** Proper removal and off-site disposal of the cleanout shall be performed as soon as liquids have evaporated.

10. Provide vertical and horizontal firestopping at all required locations per specifications and plans.

11. Provide patch back of ceiling at Building A, Rooms A-3 after the installation of new HVAC equipment and ducting by the Mechanical Contractor.

12. Provide plaster patch back where relief vents over classroom doors are figured to be removed. Figure a minimum dimension of 3'x3'. Plaster finish to match existing.

Bid Package 06 Acoustical Ceilings – Addendum No. 3

Project: **Munsey Elementary School HVAC Replacement**
3801 Brave Avenue
Bakersfield, CA 93309

DSA Number: 03-122489

Owner: Bakersfield City School District
1300 Baker St.
Bakersfield, CA 93305

In addition to the items noted in Bid Package 00 – Standard Project Requirements, which are applicable to ALL Contractors, the Specific Scope of the Work shall include, but not necessarily be limited to the items listed below in accordance with the applicable drawings and specification section(s). Contractors shall review all sections below and include any costs to comply in their base Bid.
NOTE: The term "Provide" is defined as "to furnish and install, complete and ready for the intended use."

BASE PROPOSAL

1. Provide all work specified within the following specification sections and drawings with the exception of items listed as "Work by Others":
    a. **Section: 079200 – Joint Sealants (as it pertains to this Bid Package)**
    b. **Section: 095113 – Acoustical Panel Ceilings**

2. Refer to the CPM schedule and Area Phasing plans and provide multiple mobilizations as necessary to complete this work.

3. Provide all acoustical ceiling system complete with mains, runners, lay-in fiberboard panels, including wires, hangers, braces, edge metal. sway bracing, struts, compression struts, seismic restraints mounting hardware, accessories etc. required to produce a completed ceiling.

4. Provide additional wires at any suspended ceiling as required for attachment to all light fixtures, HVAC grilles/registers, or any other device required to be mounted to or through an acoustical ceiling as required to meet any applicable codes.

5. Provide any and all fasteners, supports, bracing, hangers, clips, channels, panel termination, and trim required to produce a complete ready for use system.

6. Provide patch back of glue-on acoustic tile at classroom light wells per the contract documents.

7. Provide new tackboard finish to classroom walls as called out. Tackboard finish to be Chatfield Clark, Koroseal Ceres, Fog. Tackboard to extend 6" above acoustical ceiling grid.

Bid Package 08 Painting – Addendum No. 3

Project: **Munsey Elementary School HVAC Replacement**
3801 Brave Avenue
Bakersfield, CA 93309

DSA Number: 03-122489

Owner: Bakersfield City School District
1300 Baker St.
Bakersfield, CA 93305

In addition to the items noted in Bid Package 00 – Standard Project Requirements, which are applicable to ALL Contractors, the Specific Scope of the Work shall include, but not necessarily be limited to the items listed below in accordance with the applicable drawings and specification section(s). Contractors shall review all sections below and include any costs to comply in their base Bid.
NOTE: The term "Provide" is defined as "to furnish and install, complete and ready for the intended use."

BASE PROPOSAL

1. Provide all work specified within the following specification sections and drawings with the exception of items listed as "Work by Others":
    a. **Section: 079200 – Joint Sealants (as it pertains to this work)**
    b. **Section: 099000 – Painting**

2. Refer to the CPM schedule and Area Phasing plans and provide multiple mobilizations as necessary to complete this work.

3. Provide painted surfaces, including but not limited to sealer, primer, base, finish, accent or any other noted paint as noted below:

    a. Exterior painting shall include but not be limited to exposed piping per the Mechanical drawings or any other surface noted to be painted. Plaster patches to match existing.

    b. Interior painting shall include but not be limited to gypsum board, doors, door frames, window frames, and columns. For wall drywall called out to be painted, figure painting entire length of said wall, corner to corner. Exposed conduits per the Electrical drawings. Exposed Condensate lines per the Mechanical drawings.

4. Provide proper preparation for all items and surfaces called out to be painted.

5. Provide final painting of any surface after the other trades have completed their work and the ceilings have been installed. This Contractor should anticipate some minor repair work to fix dings, dents, chip etc. prior to the application of the finish coating. This work shall be a part of this contract.

6. Provide touch up of finish paint as where required.

Bid Package 09 Mechanical – Addendum No. 3

Project: **Munsey Elementary School HVAC Replacement**
3801 Brave Avenue
Bakersfield, CA 93309

DSA Number: 03-122489

Owner: Bakersfield City School District
1300 Baker St.
Bakersfield, CA 93305

In addition to the items noted in Bid Package 00 – Standard Project Requirements, which are applicable to ALL Contractors, the Specific Scope of the Work shall include, but not necessarily be limited to the items listed below in accordance with the applicable drawings and specification section(s). Contractors shall review all sections below and include any costs to comply in their base Bid.
NOTE: The term "Provide" is defined as "to furnish and install, complete and ready for the intended use."

BASE PROPOSAL

1. Provide all work specified within the following specification sections and drawings with the exception of items listed as "Work by Others":
    a. **Section: 024119 – Selective Building Demolition (as it pertains to this work)**
    b. **Section: 079200 – Joint Sealants (as it pertains to this work)**
    c. **Section: 224000 – Plumbing**
    d. **Section: 230010 – General Mechanical Provisions**
    e. **Section: 230593 – Testing, Adjusting and Balancing for HVAC**
    f. **Section: 230700 – HVAC Insulation**
    g. **Section: 232300 – Refrigerant Piping**
    h. **Section: 233113 – Air Distribution**
    i. **Section: 237000 – HVAC Equipment**

2. Refer to the CPM schedule and Area Phasing plans and calculate multiple mobilizations as necessary to complete this work.

3. Provide layout, and coordination of ductwork, supports, controls, equipment, curbs, piping, and all other plumbing and HVAC related items to be demolished by others (BP01 Selective Demolition & Abatement).

4. Provide draining of all existing HVAC Units to be removed / demolished.

5. Provide installation of Owner furnished HVAC units including picking up the units from the Owner's designated location at the Hadco Warehouse located at 1201 Citation Way, Bakersfield, CA 93308 and delivering to the project site ready for installation. Additional information clarifying Owner Furnished equipment to be provided via Addendum.

6. Provide installation of Owner furnished thermostats. Cut sheets to be provided via Addendum.

7. Provide HVAC system as shown in the contract documents, complete and ready for use. This includes all piping, roof curbs, flashing, fittings, flanges, anchors, final connections, etc. required to make the system completely functional.

8. Provide hangers, bracket, support, splay, rod, brace, angle, strap, fastener, clip etc. for work provide under this proposal package.

9. Provide insulation, jackets, vapor barrier, coatings, wrappings, fire caulking or firesafing/stopping for any duct, piping, fitting, valve or device provided as part of this work.

10. Provide condensate piping, drains (primary or secondary), and main drains complete for all HVAC units, including final connection of any such drain. Provide required trenching, backfill, and compaction required for tie-in to point of connection.

11. Provide all refrigerant piping and accessories complete as part of the indoor / outdoor units

12. Provide drip pans (primary or secondary) prepared to accept/receive condensate piping as/where required for all HVAC units requiring same.

13. Provide t-stats or any other device required to complete the controls system as/where noted including all required programming and training.

14. Provide connection of suspension wires to any grilles, registers etc. provided as part of this work. Installation of the wire to the structure are by others.

15. Provide caulking and/or joint sealers for all work provided under this proposal package.

16. Provide access doors as required by the work of this contract.

17. Provide air balancing accompanied by the appropriate supporting documentation/certification.

18. Provide all grilles, louvers, diffusers, and any finish trim etc. necessary to produce a finished complete working system. Note: It is this Contractor's responsibility to connect the ceiling wires to these items as required.

19. Provide location and/or layout for any backing or framing opening that is required to install any work performed under this proposal package.

20. Provide all required, marking, labeling and signage for all piping, valves, devices, units, etc.

21. Provide flashing and counter flashing wherever any part of a system installed under this bid package penetrates a roof or outside wall. These penetrations shall be flashed and counter-flashed absolutely watertight with a minimum 24 gauge galvanized sheet metal. Flashing apron shall extend not less that eight inches (8”) from the conduit, pipe, device or support member in all directions unless detailed otherwise and approved prior to installation. All penetrations shall be flashed following the procedures of the National Roofing Contractor’s Association.

22. Provide commissioning and documentation thereof for any item or system as required per the specifications.

23. Provide temporary filters in all equipment, for use in any equipment of this system for start-up and thru the construction phase.

24. Provide removal and off-site disposal of all temporary filters and replace with permanent filters for all equipment prior to testing and balancing with new filters

25. All firesafing and stopping to be coordinated with DSA inspector and other trades prior to installation.

26. ~~Disconnect, remove, clean, and re-install ceiling mounted ionizers in new ceilings per the contract documents.~~ Existing ionizers in the ceiling are being removed, cleaned and palletized by the District.

27. Mini-split curbs are not Owner Furnished. Contractor to provide mini-split curbs per the contract documents.

28. Provide removal and patch back of concrete, asphalt and/or landscaping disturbed by work in this proposal package.

Bid Package 10 Electrical & Fire Alarm – Addendum No. 3

Project: **Munsey Elementary School HVAC Replacement**
3801 Brave Avenue
Bakersfield, CA 93309

DSA Number: 03-122489

Owner: Bakersfield City School District
1300 Baker St.
Bakersfield, CA 93305

In addition to the items noted in Bid Package 00 – Standard Project Requirements, which are applicable to ALL Contractors, the Specific Scope of the Work shall include, but not necessarily be limited to the items listed below in accordance with the applicable drawings and specification section(s). Contractors shall review all sections below and include any costs to comply in their base Bid.
NOTE: The term "Provide" is defined as "to furnish and install, complete and ready for the intended use."

BASE PROPOSAL

1. Provide all work specified within the following specification sections and drawings with the exception of items listed as "Work by Others":
    a. **Section: 024119 – Selective Demolition (as it pertains to this work)**
    b. **Section: 079200 – Joint Sealants**
    c. **Section: 260573 – Short Circuit Protective Devices Coordination Study**
    d. **Section: 260574 – Arc Flash Hazard Study**
    e. **Section: 260943 – Network Lighting Control**
    f. **Section: 266000 – General Conditions**
    g. **Section: 267000 – Basic Electrical Materials and Methods**
    h. **Section: 270000 – Communication General**
    i. **Section: 270258 – Communication Infrastructure Systems**
    j. **Section: 271000 – Structure Cabling System**
    k. **Section: 272000 – Network Electronics – Owner Provided**
    l. **Section: 272300 – Uninterruptible Power Supply System**
    m. **Section: 273000 – Telephone/Voice System – Owner Provided**
    n. **Section: 274100 – Classroom Audio Visual Systems – Owner Provided**
    o. **Section: 275100 – Intercom/Paging/Clock Systems**
    p. **Section: 275200 – Assistive Listening Systems**
    q. **Section: 281600 – Intrusion Detection/Alarm System**
    r. **Section: 282300 – Surveillance Camera System – Owner Provided**
    s. **Section: 293100 – Fire Detection and Alarm Systems**
2. Refer to the CPM schedule and Area Phasing plans and calculate multiple mobilizations as necessary to complete this work.

3. Electrical contractor shall make all buildings and site safe for demolition to be performed by others. Provide coordination and layout for the demolition Contractor.

4. Ensure existing systems outside of the construction area are left in working order during construction. Coordinate any system outages (if required) with SCA.

5. Perform shutdowns or tie-ins during off hours. This Contractor shall include any second shift, or overtime work, and temporary facilities for such work. Notify all parties initially two (2) weeks in advance and again forty-eight (48) hours in advance before any shutdowns or tie-ins are made.

6. Contractor shall acquire an Underground Service Alert Permit for the scope of this package and maintain it during underground activities. Provide the permit number and expiration date to SCA prior to starting underground work.

7. All fire-safing and stopping to be coordinated with DSA inspector and other trades prior to installation.

8. Provide all building electrical, including but not limited to conduit, connectors, boxes, plates, receptacles, switches, fireproofing requirements, pull rope/strings, fixtures, exit signs, emergency lighting, inverters, bulbs, transformers, ~~panels~~, breakers, grounds, racks, penetrations and testing as noted in contract documents. Note: to Clarify: all wiring, conduits, fittings, pull boxes, junction boxes etc. necessary for the connection of any electrical, low voltage systems, fire alarm, or controls, etc. are part of this contract work. Panels are Owner Furnished, Contractor Installed.

9. Provide installation of Owner furnished Electrical equipment including picking up the units from the Owner's designated location at the Hadco Warehouse located at 1201 Citation Way, Bakersfield, CA 93308 and delivering to the project site ready for installation. Additional information clarifying Owner Furnished equipment to be provided via Addendum.

10. Provide all site underground or above ground electrical, power, fire alarm, including but not limited to trenching/excavation, conduit, fitting, pull boxes, vaults, bedding, shading, backfill, compaction, ~~switchgear~~, panels, pull rope/string, wire, connectors, anchor bolts, layout and placement of required anchor bolts, light poles, and relocation of pull boxes as noted on plans. Switchgear is Owner Furnished, Contractor Installed.

11. Provide PG&E infrastructure including all conduit, vaults, transformer pad, and bollards per the PG&E drawings. Contractor to coordinate PG&E inspections.

12. Provide removal and patch back of concrete, asphalt and landscaping disturbed by work in this proposal package.

13. Maintain power connection to the chiller section of the existing main switchboard in order to keep the HVAC system operational during construction. Shutoffs to be coordinated with the Construction Manager and scheduled appropriately.

14. Provide a complete and operational Fire Alarm system including but not limited to: Fire Alarm system, terminal blocks, horizontal wiring, backbone wiring, jacks, faceplates, terminations, cross connects, programming, etc.

15. Locate using appropriate means all existing underground utilities, electrical and communication conduit etc. within the new construction site. Update General Contractors As-Built drawings showing the locations of all existing utilities prior to commencement of any work.

16. Provide any excavation, shading, bedding, backfill and compaction for any work under this contract.

17. Restore grades in all areas excavated to the pre-existing condition and provide written certification these grades have been restored. Any costs associated with surveying or re-working areas previously graded shall be the responsibility of this contractor.

18. Provide off-site removal of all spoils generated by this work.

19. Include battery calculations for emergency lighting with submittals.

20. Provide all specified labeling, stenciling, tagging identification of equipment and all systems installed in this Contract. All panels must be labeled with “typewritten” labels prior to initial “punch-walk”.

21. Provide all access doors/panels required for this proposal package. Contractor shall coordinate with the Rough Framing Contractor for the location and installation of required backing material.

22. Provide disconnect switches and motor starters for equipment supplied by this and other Contractors as required. Locations of disconnect switches to be coordinated with other contractors to ensure clear view from equipment to disconnect switch. Include all supports, stands, etc. to support such items.

23. Provide connection of supporting ceiling wires to light fixture or any other device provide as part of this work.

24. Provide flashing and counter flashing wherever any part of a system installed under this proposal package (including Fire and Telecom) penetrates a roof or outside wall. These penetrations shall be flashed and counter-flashed absolutely watertight with a minimum 24-gauge galvanized sheet metal. Flashing apron shall extend not less than eight inches (8”) from the conduit, pipe or support member in all directions unless detailed otherwise and approved prior to installation. All penetrations shall be flashed following the procedures of the National Roofing Contractors Association.

25. Provide Arc Flash Hazard Studies as required by current code.

26. Provide all breaker testing as required by current code and/or per the specifications.

27. At the commencement of construction, coordinate a meeting through SCA with all trades that require electrical power. All items and equipment shall be verified for voltage, amperage, phase, location, orientation, space requirements, type of connection, starter and disconnect locations and provisions, control system operation, etc. Any discrepancies shall be listed in a formal RFI to SCA.

28. Contractor is responsible to verify/coordinate the correctness of all locations, dimensions, size of equipment/fixtures/conduit etc., with all other trades and building components. Contractor shall verify that all electrical items will fit within the designed wall cavities, ceiling spaces, furred areas, etc. before floors, decks or underground work is installed.

29. Provide full coordination and scope coverage between the HVAC Contractors for the duct smoke detection systems. This Contractor will review all the Contract Documents to confirm that all of the necessary components, conduits, equipment and low/line voltage wiring is defined properly between trades so that a complete operation system will be obtained. HVAC Contractor to install the duct smoke detectors.

30. Provide temporary power boxes (1 each per building) and power cords until permanent power supply is established to the building.

31. Provide all connections, supports, support wires, rods, braces, angles, straps, anchors, etc. for work installed under this proposal package.

32. Provide conduit, wire and connections for other trades as noted in plans and specifications.

33. Provide commissioning and documentation thereof for any item or system as required per the specifications.

34. Provide any joint sealant/caulking required to finish and seal the work of this proposal package.

35. Provide disconnects of economizer separate from AC units.

36. Contractor shall comply with the requirements of AB 219 as it pertains to the related scope of work.

37. Provide sufficient manpower and equipment to meet the dates shown on the CPM schedule. Refer to Bid package 00 (Project Requirements) for more detailed requirements.

38. Provide submittals in accordance with the Project Manual and CPM Schedule.

39. Provide final cleaning of all equipment, etc.

40. Furnish and install all fire stop material as required at all penetrations through rated walls, ceilings and slabs required by the work to meet code and construction document requirements.

41. All single line and electrical drawings and diagrams are schematic in nature and actual locations of devices and routing of conduit and wiring will vary due to actual project conditions. Include all necessary relocations and re-routing as required for a complete and functional system.

42. Contractor shall provide formal training to school district staff on any installed system.

43. Provide housekeeping pads for transformers, panels, and switchgear per the contract documents.

44. Provide reinstallation of ceiling mounted ionizers.

45. Note: the wall finish within classrooms is a plywood finish, not drywall.

46. Provide all Division 27 and Division 28 work as described in the specifications and as shown on the Camera Plot Map plan and the Standard Classroom plan. Provide all work required for complete and functioning systems including the installation of Owner provided equipment.

Bid Package 12 Asphalt Concrete Paving – Addendum No. 3

Project: **Munsey Elementary School HVAC Replacement**
3801 Brave Ave.
Bakersfield, CA 93309

DSA Number: 03-122489

Owner: Bakersfield City School District
1300 Baker St.
Bakersfield, CA 93305

In addition to the items noted in Bid Package 00 – Standard Project Requirements, which are applicable to ALL Contractors, the Specific Scope of the Work shall include, but not necessarily be limited to the items listed below in accordance with the applicable drawings and specification section(s). Contractors shall review all sections below and include any costs to comply in their base Bid. **NOTE**: The term "Provide" is defined as "to furnish and install, complete and ready for the intended use."

BASE PROPOSAL

1. Provide all work specified within the following specification sections and drawings with the exception of items listed as "Work by Others":
    a. **Section: 312000 – Earth Moving**
    b. **Section: 321216 – Asphalt Paving**

2. Refer to the CPM schedule and Area Phasing plans and calculate multiple mobilizations as necessary to complete this work.

3. Provide all site asphalt concrete paving including but not limited to: subgrade preparation, vegetation control, soil sterilization, tack coat, asphalt emulsion seal coat, redwood headers, patching and repair of existing pavement.

4. Provide flood testing of all paved surfaces after paving is complete, to ensure proper drainage, and prove no puddling will occur. Max tolerance is to be 1/8".

5. Provide all aggregate base, including grading and compaction, under any area to receive paving.

6. Provide clean sawcut line at locations where new paving abuts existing paving prior to new paving placement.

7. Provide proper number of move-ins required to complete work.

8. Provide scarification, moisture conditioning, compaction (including any proof rolling), fine grading of asphalt subgrade.

9. Obtain an approved haul route permit complete with driving route, traffic control plan, and hours of approved work from the City Public Works and/or any other required agency prior to commencing import/export activities.

10. Obtain and coordinate a designated queuing/Staging area/plan for trucks from the appropriate municipality and present to General Contractor prior to commencing any import/export or hauling of material.

11. Provide all pavement paint marking & striping as/where noted in the contract documents, including outdoor courts, play areas, fire lanes and curbs as shown on contract documents including but not limited to layout and surface preparation etc.

12. Provide all site signage as/where noted in the contract documents, including but not limited to all Accessible parking, accessible loading, fire lane, tow away, parking, bus loading student load and fire access line, exit route. Note; this work shall also include any posts (including excavation, concrete and rebar) and core drilling of any concrete necessary to install any sign or sign post. Provide

13. Provide all parking bumpers and/or barriers as/where shown including but not limited to, layout, auguring, concrete fill (of bollards) and anchors.

14. Recompact the top 12” of native soil to 92% compaction.

15. Expand asphalt patch 5’ beyond the new asphalt limits as shown on The Partial Site Plan on A2.21. Demo Contractor to provide clean saw-cut line.

JOB WALK SIGN IN SHEET – MANDATORY FOR BP 01 , 09, 10

Project:	Munsey Elementary School HVAC Replacement	**Meeting Date:**	January 24th, 2024 3:30 P.M
Facilitator:	S.C Anderson, Inc / B.C.S.D	**Place/Room:**	In Front Of School

Name	Company	Phone	E-Mail
Saad Shaikh	IDR	7144831534	info@idrdemo.com
Pete Alvarez	Sheldon Mech	661 505-7660	Pete@Sheldonmech.com
Dillon Boutē	Sheldon mech	661 414 2025	Dillon@Sheldonmech.com
Jennifer Gangl	JTS Construction	661-835-9270	estimating@jtsconstruction.com
Daniel Sanchez	PARC Environmental	559-999-5427	dsanchez@parcenvironmental.com
George Ghmoid	Michael surface solutions	818-852-8439	/george@michaelsurfacesolutions.com
Ron Ellsings	Kem Smith Const.	661.204.0419	RON@KWSMITHCO.COM
Vern Farmer	ACS Mechanical	661-663-0970	Vern@A-C-Systems.com
Dan Alexander	A-C Electric Company	461-304-4689	DanAlexander@A-CElectric.com
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Jeff West	Jarrett Elect.	661 327 8046	Jeff@CJElectric.net
Dustin Ayers	Jarrett Elect	661 327 8046	Dustin@CJElectric.net
Daniel Wastaferro	BCSD	661-510-7429	wasteferrod@bcsd.com
Anthony Osborn	Wm B Selch	661-393-8812	anthony@selchcompanies.com
Philip Ferdinands	Journey AC	661-322-1673	phil@journeyac.com
Donnie Hensley	SKYCON ELECTRIC	661-213-4141 661-330-1292	DONNIE@SKYCONELECTRIC.com

JOB WALK SIGN IN SHEET – MANDATORY FOR BP 01 , 09, 10

Project:	Munsey Elementary School HVAC Replacement	**Meeting Date:**	January 24th, 2024 3:30 P.M
Facilitator:	S.C Anderson, Inc / B.C.S.D	**Place/Room:**	In Front Of School

Name	Company	Phone	E-Mail
Robbie Judd	Bronco	661.589.9439	rjudd@broncoelectric.com
Gary Ochoa Tom Hamacher	Premier Success	661-633 U	Premier 661 @gmail.com
Kenneth Ricks	AZZ Technologies Inc	661-428-5400	AZZTechnologies.KR @Gmail.com
Curtis Long	Building Electronic Controls INC.	661-332-1826	Curtis L@BECINC.NET
Hector Rodrigue	Rodriguez Drywall	661-477-4154	NRODplastering@yAoo.com
Craig Henriksen	EMCOR Mesa	661 335-1500	Chenriksen@emcor.net
Dance LaMarsha	American Inc. MD DEMO	5596051 ITL,	Llamarsha@amiic.com
FRED WARD	AMERICAN inc	6618059888	
Jesse Jurevano	ASI INC	327-2900 661-827-2900	Keena@asi-INC.NET jesse@asi-INC.NET
Kaleb Abernathy	Amerivet	661-205-2150	blakearnold Construction @yahoo.com
Lupe Trevino	ACCO	619-339-7401	Rblunt@accoes.com ltrevino@accoes.com
Daniel Bowen	Bowen Eng	5597337464	OFFICER bowendemo.com
Greg Paul	CVE	559 978 1053	GREGP@CVECORP.COM
Marc Asher	ASTI Integrated	424-320-1898	Marc@astifm.com
TERRY JOHNSON	SCA	661.281 8478	
Jack Garcia	S.C.A	661-392-7000	estimating@scanderson.com
JOE IANNINO	SCA	11	JEJANNINO@SCANDERSON.COM

Name	Company	Phone	E-Mail
Dick Wilson	Paint	661 619 8112	WDWilsonPainting@

BACKERSFIELD CITY SCHOOL DISRICT
MUNSEY ELEMENTARY SCHOOL
HVAC REPLACEMENT
3801 BRAVE AVENUE
BAKERSFIELD, CA 93309

DSA APP# 03-122489

PROJECT: 5524 February 5, 2024

RESPONSES TO RFI 003 DATED JANUARY 25, 2024

3.01 Existing ceiling ionizers are to be removed, cleaned free of dirt, grease, rust, stains, etc. and palletized by the district. The electrical contractor shall reinstall and connect all existing salvaged ionizers.

3.02 Provide controls per Specification Section 237000, 1.2, A, 2 Temperature Control System and per detail 8/M0.11 as issued in Addendum 1, except for the thermostat with integrated CO2 sensor. Contractor to install Owner furnished Pelican Wireless thermostat with integrated CO2 sensor. See attachment DS-TS250-02-T-Stat-CO2-Datasheet.

3.03 Mechanical sheets M2.31, M2.41, and M2.51. have been revised to indicate continuation of the condensate pipe from the roof to existing drywell.

3.04 Each worker on site is required to obtain Two Hour Asbestos Awareness Training or provide proof of training within the last year. Two-hour Asbestos Awareness Training is an annual training.

3.05 Remove existing radiator as indicated in revised sheets M2.31, M2.41, and M2.51. After the radiator is removed, the area is to be furred out to accept new tackboard finish. District would like to add new tackboard finish to the walls as highlighted on the attached sketch. Chatfield Clark Ceres Fog https://chatfieldclarke.com/koroseal-ceres/fog-b321-91/

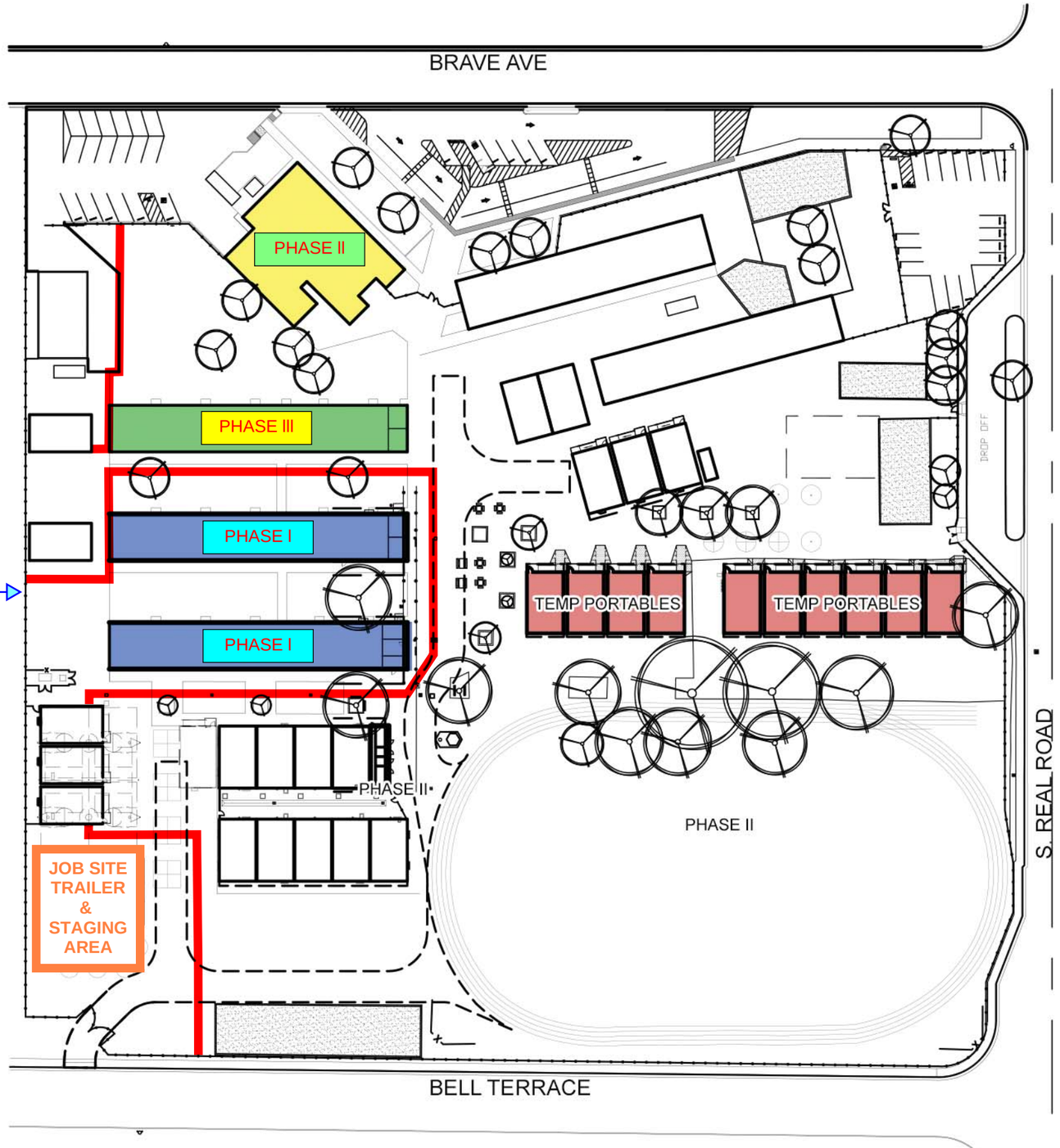
3.06 Remove existing barometric relief vent and metal panel infill and infill opening as per detail 2/A2.10, also see revised sheets M2.31, M2.41, and M2.51.

3.07 Sheets A2.10, A2.11, A2.20, and A2.21 have been revised to indicate the removal of a portion of existing cabinets at each of the classrooms.

3.08 Remove existing hydronic piping on covered walkway roof between building A and C. The district will assess the condition of the roof after piping is removed to determine if foam roof re-coating will be needed.

3.09 Contractor to provide roof curbs for outdoor units, ODU-1 to ODU-3. Refer to detail 12/M0.11 and Specification Section 237000, 2.2 Equipment Support.

3.10 Building A reflected ceiling plans on sheets A6.10 and A6.20 have been revised to indicate the removal of the existing ceiling in the rooms on each side of the Stage room A-2 and new 2’X4’ suspended acoustical tile ceiling system. Building A lighting plan E2.20 was coordinated with the architectural drawings.



PHASE 1 - TEMP. FENCING - 1,055LF

SCALE: 1" = 60'-0"

0 60' 120'

G:\Design\2022 Projects\BCSD Munsey ES Temp Portables\Design\230825_Temp Portables

Bakersfield City School District
1300 Baker Street
Bakersfield, CA 93305

PHASING PLAN

Munsey Elementary School

integrated designs
by SOMAM, Inc.
ARCHITECTURE • ENGINEERING • INTERIOR DESIGN
PROJECT MANAGEMENT
Phone (559)436-0881 • www.integrateddesigns.com

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10/17/2023

PHASE 2 - TEMP. FENCING - 370LF

SCALE: 1" = 60'-0"

0 60' 120'

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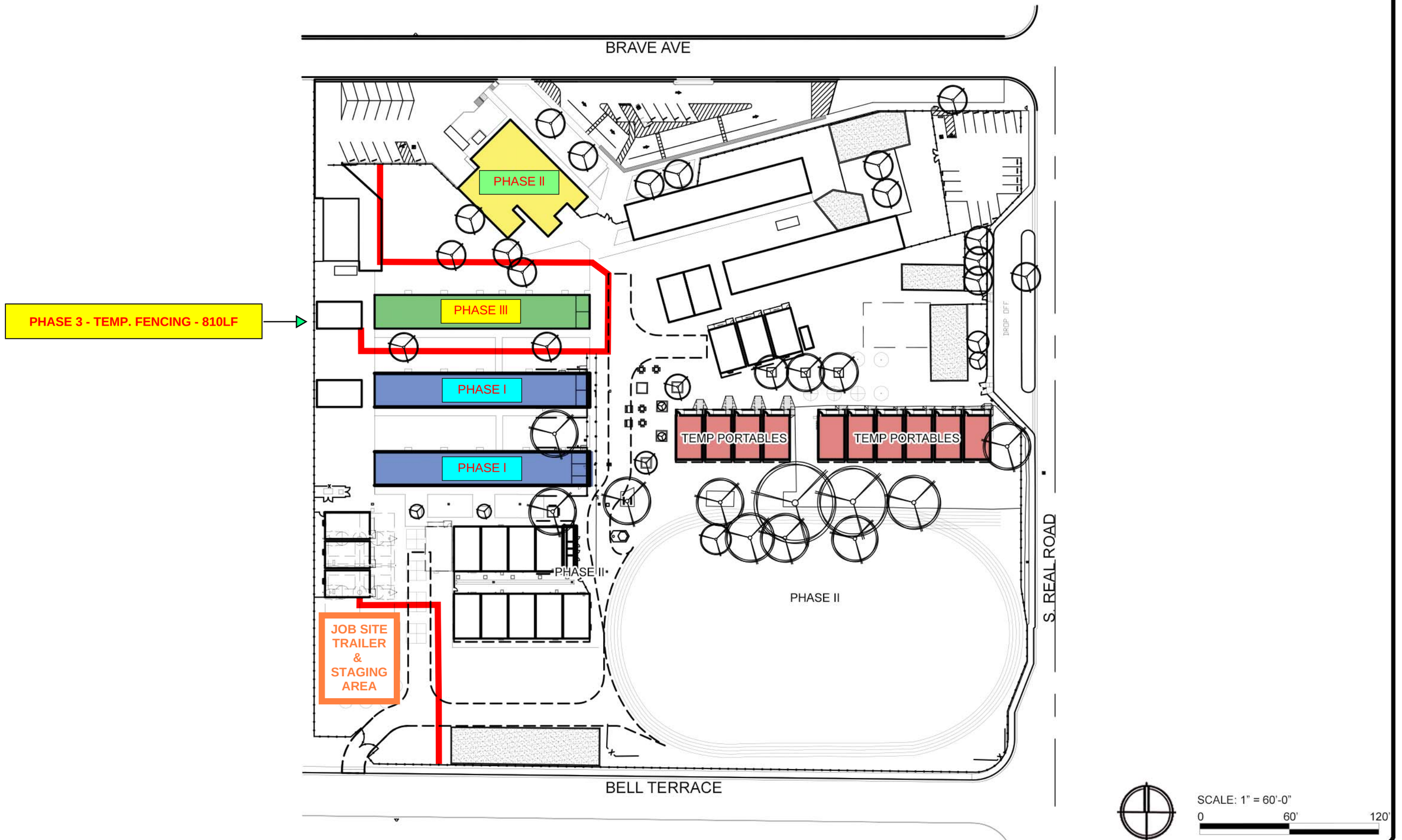

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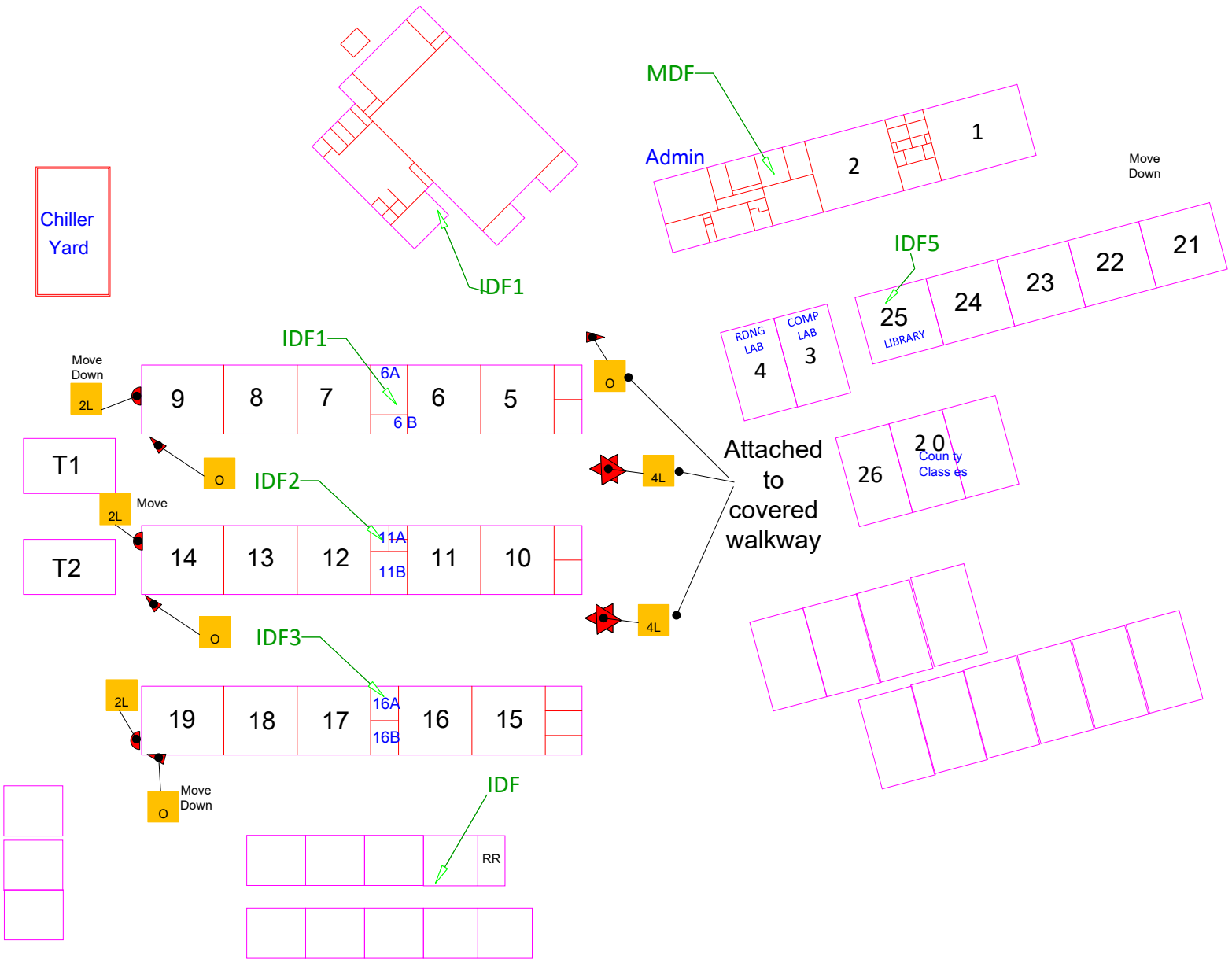
10/17/2023

Munsey / Site 35
3801 Brave Ave.
631.5390



PELICAN

TS250 Internet-Enabled Thermostat with Integrated CO^2 Sensor

The Pelican Internet-Enabled Thermostat with an integrated CO^2 sensor provides commercial customers with virtual climate and air quality management. The TS250 delivers accurate temperature management, air quality (CO^2) management, leading edge energy efficiency, built-in safeties and alarming, and fine tuned comfort. Coupled with the Pelican Web App, the TS250 tracks space temperature, CO^2 levels, and HVAC operational data in real-time and historically. All information is displayed in real-time online and is viewable on any Internet-connected device.

MESH WIRELESS NETWORK

The TS250 communicates wirelessly with a GW400 to reach the Internet. Each TS250 has built-in state-of-the-art wireless mesh network communication and repeating.

FAULT ALARMING

Built-in system and space analytics with automated email or text message alerts when a fault is detected.

WEB APP

Virtual and central management of TS250 available on all smart phones, tablets, and PCs. Directly manage thermostat temperature and CO^2 levels through a web browser. Designed for intuitive control over multiple thermostats.

HISTORICAL TREND DATA

Online viewable historical data of space temperature, setpoints, HVAC demand, CO^2 level, and fan demand.

INSTALLATION

Industry standard HVAC terminals utilize existing thermostat wire. Included with TS250 is Pelican's innovative limited wiring relay pack (WM500) used in applications where there are only three (3) wires to the HVAC unit.

SCHEDULING

Through the Pelican Web App you can schedulethe TS250 thermostat for daily, 5-2, or 7-day schedules. Thermostats can also be scheduled as groups, for simple multi-thermostat management.

Specifications

POWER	
Hardwire	24VAC, 60Hz; 50 mA
Voltage Range	23 - 30VAC
Relay Current	1.0A running
COMPATIBILITY	
24VAC gas, electric, or oil heating systems. Conventional and Heat Pump	
WIRING	
Conventional	R, RC, W, W2, Y, Y2, G, C
Heat Pump	R, RC, O/B, AUX, Y, Y2, G, C
SYSTEM PROTECTION	
Four-Minute Compressor Short-Cycle Protection	
Temporary Schedule Override	
Auxiliary/Emergency Heat Efficiency Algorithm	
Keypad Lockout	
Trend Data Analytics and Fault Monitoring	
THERMOSTAT RANGE	
Operating Range	-20°F to 122°F
Differential Temperature	±0.5°F
Operating Humidity (%RH)	5 to 90% RH; non-condensing
Integrated Room CO^2 Sensor	0 – 2000 PPM; +/- 50ppm accuracy
Storage Temperature	-20°F to 160°F
SIZE	
Inch	H 3.5 x W 5.97 x D 1.5
mm	H 89 x W 150 x D 38
Horizontal Mounting	

Designed and assembled in the USA
5-Year Limited Warranty

CONTAINS FCC ID OA3MRF24J40MA

Air Quality Management

Pelican Wireless Systems | 2655 Collier Canyon Road, Livermore CA 94551
(888) 512-0490 | sales@pelicanwireless.com

SECTION 27 0000

COMMUNICATIONS GENERAL

Part 1 General

1.1 Related Sections

A General

1 This specification section provides general conditions for all division 27 specifications. All contractors working within the division 27 specification shall adhere to this specification.

- Section 27 0258 – Communication Infrastructure Systems
- Section 27 1000 – Structure Cabling System
- Section 27 2000 – Network Electronics – Owner Provided
- Section 27 2300 – Uninterruptible Power Supply System
- Section 27 3000 – Telephone/Voice System – Owner Provided
- Section 27 4100 – Classroom Audio Visual Systems – Owner Provided
- Section 27 5100 – Intercom/Paging/Clock Systems
- Section 27 5200 – Assistive Listening Systems
- Section 28 1600 – Intrusion Detection/Alarm System
- Section 28 2300 – Surveillance Camera System – Owner Provided

1.2 Statement of Work

A General

1 This document describes the requirements for the contractors, products, and installation relating to furnishing and installing the described low voltage systems.

2 The Contractor will provide a bid including all labor, materials, tools and equipment required for the complete installation of work called for on the Construction Drawings and described in the specification sections. It is the responsibility of the Contractor to provide all material necessary to provide a complete and operable system. If the Contractor feels that the system described is incomplete, they must address this in writing to the Owner's Representative before providing a bid.

3 All questions concerning non-specified products and services will be addressed to the Owner's Representative before the Contractor provides a bid. The Owner expects that by accepting the Contractor's bid proposal that the Contractor has provided a competent bid for a complete solution.

4 Product specifications, general design considerations, and installation guidelines are provided in this document. Typical installation details, and mounting details are provided in the Construction Drawings. The successful vendor shall meet or exceed all requirements for the systems described in this document.

1.3 Regulatory References

A The Contractor will comply with the following:

1 Federal:

- National Electrical Code (NEC) 2008 or latest approved
- Chapter 8: "Communications Systems"
- Article 250: "Grounding"

2 NFPA 70 – National Electric Code

3 FCC – Part 15, Part 68

4 ADA – Americans with Disabilities Act

B State of California
1 CCR, Part 2 – California Building Code
2 CCR, Part 3 – California Electrical Code
3 Occupational Safety and Health Act (OSHA)
4 Title 24, Building Standards, State of California
5 Title 19, California Code of Regulations
6 Title 8, Electrical Safety, State of California

C ANSI Standards
1 ANSI C2-2001 National Electrical Safety Code
2 ANSIC80.3 Specification for Zinc-Coated Electrical Metallic Tubing
3 ANSI/UL 797 Electrical Metallic Tubing
4 ANSI/CEA S-83-596-2001 – Fiber Optic Premises Distribution Cable Technical Requirements

D Industry Standards
1 Telecommunications Industry Associations/Electronics Industry Association (TIA/EIA)
- TIA/EIA-568-C Commercial Building Telecommunications Cabling Standard
- TIA/EIA-568-C.1 General Requirements
- TIA/EIA-568-C.2 Balanced Twisted Pair Cabling Components Standard
- TIA/EIA-568-C.3 Optical Fiber Cabling Components Standard
- TIA/EIA-569-A Commercial Building Standard for Telecom Pathways and Spaces
- TIA/EIA-606 Administration Standard for the Telecommunications Infrastructure of Commercial Buildings
- TIA/EIA-607 Commercial Building Grounding/Bonding
- TIA/EIA-758 Customer Owned Outside Plant Telecommunications Cabling Standard
- TIA/EIA-758-1 Addendum No. 1 to TIA/EIA-758, Customer Owner Outside Plant Telecommunications Cabling Standard

2 National Electrical Manufactures Association (NEMA)
3 Institute of Electrical and Electronic Engineers (IEEE)
- 802.3 (Ethernet)
- 802.3ab (Gigabit Ethernet over 4-pair Category 5e, 6 & 6A or higher)
- 802.3Z (Gigabit Ethernet over Optical Fiber)

4 Underwriters Laboratories Inc. (UL)
5 International Organization for Standardization/International Electromagnetic Commission (ISO/IEC) ISO 11801 Generic Cabling for Customer Premises
6 Building Industry Consulting Services International (BICSI) Telecommunications Distribution Methods Manual (TDMM 14th Edition or latest)
7 ASCII – American Standard Code for Information Interchange
8 ASTM – American Society for Testing Materials

E Conflict
1 If there is a conflict between applicable documents, then the more stringent requirement shall apply. All documents listed are believed to be the most current releases of the documents. The Contractor has the responsibility to determine and adhere to the most recent release when developing the proposal for installation.
2 This document does not replace any code, either partially or wholly. The Contractor must be aware of and comply with all local codes that may impact this project.

Part 2 Contractor Requirements/Qualifications

2.1 Safety and Indemnity

A General

1 The contractor shall be solely and completely responsible for conditions of the job site, including safety of persons and property during performance of work.

2 The Contractor shall ensure that all personnel working in or anywhere on the site shall be provided a hard hat, safety shoes, a face shield or safety goggles, etc. for their protection.

3 No act, service, drawing review or construction observance by the Owner's Representative or any other party employed by the campus is intended to included review or approval of adequacy of the Contractor's safety measures, in, on or near the construction site.

2.2 Contractor Qualifications

A General

1 Each low voltage contractor/sub-contractor shall submit their qualifications to the district prior to award of contracts.

2 Contractor shall have been in business for no less than five (5) years and have installed a minimum of three (3) projects of similar size and scope.

3 A Manufacture Certified Installer shall complete the System installation. The Contractor shall have completed standards based product and installation training. A copy of the Contractor's Manufacture Certified Installed certificate shall be submitted with their submittal.

4 Sub-Contractor Qualifications

- All Contractors shall submit a list of at least three (3) projects of similar dollar volume completed within the past 24 months for reference purposes.
- The Contractor shall compile detailed information relating to similar work completed, including corporate references sufficient to enable the Owner to evaluate and agree to the Contractor' responsibility, experience and capacity to perform the work.
- Each Contractor to perform telecommunications work on this project shall possess a C-10 or C-7 (formerly C-6) Limited Specialty License for Telecommunications and must be certified for installation, termination, splicing, and testing of copper cables, fiber optic cable, riser cable and inside wiring. The appropriate contractor's license for underground construction and conduit installation is also required.
- An on-site Contractor superintendent must be available at all times. Contact can be by person or telephone.

5 Contractors who do not meet the minimum requirements specified will not be accepted.

2.3 Quality Assurance

A General

1 Contractors are required to comply with the following without exception.

2 The winning Contractor will assign this project to a competent Project Manager who has demonstrated their ability to supervise a telecommunications project of the same size and scope.

- The Contractor will make this person available to the Owner/Owner's Representative before the start of this project for an interview. This person must be deemed acceptable by the Owner and/or their Representative before work can begin.

- Project Manager will be required to be available for scheduled on-site project meetings at no additional cost to the Owner.
- Project Manager will be required to be available to meet on-site with the Owner/Owner's Representative with a minimum of 24 hours' notice for non-emergency issues, and a minimum of 4 hours for emergency issues at no additional cost to the Owner.

3 All material and equipment to be installed on this project shall be "new". If the Owner/Owner's Representative discovers that "used" material or equipment has been installed on this project, the Contractor will be required to replace said materials and/or equipment with "new" products as no additional cost to the Owner.
- "New" – Materials and products manufactured within one (1) year prior to installation, and meet or exceed the latest published specifications of the manufacture. Also these materials and equipment may not have been in use before installation on this project unless directed otherwise in the project documents.

Part 3 Documentation

3.1 Products

A Pre-Approved Equals

1 All pre-approved products shall be listed in the relevant specification section.

B Other Products

1 Contractors wishing to approve a system other than those specified in this document will be required to perform the following:
- Provide system specifications and cut sheets for all system components for the proposed new system(s).
- Provide an itemized comparison to each of the system functions as described in this specification. Include in that document how the proposed system compares to the specified system described in this document on a line-by-line basis, using one of the following three criteria:
  - "exceeds"
  - "matches"
  - "unequal"

2 All other products than those specifically addressed in the bid documents the Contractor is seeking approvals for must be received by the Owner's Representative no later than 10 business days before the bid date. All Approved Equals will be published in addendum form prior to the bid date.

3 Failure to receive written approval for products installed that deviate from the products called for in the specifications and/or in the project drawings, will result in the Contractor replacing the unapproved materials and equipment with the originally specified products at no additional cost to the Owner.

4 All proposed system documentation must be sent to the Owner's Representative via one of the following: mail, fax, or email. The Contractor will include the project name, their contact information, and the specification section number that the proposed system is comparable to.

3.2 Submittal Documentation

A General

1 The successful Contractor shall provide their submittal package in accordance with Section 01 20 00 1.06 Submittal Schedule.

B The Submittal Package will include:
1 All documentation given will be on a digital media device (USB thumb drive or CD/DVD)
2 A coversheet on the Contractor's Company Letterhead including:
- Contractor's Name
- Contractor's License Number
- The Project Name
- The specification Number and Description
- The date documentation was submitted.

3 A spreadsheet with a full material list of products, equipment and software included in the Contractor's bid price. The items on the spread sheet shall be in the same order as listed in the specifications. The spreadsheet will include:
- Manufactures Name
- Part Number
- Description
- Quantity to be installed for each part

4 A legible copy of the Manufacture's Catalog Cut sheet for each part included in the Contractor's Bid.
- The catalog cut sheets shall be placed in the same order as shown on the spread sheet.
- The catalog cut sheets shall have the specified part numbers clearly highlighted.

5 Copies of the Manufacture's Certification for a minimum of the Project Foreman and 50% of the installation crew.
6 The Contractor will provide a sample for each cable identifier to be used on the project. Labeling schemes can be found in the installation details.
7 When submitting multiple submittal sections for review, the contractor shall create digital bookmarks at each specifications section change. The digital book marks shall be easily identified and easily accessible through all standard PDF viewing software (i.e. Adobe, BlueBeam).

C LEED/CHIPS/HPSA (when applicable to the project, provide additional submittal information)
1 Recycled content, segregated by per- and post-consumer percentages.
2 Rapidly renewable material content.
3 VOC Content
4 Distances from site to follow material process locations.
- Raw material harvest, collection or extraction
- Product of component fabrication
- Final materials manufacture, if different than component fabrication.

3.3 Acceptance
A Project Acceptance
1 The Owner and the Contractor shall accept the project as complete based on the following criteria:
- Before executing any performance testing, the Contractor shall present a test plan to the Owner's Representative for their approval.
- The Contractor has completed all testing and delivered copies of all test resulting the Owner's Representative.
- All test results have been examined and approved by the Contractor and Owner's Representative.
- Copies of all documentation required by [close out documents section] have been delivered to the Owner's Representative.

- All punch list items are completed to the satisfaction of the Inspector of Record.
- Manufacturer Warranty Certification Certificates are provided to the Owner.

2 Following completion and/or compliance with the requirements listed above, the Contractor shall issue a Notice of Completion confirming that the project is complete. A 45-day acceptance period shall begin immediately following the issuance of the Notice of Completion.

3 Minor failures shall be responded to at the Owner's discretion or within one (1) business day.

3.4 Warranty

A Manufacturer Warranty

1 The installed 27 1000 Structured Cabling (as applicable for given cable media) System, including both inter-building and intra-building sub-systems, shall be warranted by a manufacturer for a minimum of 15 years.

2 The warranty certified systems will be complete systems comprised of products from a single manufacturer for the entire channel (cords, outlets/connectors, cables, cross-connects, patch panels, etc.). The manufacturer shall administer a follow on program through the Contractor to provide support and service to the Owner. In the event that the certified systems cease to support the certified application(s), whether at the time of cutover, during normal use, or when upgrading, the manufacturer and Contractor shall commit to promptly implement corrective action.

3 The Contractor shall be responsible for correcting any problems and malfunctions that are warranty related for the entire warranty period. In the event that a Contractor should not be in business at the time of an issue, the manufacturer shall be responsible for all corrections, if deemed the responsible party.

4 Copies of an extended material warranties shall be passed through to the Owner.

B Contractor Warranty

1 Contractor must warranty all materials, equipment and labor for a minimum of one (1) year from the Owner's acceptance of the work.

- Warranty will provide repair/replacement of all defective or improperly installed materials at no additional cost to the Owner (including labor, travel time/expenses, shipping, taxes, etc.).
- Contractor is required to keep in stock replacement parts for all items covered in this specification and provide a competent service technician to be on site to repair/replace defective items no later than 24 hours after receiving a trouble call.

2 Warranty will cover normal business hours, 8am-5pm, Monday through Friday. All calls received on a Friday or the day before a holiday will be held until the following regular business day.

3 During the installation and up to the date of final acceptance, the Contractor shall protect all finished and unfinished work against damage and loss. In the event of such damage or loss, the Contractor shall replace or repair such work at no cost to the Owner or any other Trade Partnership working on the project.

3.5 Close-Out Documentation

A Structured Cabling

1 Upon completion of the installation, the telecommunications contractor shall provide two (2) full documentation sets to the Owner's Representative for approval. One (1) to be a hard copy and one (1) to be an electronic copy. Documentation shall include the items detailed in the sub-section below.

- Documentation shall be submitted within thirty (30) days of the completion of each construction phase. This is inclusive of all test results and draft as-built

drawings. Draft as built drawings must include annotations of any changes to the original plans. Machine generated final copies of all drawings shall be submitted within thirty (30) calendar days of the completion of each testing phase. At the request of the Owner's Representative, the telecommunications contractor shall provide copies of the original test results.

- The As-Built drawing are to include conduit routes, utility vault/pull box locations, surface mount enclosure locations, PVC to GRC transition points and the approved labeling identifiers. Numbering, icons, and drawing conventions used shall be consistent throughout all documentation provided. The Owner will provide floor plans in paper and electronics (DWG, AutoCAD 2008) formats on which as built construction information can be added. These documents will be modified accordingly by the telecommunications contractor to denote as-built information as defined above and returned to the Owner.
- The Owner's Representative/Engineer can request that a 10% random field re-test be conducted on the cable system, at no additional cost, to verify documented findings. Tests shall be a repeat of those defined above. If findings contradict the documentation submitted by the telecommunications contractor, additional testing can be requested to the extent determined necessary by the Owner's Representative/Engineer, up to and including 100% re-test. Any re-testes shall be at no additional cost to the Owner.
- Test Result documentation shall be provided in two media, as listed above, one (1) hard copy and one (1) digital copy, within thirty (30) days after the completion of the project. The documentation shall be clearly marked on the outside front cover with the words 'Project Test Documentation', the project name and the date of completion (month and year). The results shall include a record of test frequencies, cable type, conductor pair and cable (or outlet) ID, measurement direction, reference setup, and crew member name(s). The test equipment name, manufacturer, model number, serial number, software version and last calibration date will also be provided at the end of the document. Unless the manufacturer specifies a more frequent calibration cycle, a bi-annual calibration cycle is anticipated on all test equipment used for this installation. The test document shall detail the test method used and the specific settings of the equipment during the test as well as the software version being used in the field test equipment.
- Printouts generated for each cable by the wire test instrument shall be submitted as part of the documentation package.
- When repairs and re-tests are performed, the problem found and corrective action taken shall be noted, and both the failed and passed test data shall be documented.

B Audio Visual Systems

1 Upon completion of the installation, the contractor shall provide two (2) full documentation sets to the Owner's Representative for review, one (1) copy to be a hard copy and one (1) to be an electronic copy. Documentation shall include the items detailed in the sub-sections below:

- Documentation shall be submitted within ten (10) days of the completion of each testing phase. This includes system single line drawings, maintenance and operations manuals and all warranty information.
- The Device Information documents are to be in Excel spreadsheet format. Each device installed will have individual information entered in the spreadsheet including:
- Manufacture and Model of each device
- Physical location (may include a digital picture) and mount type
- Serial number of the device

- Firmware revision installed
- Address and contact information of the responsible staff.
- Each Device Configuration document shall be provided in both an electronic and text document format. One (1) to be a hard copy and one (1) to be an electronic copy. The Device Configuration documents are to be in a text file format. Each device installed will have the following configuration information included (where applicable):
- Manufacturer and Model of device
- Current installed (running) configuration
- Firmware revision installed
- Installed modules, blades, or accessories
- All System source codes and passwords must be handed over to, and become property of the Owner upon completion of this project.

2 As-Built Drawings
- The As-Built drawings are to include Rack Elevations, Back Board Layout, Equipment Layout and System Single Line Drawings.

C Intercom/Paging/Clock Systems

1 Upon completion of the installation, the contractor shall provide two (2) full documentation sets to the Owner's Representative for review, one (1) copy to be a hard copy and one (1) to be an electronic copy. Documentation shall include the items detailed in the sub-sections below:
- Documentation shall be submitted within ten (10) days of the completion of each testing phase. This includes system single line drawings, maintenance and operations manuals and all warranty information.
- The Device Information documents are to be in Excel spreadsheet format. Each device installed will have individual information entered in the spreadsheet including:
- Manufacture and Model of each device
- Physical location (may include a digital picture) and mount type
- Serial number of the device
- Firmware revision installed
- Address and contact information of the responsible staff.
- Each Device Configuration document shall be provided in both an electronic and text document format. One (1) to be a hard copy and one (1) to be an electronic copy. The Device Configuration documents are to be in a text file format. Each device installed will have the following configuration information included (where applicable):
- Manufacturer and Model of device
- Current installed (running) configuration
- Firmware revision installed
- Installed modules, blades, or accessories
- All System source codes and passwords must be handed over to, and become property of the Owner upon completion of this project.

2 As-Built Drawings
- The As-Built drawings are to include Rack Elevations, Back Board Layout, Equipment Layout and System Single Line Drawings.

D Intrusion Alarm System

1 Upon completion of the installation, the contractor shall provide two (2) full documentation sets to the Owner's Representative for review, one (1) copy to be a hard copy and one (1) to be an electronic copy. Documentation shall include the items detailed in the sub-sections below:

- Documentation shall be submitted within ten (10) days of the completion of each testing phase. This includes system single line drawings, maintenance and operations manuals and all warranty information.
- The Device Information documents are to be in Excel spreadsheet format. Each device installed will have individual information entered in the spreadsheet including:
- Manufacture and Model of each device
- Physical location (may include a digital picture) and mount type
- Serial number of the device
- Firmware revision installed
- Address and contact information of the responsible staff.
- Each Device Configuration document shall be provided in both an electronic and text document format. One (1) to be a hard copy and one (1) to be an electronic copy. The Device Configuration documents are to be in a text file format. Each device installed will have the following configuration information included (where applicable):
- Manufacturer and Model of device
- Current installed (running) configuration
- Firmware revision installed
- Installed modules, blades, or accessories
- All System source codes and passwords must be handed over to, and become property of the Owner upon completion of this project.

2 As-Built Drawings

- The As-Built drawings are to include Rack Elevations, Back Board Layout, Equipment Layout and System Single Line Drawings

END OF SECTION

SECTION 27 0528

COMMUNICATIONS PATHWAYS

Part 1 General

1.1 Statement of Work

A General

1 This document describes the requirements for the contractors, products and installation relating to furnishing and installing Underground Ducts and Raceway systems. All systems described herein shall be governed by the Division 26xxxx specifications, should these two documents be in conflict the more stringent shall prevail.

2 The locations of vaults and pull boxes on the drawings are approximate and reflect the best information available. The Contractor is responsible for locating all existing utilities within the areas to be excavated prior to excavation. Final location of all trenches, communications utility vaults, and pull boxes must be verified and signed off on by the Owner/Owner's Representative.

3 The contractor shall furnish and install all work necessary to make compete systems, whether or not such details are mentioned in these specifications or shown on the drawings, but which are necessary in order to complete working systems, excepting those portions that are specifically mentioned therein or plainly marked on the accompanying drawings as being installed or supplied by others.

1.2 References

A Regulatory References

1 Contractors will comply with all requirements as specified in Section 27 0000 '1.3. – Regulatory References'.

1.3 Safety and Indemnity

A Requirements

1 Contractors will submit the necessary documentation to demonstrate their compliance with Section 27 0000 '2.1 – Safety and Indemnity'.

1.4 Contractor Qualifications

A Requirements

1 Contractors will submit the necessary documentation to demonstrate their compliance with Section 27 0000 '2.2 – Contractor Qualifications'.

1.5 Quality Assurance

A Requirements

1 Contractors shall comply with all requirements as specified in Section 27 0000 '2.3 – Quality Assurance'.

1.6 Equivalent Products

A Approved Products

1 All products described, and part numbers given in this specification are those of Leviton, Superior Essex and Cooper B-Line unless otherwise noted.

B Pre-Approved Equals
1 Utility Vault Company, Christy Concrete, BES
2 Hoffman, B-Line, Circle AW
3 Carlon, Allied Tubing, MaxCell
4 RANDL Inc., Thomas & Betts, Bridgeport, Appleton, Erico, Minerallac
5 Wiremold, Hubbell

C Other Than Approved Products
1 Contractors wishing to approve a system other than those specified in this document shall do so in accordance with Section 27 000 '3.1 Products'.

1.7 Submittal Documentation
A Requirements
1 The successful contractor shall provide their submittal package in accordance with the Section '01 20 00 – Submittal Schedule' and Section 27 0000 '3.2 – Submittal Documentation'.

1.8 Acceptance
A Requirements
1 The contractor shall comply with all requirements as listed in Section 27 0000 '3.3 – Acceptance'.

1.9 Warranty
A Requirements
1 The contractor shall comply with all requirements as listed in Section 27 0000 '3.4 – Warranty'.

Part 2 Products

2.1 Pathways and Fittings
A Communication Underground Boxes
1 Communication Pull Boxes
- Provide separate pre-cast concrete pull boxes, with lids labeled "communications" (for TV, telephone, data, security).
- Type equal to "Christy N16, N30, N40, N44" steel reinforced solid concrete box, concrete lid & 12" extension box shall be used. See project drawings for locations & additional requirements.
- Shall be constructed out of 3000 PSI steel reinforced concrete.
- Install on 6" gravel pad and provide drain. See project details for more info.
- Pull boxes in traffic areas and along roads shall be designed and installed for H20-44 loading.
- Pull boxes shall be located and provided with grade rings as necessary to ensure that water is drained from conduits.
- Pull boxes shall be installed to minimize surface drainage entry as follows:
  - Pull boxes should not be located in paths or streets. If such location cannot be avoided, pull boxes should not be located in low spots or drainage channels.

- Pull boxes not located in paths or streets should be installed so that the top is approximately 2" above final grade.
- All pull boxes shall be installed with a mow strip minimum of 6”.
- Non-slip lids shall be provided for pull boxes in sidewalk areas. Use concrete or fiberglass-no metal lids in sidewalks.
- Quantity: Contractor will provide pull boxes and covers in the sizes and quantities as shown on the drawings

2 Communication Vaults

- Provide separate pre-cast concrete vault, with lids labeled "communications" (for TV, telephone, data, intrusion alarm).
- Vaults shall be equipped with a cable racking on the long walls suitable to support large copper cables as called for on the design documents.
- Vaults shall include; Anchorage, Lifting Inserts and Racking Devices.
- All Vaults shall be equipped with traffic-rated lids with a locking mechanism. All lids shall have the identification marking of “Communications” permanently affixed to the cover.
- All pull boxes shall be installed with a mow strip minimum of 12”.
- Quantity: Contractor will provide vaults and covers in the sizes and quantities as shown on the drawings.
- Standard Vault size 24”x36”x36” equal to Old Castle 2436-STD
- Large Vault size 36”x60”x36” equal to Old Castle 3660-STD

3 Communication Vault Accessories

- UNDERGROUND CABLE RACK HOOKS
- Lite Duty Extension
  - Formed from 3/16-inch steel
  - Hot dipped galvanized per ASTM A123 / A153
  - Smooth top surface to protect cables from damage
  - Insulator 11A31 fits these hooks
  - Part numbers Inwesco or equal

Catalog Number	Extension from Face of Rack
10A35	4”
10A36	7-1/2”
10A37	10”
10A38	14”
10A39	18”

- Heavy Duty Extension
  - Formed from 10-ga. steel
  - Hot dipped galvanized per ASTM A123 / A153
  - Unique design locks hook into rack
  - Part numbers Inwesco or equal

Catalog No.	Extension from Face of Rack
10C38	14”

- J-Hook Cradle
  - Curved design to cradle cable
  - Available in fusion bonded epoxy coated steel
  - Available in injection molded ABS plastic
  - Steel used is 1/4-inch-thick x 15/16 inch wide
  - ABS plastic hooks are 1-3/8 inch wide
  - ABS plastic hooks furnished with locking tab
    Part numbers Inwesco or equal

Catalog No.	Type	Extension from Face of Rack
10A60	Coated Steel	2-1/2”
10B60	Plastic	2-1/2”
10A61	Coated Steel	5”
10B61	Plastic	5”

4 Surface-Mounted Entrance Cabinets Type 1 & 12
- The Contractor shall provide a minimum of a NEMA 1 type enclosure that meets the UL 50, File No. E27567: Type 1 NEMA/EEMAC Type 1 CSA, File No. LL42184: Type 1 IEC 60529, IP30 standards for indoor applications.
- The Enclosure shall be constructed from 16 awg galvanized steel, with a drip shield top and seam free side, front and back.
- The Enclosure shall have a “slip-on” removable front cover held in place with steel screws.
- Enclose shall incorporate pre-punched knockouts for standard trade size conduits up to 1”.
- The size of cabinets mounted on an outside wall to serve a smaller building shall be as indicated on the construction plans.
- Quantity: Contractor will provide boxes in the sizes and quantities as shown on the drawings.

5 Surface-Mounted Entrance Cabinets Type 3R and 4X
- The Contractor shall provide a minimum of a NEMA 3R type enclosure that meets the UL 50 for outdoor applications.
- The Enclosure shall be constructed from 16 awg galvanized steel, with a drip shield top and seam free side, front and back.
- The Enclosure shall have a “slip-on” removable front cover held in place with steel screws.
- Enclose shall incorporate pre-punched knockouts for standard trade size conduits up to 1”.
- The size of cabinets mounted on an outside wall to serve a smaller building shall be as indicated on the construction plans.
- Quantity: Contractor will provide boxes in the sizes and quantities as shown on the drawings.

B Metallic Pull Boxes and Terminal Cans

1 NEMA Type 1 – Screw Cover Cans
- Used for indoor use only
- NEMA/EEMAC Type 1, IEC 60529, IP30
- UL 50, 50E Listed; Type 1; File No. E27525, cUL Listed per CSA C22.2 No 40; Type 1; File No. E27525
- 16, 14 or 12-gauge steel or plated steel
- ANSI 61 gray polyester powder paint finish inside and out.
- Minimum size 6x6x4
- Pre-Approved Sizes
- Hoffman ASE6X6X4, ASE10X10X4, ASE12X12X4, ASE18X12X4, ASE18X18X4
- Hoffman ASE6X6X6, ASE10X10X6, ASE12X12X6, ASE18X12X6, ASE18X18X6, ASE24X18X6, ASE24X24X6
- Provide “NK” for No Knock-Outs as required.
- Provide “AFE” Flush Covers as required.
- Provide “AFDF” Flush Doors on all cans in user accessible areas IE; Data Closets, Electrical Rooms, Janitor Rooms, and Mechanical Rooms.
- Provide “ACLFDF” Lock Kits for all cans in student areas.

2 NEMA 3R Terminal Cans
- Used for outdoor use under-eve, breezeway or parapet

- NEMA/EEMAC Type 3R, IEC 60529, IP32
- UL 50, 50E Listed; Type 3R; File No. E27567, cUL Listed per CSA C22.2 No 94; Type 3R File No. E27567
- 16-gauge galvanized steel
- ANSI 61 gray polyester powder paint finish inside and out over galvanized steel.
- Minimum size 12x12x6
- Hoffman A12R126HCR, A18R186HCR, A20R208HCR, A30R308HCR

3 NEMA 4 Terminal Cans

- Used for outdoor use vertical or Horizontal under-eve, breezeway or parapet
- 16 or 14-gauge steel (see table)
- Seams continuously welded and ground smooth
- Stainless steel door clamps on three sides of door
- ANSI 61 gray polyester powder paint finish inside and out over galvanized steel.
- Minimum size 16x16x6
- Hoffman A16H16ALP, A20H20ALP, A24H24ALP, A36H24ALP

C Conduit

1 Rigid Steel Conduit

- Rigid steel conduit shall comply with Underwriter's Laboratories UL-6 Specification, ANSI C80.1 and Federal specification WW-C-581E or latest revisions. Conduit shall be hot dip galvanized on the exterior, with zinc or enamel on the interior.
- Couplings, locknuts, and all other fittings shall be galvanized or sheardized, waterproof and threaded type only. Rigid conduit shall terminate with two locknuts; one outside and one inside enclosures and specified bushings. No running threads or chase nipples shall be issued without approval.
- Bushings shall be non-metallic for 1 inch and smaller and insulated metallic for conduits larger than 1 inch.
- **Galvanized rigid steel conduits (GRC)** way be used in all locations. For underground runs in direct contact with earth, conduit shall be wrapped in10mil PVC tape or shall be factory PVC-over-GRS conduit.
- **Intermediate metallic conduit (IMC)** may be used indoor and outdoor locations, not underground.

2 Electrical Metallic Tubing (EMT)

- EMT conduit shall comply with Underwriter's Laboratories UL 797, ANSI C80.3 and Federal Specification WW-C-563 or latest revision. EMT shall be galvanized or sheardized.
- Couplings and connectors for EMT shall be galvanized or cadmium plated and shall be of the compression type requiring the tightening of a nut on a gland ring. No die cast type shall be allowed. All connections shall have permanent insulated throats.
- **Electrical metallic conduit (EMT)** may be used indoor and outdoor locations, not underground, not in areas subject to physical damage, not in concrete slabs, not in hazardous areas, not in masonry walls.

3 Schedule 40 PVC:

- The minimum conduit trade size allowed for this project will 2”. Contractor will increase to the next higher trade size if conduit fill ration will exceed 40%.
- Conduit shall be Carlon or equal, rated for use with 90° C conductors, UL Listed or approved equal. Material shall comply to NEMA Specification TC-2 (Conduit), TC-3 (Fittings) and UL 651 (Conduit) and 514b (Fittings).
- Conduit and fittings shall carry a UL label (Conduit - on each 10 foot length; Fittings - stamped or molded on each fitting).

- Conduit and fittings shall be identified for type and manufacturer and shall be traceable to location of plant and date manufactured. The markings shall be legible and permanent.
- The Conduit shall be made from polyvinyl chloride compound (recognized by UL) which includes inert modifiers to improve weatherability and heat distortion. Clean rework material, generated by the manufacturer's own conduit production, may be used by the same manufacturer, provided the end products meet the requirements of this specification.
- The conduit and fittings shall be homogeneous plastic material free from visible cracks, holes or foreign inclusions. The conduit bore shall be smooth and free of blisters, nicks or other imperfections which could mar conductors or Cables.
- Conduit, fittings and cement shall be produced by the same manufacturer to assure system integrity.
- Testing and Acceptance Criteria: Conduit and fittings shall be tested in accordance with the testing requirements defined in NEMA TC-2, NEMA TC-3 and UL-651 and 514. The acceptance criteria shall be given in the same standards.
- All conduit and fittings shall be solvent cemented in applications in accordance with instructions from the manufacturer.
- Conduit Spacers
- High impact spacers shall be used in all multi-conduit duct banks (five or more conduits). The spacers shall conform to NEMA TC-2, TC-6, TC-8, and ASTM F 512.
- Spacers shall be installed and secured following the manufacturer's suggested guidelines, the BICSI CO-OSP Manual, or TIA/EIA 578, whichever is more stringent.

4 Pipe hangers for individual conduits shall be factory made, consisting of a pipe ring and threaded suspension rod. The pipe ring shall be malleable iron, split and hinged, or shall be interlocked with the suspension rod socket.

5 Pipe racks for a group of parallel conduits shall be galvanized structural steel preformed channels of length as required, suspended on threaded rods and secured thereto with nuts above and below the cross bar. All offsets shall be in the same plane and shall be parallel.

6 Factory made pipe straps shall be one-hole malleable iron or two-hole galvanized clamps.

7 Manufacturer: Appleton, Crouse-Hinds, B-Line, Unistrut, T&B, or an approved equivalent product.

8 Conduit Terminations and Plugs

9 All conduits entering a vault or pull box shall be equipped with a bell-end securely attached to the structure.

- All metal conduits shall be equipped with a bushing or end collar to protect cable during placement.
- All unused conduits placed on this project or cleaned and modified by the Contractor shall be equipped with reusable rubber or plastic expansion seal plugs in all utility vaults/pull boxes and within all buildings.

10 Conduit Flexible Type

- Flexible conduit "Steel Flex or Aluminum Flex" may only be used for attic j-box to device connection, where specified in the project drawings or with consent of the owner/consultant representative.
- Liquidtight flexible conduit may only be used where specified in the project drawings or with consent of the owner/consultant representative.
- GRC & IMC fittings shall be galvanized rigid steel threaded type. Provide insulated grounding bushings at all enclosures.

- EMT fittings shall be die cast or steel set screw type for dry locations, die cast or steel compression type for wet locations. Provide insulated grounding bushings at all enclosures.
- PVC fittings shall be schedule 40 or schedule 80, provide adapters at all enclosures and transitions to GRC, IMC or EMT conduits.
- Flexible fittings shall be die cast or steel type.
- Liquidtight fittings shall be steel compression type.
- Provide insulated screw on bushings on all conduit connections.
- Provide insulated push on bushings for all stub-out conduits.
- Quantity: Contractor will provide conduits in the sizes and quantities as shown on the drawings.

11 Textile Innerduct - MaxCell

- Made from White Polyester and Nylon resin polymer
- Standard Outdoor Textile Innerduct: Micro (33mm), 2-inch, 3-inch and 4-inch single or multi-cell polyester/nylon textile innerduct containing 1250lb polyester flat woven pull tape.
- Detectable Outdoor Textile Innerduct: Micro (33mm), 2-inch, 3-inch and 4-inch single or multi-cell polyester/nylon textile innerduct containing 1250lb polyester flat woven pull tape, and a solid copper, polyvinyl color coated conductor (19AWG minimum) for tracing and rated for a minimum of 6 amps and 600 volts. Conductor shall be placed in the sidewall edge fold of the textile sleeve.
- Indoor Textile Innerduct (Riser-listed): Micro (33mm), 2-inch, 3-inch and 4-inch single or multi-cell nylon textile innerduct containing 1250lb polyester flat woven pull tape which meets UL2024A for flame propagation and smoke density values for general applications.
- Plenum-Listed Textile Innerduct: Micro (33mm), 2-inch and 3-inch single or multi-cell nylon textile innerduct containing 200lb nylon-resin flat woven pull tape which meets UL2024A for flame propagation and smoke density values for use in air handling spaces.
- Conduit Plugs: Compression-type conduit plugs with locking nuts for sealing and securing one or more textile innerducts within a 4-inch inside diameter conduit, e.g.: 4-inch plug with nine holes for cables in a 3 pack (9-cell) configuration
- Termination Bags: Inflation-type bags for sealing and securing around one or more textile innerducts and cables within 2-inch outside diameter or larger conduit.
- Pull Tape: measuring and pulling tape constructed of synthetic fiber, printed with accurate sequential footage marks. Color-coded.
- Duct Water Seal: products suitable for closing underground and entrance conduit openings where innerduct or cable is installed, to prevent entry of gases, liquids, or rodents into the structure.
- Approved Textile Innerduct #'s
  MXC4003, MXR4003
  MXC3456, MXP3456, MXR3456
  MXC2003, MXP2003, MXR2003
  MXC2002, MXP2002, MXR2002

D Duct Bank Locating Cable (Detectable Warning Tape)

1 Warning tape

- Warning Tape shall be a minimum of 3" wide, orange in color, 4 mils thick, and shall have an imprint as follows:
  - "Caution Telephone Cable Buried Below" or,
  - "Caution Fiber Optic Cable Buried Below"

E Inter-duct

1 Plenum

- White or orange Kynar PVDF Resin, a fluoropolymer compound.
- Plenum rated flexible optical fiber/communication raceway.
- Provide wire management in a building for fiber optic and data and communications cabling.
- Recognized per NEC Articles, 770 and 800 for Plenum, Riser and General-Purpose Raceway for optical fiber, and telecommunications cables.
- UL Listed
- Meets UL 910 standards for Plenum Optical Fiber/Communications raceways.
- Provide all fittings to form a complete integrated raceway system.
- Extrude raceway from precision extruded PVDF resin
- 1”-2” diameter raceway shall have a 1/4” wide 1250 lb. tensile pull tape preinstalled.
- Shall be available in ¾” through 2” diameters.
- Footage shall be sequentially marked.
- Threaded Aluminum Coupling: Molded Aluminum fitting which connect two pieces of corrugated tubing equipped with threaded ends.
- Quick-Connect Couplings: Molded Part which allows two pieces of 1” diameter corrugated tubing to be quickly snapped together. Available only in 1” diameter.
- Quick-Connect Threaded Male Adapters: Molded fitting which quickly snaps onto a 1” diameter piece of corrugated tubing to produce a threaded end. Available only in 1” diameter.
- Quick-Connect Male Snap-In Adapters: Molded fitting which snaps onto a 1” diameter piece of corrugated tubing to connect to an outlet or switch box. Available only in 1” diameter.
- Metallic Terminal Adapters: Molded metal part which allows a piece of corrugated tubing to connect to metallic conduit and metallic boxes.
- **Spool Length: Varies**, contractor shall field verify prior to ordering.
- Color: Orange
- **Part #: Carlon**
  ¾” CE4X1-1000
  1” CF4X1C-1000
  1-1/4” CG4X1C-900
  1-1/2” CH4X1C-1200
  2” CJ4X1C-1400

2 Riser

- Orange polyvinyl chloride (PVC)
- Riser rated Flexible Optical Fiber/Communication Raceway.
- Provides wire management for fiber optic and data and communications cabling in Riser applications and/or General-Purpose applications within a building or for direct burial or concrete encasement.
- Recognized per NEC Articles, 770 and 800 for Plenum, Riser and General-Purpose applications for optical fiber, and telecommunications cables.
- UL Listed
- Listed under UL 1666 - Standard for Riser Application for Optical Fiber Raceway.
- Provide all fittings to form a complete integrated raceway system.
- Fabricate Raceway from precision extruded PVC resin.
- Kevlar_ pull tape can be preinstalled in the 1” through 2” diameter.
- The footage shall be sequentially marked.
- Shall be available in ¾” through 2” diameters.
- Threaded Aluminum Coupling: molded Aluminum fitting which connect two pieces of corrugated tubing equipped with threaded ends.
- Quick-Connect Couplings: Molded Part which allows two pieces of corrugated tubing to be quickly snapped together. Available only in ½”-1” diameter.

- Quick-Connect Threaded Male Adapters: Molded fitting which quickly snaps onto a piece of corrugated tubing to produce a threaded end. Available only in ½”-1” diameter.
- Quick-Connect Male Snap-In Adapters: Molded fitting which snaps onto a piece of corrugated tubing to connect to an outlet or switch box. Available only in ½”-1”.
- Metallic Terminal Adapters: Molded metal part which allows a piece of corrugated tubing to connect to metallic conduit and metallic boxes.
- Schedule 40 Fittings: Molded fitting that is solvent cemented to the raceways. Schedule 40 fittings are commonly used with PVC Schedule 40 rigid conduit.
- **Spool Length: Varies**, contractor shall field verify prior to ordering.
- Color: Orange
- **Part #: Carlon**
  ¾” DE4X1-1000
  1” DF4X1C-1000
  1-1/4” DG4X1C-900
  1-1/2” DH4X1C-1200
  2” DJ4X1C-700

3 General Purpose for use in Underground Conduit
- Orange polyvinyl chloride (PVC)
- General Purpose is nonmetallic flexible raceway for use in General Purpose applications only. It is UL Listed and available with tape pre-installed.
- General Purpose raceway is listed to UL 2024 in accordance with the National Electrical Code per Articles 725, 770, 800 and 820 for General Purpose and other cabling optical fiber/telecommunication applications.
- For use in General Purpose areas per Articles 725, 770, 800 and 820 of the NEC.
- Available in sizes 3/4" through 2"
- Pull tape can be factory pre-installed in 1" through 2"
- Outside Diameters meet IPS Dimensions
- Footage sequentially marked
- **Spool Length: Varies**, contractor shall field verify prior to ordering.
- Color: Orange
- **Part #: Carlon**
  1” BF4X1B-8000
  1-1/4” BG4X1B-5600
  1-1/2” BH4X1B-4500
  2” BJ4X1B-8000

F Outlet Boxes

1 Outlet boxes (voice, data and audio visual)
- All boxes shall be 5 in. Square x 2.875 in. Deep Metal Box with Cable Management minimum. As required provide 4-11/16” square by 2-1/8” deep.
- Volume: 64 in3 (1050 cm3)
- Side Knockouts: (1) 1"& (1) 1-1/4" each side
- Listing: C ETL US; for use on Class 2 and Class 3 Remote-Control, Signaling and Power-Limited Circuits only.
- Provide **varied depth** mud ring as required to allow no more than 1/8” gap between wall materials.
- Any unused outlet or j-box shall be equipped with a blank cover.
- Approved Outlet box shall be RANDL Inc. T-55 series or Hubbell HBL260/263 Large Capacity Wall Boxes

2 Outlet boxes (wall phone, microphone and other devices)
- All boxes shall be 4-11/16” square by 2-1/8” deep minimum.

- Provide **varied depth** mud ring as required to allow no more than 1/8” gap between wall materials.
- Any unused outlet or j-box shall be equipped with a blank cover.

3 Junction boxes
- All boxes shall be 4-11/16” square by 2-1/8” deep minimum.
- Provide **varied depth** mud ring as required to allow no more than 1/8” gap between wall materials.
- Any unused outlet or j-box shall be equipped with a blank cover.

4 Surface Mount boxes
- base has rectangular KO to enable extension from existing single-gang flush wall box and 1/2" and 1" trade size concentric KOs.
- Accepts NEMA Faceplates
  - One-gang - 4 3/4" H x 3" W x 2 3/4" D equal to Wiremold # 2344
  - Two-gang - 4 3/4" H x 4 7/8" W x 2 3/4" D equal to Wiremold # 2344-2

G Floor Boxes

1 Coordinate with Electrical 26xxxx prior to submittal or ordering of boxes.

2 Coordinate cable and outlet quantities prior to submittal or ordering of boxes.

3 Floor boxes provide the interface between power and communication cabling in an on-grade or above-grade concrete floor where power and communication services are required. Boxes shall provide flush or recessed device outlets that will not obstruct the floor area.

4 Provide floor boxes approved for use in concrete floor construction. Boxes shall be approved for above grade (stamped steel) and on grade (cast iron) applications. Floor boxes shall have been examined and tested by Underwriters Laboratories Inc. to meet UL514A and shall bear the appropriate label. Floor boxes shall conform to the standard set in the National Electrical Code. Multi-compartment box shall have been evaluated by UL to meet the applicable U.S. safety standards for scrub water exclusion when used on tile, terrazzo, wood, and carpet covered floors.

5 Boxes shall be available in one-, two-, or three-gang configurations or a single unit with four independent wiring compartments and available in stamped steel and cast-iron versions. Boxes shall be rectangular in shape and available in deep and shallow versions. Boxes shall provide pre- and post-pour adjustments. Multiple gang boxes shall also provide a removable barrier between the individual compartments for greater capacity when required.

6 Multi-Compartment Boxes: Floor boxes shall be manufactured in stamped steel or cast-iron. Box shall be available in shallow version for stamped steel or cast-iron types and deep version for stamped steel type only. Box shall have four independent wiring compartments that allow up to 4 duplex receptacles and/or communications services.
- Boxes shall permit a tunneling feature that will allow internal wiring to various compartments. The box shall provide various size conduit openings.
- Boxes shall be fully adjustable, providing a maximum of 1-7/8-inch pre-pour adjustment, and a maximum of 3/4 inch post-pour adjustment.
- Boxes shall provide a series of device mounting plates that will accept both duplex power devices, as well as plates that will accommodate connectivity outlets and modular inserts. Where indicated, provide connectivity outlets and modular inserts by Wiremold/Ortronics or approved equal.
- Activation covers shall be die-cast aluminum. Cover finish shall be one of the following, as selected:
  - Textured aluminum finish.
  - Powder coat finish, color shall be Black.
  - Powder coat finish, color shall be Brass,
- Activation covers shall be available in flanged or flangeless versions as selected. Covers shall be available with options for tile or carpet inserts, blank covers, or

covers with one or two 1-inch liquid tight openings for furniture feed applications as applicable.
- Pre-Approved Floor boxes shall be equal to **Wiremold RFB-4, RFB6E-OG & RFB-9** series boxes or equal Hubbell System One.
- Contractor shall provide all required entrance fittings & adapter plates for scope of work depicted.

H Poke Thru Floor device
1 Coordinate with Electrical 26xxxx prior to submittal or ordering of boxes.
2 Coordinate cable and outlet quantities prior to submittal or ordering of boxes.
3 Poke Thru boxes provide the interface between power and communication cabling in an above-grade concrete floor where power and communication services are required. Boxes shall provide flush or recessed device outlets that will not obstruct the floor area.
4 Pre-Approved Poke Thru boxes shall be equal to **Wiremold 6ATCFFNK**

I Surface mount raceway “SMR”
1 Non-metallic raceway is an enclosed pathway used for surface distribution of branch circuit electrical wiring, and cabling for voice, data, multi-media, low voltage, and optical fiber. Raceway is typically installed in existing building structures, or after construction is complete. A complete raceway system includes raceway, covers, mounting hardware, various fittings, and outlet boxes installed at specific locations. Specific codes and standards apply to electrical wires and telecommunications cables that are deployed within non-metallic raceway. Codes that are enforced by the local Authority Having Jurisdiction (AHJ) must be observed during construction.
- Assembly and disassembly of raceway base, cover, and fittings shall require no special tools.
- Installed fittings shall be designed to overlap the raceway junction to cover exposed or uneven edges.
- Security caps shall provide enhanced tamper protection by installing over the assembled raceway in desired locations.
- Raceway shall be designed to accept inline device boxes with either horizontal or vertical faceplate orientations.
- Device boxes shall have a removable knockout portion to permit raceway entry and exit. Device boxes shall serve as an extension box by removing a single knockout.
- Device boxes shall be available in standard NEMA single, double, and 3- gang versions. Device box color shall match raceway color.
- Device boxes shall accommodate various faceplates that accept modular connector inserts or bezels for balanced twisted pair, fiber optic, coaxial, multi-media, and other low voltage cabling connectors.
- Faceplates for device boxes shall accommodate pre-printed labels for proper electrical identification, or telecommunications port identification according to ANSI/TIA/EIA-606-A.
- Faceplates shall be available in colors that match the device box and raceway.
- Category rated communications jacks installed in surface box faceplates shall have provisions for snap-in icons for further identification.

2 5400 Series
- The raceway shall be a two-piece design with a base and Snap-On covers. The raceway base shall accept both a single cover that spans the entire base or two individual TwinSnap™ covers. Total width shall be 5.25" [133mm] by 1.75" [44.5mm] deep with an approximate thickness of .095" [2.4mm]. The base and cover shall be available in 8' [2.4m] lengths. The raceway shall be available with two (5400TB) or three (5400TBD) wiring channels.

- The 5400TB Series Base shall have two wiring channels separated by one integral barrier. Each channel must be large enough to accept standard power and communication devices without restricting capacity of the adjacent channel. The 5400TBD Series Base shall have three wiring channels separated by two integral barriers forming 1/2, 1/4, and 1/4 compartments. One channel must be large enough to accept standard power and communication devices without restricting capacity of the other channels. The 5400C Series Cover shall span the entire width of the base concealing all of the wiring channels. The 5400TC Series Cover shall have flanges for snapping onto the base side walls and center barrier. The cover shall span one-half the width of the base, providing independent access to services.
- A complete line of full capacity corner elbows and tee fittings must be available to maintain a controlled 2" [51mm] cable bend radius which meets the specifications for Fiber Optic and UTP/STP cabling and exceeds the TIA / EIA 569-A requirements for communications pathways. They shall be manufactured of a rigid PVC compound. A full complement of fittings must be available including, but not limited to tees, entrance fittings, cover clips, and end caps. They shall be manufactured of a rigid PVC compound. The fittings shall have a matte texture, in ivory or white colors to match the base and cover. They shall overlap the cover and base to hide uneven cuts. All fittings shall be supplied with a base where applicable to eliminate mitering. A transition fitting shall be available to adapt to other Wiremold series raceways.
- Device brackets shall be available for mounting standard devices in-line or offset from the raceway. A device bracket shall provide up to three single-gang openings at one location. Faceplates shall be 5507 Series that match and fit flush in the device plate. They shall be manufactured of rigid PVC compound.
- The raceway manufacturer will provide a complete line of connectivity outlets and modular inserts for UTP, STP (150 ohm), fiber optic, coaxial and other cabling types with faceplates and bezels to facilitate mounting. A complete line of preprinted station and port identification labels, snap-in icon buttons, as well as write-on station identification labels shall be available.

2.2 Cable Tray Systems

A Provide cable tray system to route power and communications cable distribution for utility needs. Cable tray system shall consist of cable tray and appropriate fittings for a complete installation.

1 Cable tray is to be utilized in locations only as covered in Article 392 of the National Electric Code, as adopted by the National Fire Protection Association and as approved by the American National Standards Institute.

2 Trays shall be constructed of 6063 T6 and T5 aluminum alloys and shall utilize center lines to indicate all areas where after field cutting of tray, new holes need to be drilled or screws inserted (Center Spine, Twin Spine, Ladder Style and Wall Mounted Trays).

3 Ladder Tray: Cable tray shall be constructed to form an open and accessible compartment to hold the necessary cables. The tray shall be constructed of two components, (1) two longitudinal support rails (side rails) and (2) the rungs. The rail shall be a single aluminum extrusion with extending flanges that provide rung support. The rungs shall have 7/8-inch cable laying surface and be attached with sheet metal screws to the two side rails on 6 inch, 9 inch or 12 inch centers, creating a cable laying area between the rails.

4 Wall Mounted Cable Tray: Cable tray shall be constructed to form an open and accessible compartment to hold the necessary cables which also enables full viewing of the compartment. The tray shall be wall mounted allowing cable lay-in where applicable.

- Trays shall be constructed with two components, (1) the main support which is the spine and (2) the rungs. The spine shall be a single aluminum extrusion designed with a lower cavity which has extending wings and provides rung support.
- Rungs shall have a 1-inch cable laying surface, and be attached on 6 inch, 9 inch or 12 inch centers, and protrude from the spine only on one side. The end of the rungs shall be bent upward to the height of 3 inches, 4 inches or 6 inches as applicable forming a 90-degree angle. This creates a cable laying area between the spine and the vertical portion of the rung. The rung shall be designed with a center screw groove along its length to provide a direct connection for rung mounted accessories. The ends of all rungs shall be fitted with a plastic cap to prevent damage to the cable and injury to the installer.
- For multi-tier wall mounted trays, the lower rungs shall be mounted through the entire vertical distance of the spine and project down, be bent outward, then up from one side only, forming a 'J' hook shape. These rungs shall be fixed in place with a sheet metal screw through the top of the spine which allows for replacement or expansion of the tray area.
- Top and bottom rungs shall form two or three tiers of cable tray, one above the other, attached to one single support member or spine.
- Tray shall not have side rails and shall offer an open view of the cables.

5 A full complement of fittings for the cable tray shall be available including, but not limited to, 45 and 90-degree flat, vertical inside and outside elbows, tee and cross fittings, couplings for joining sections of the tray, hangers, end blanks, field-installed dividers and all other components necessary to make the system perform as intended. The fittings and accessories shall be of a compatible material.

6 Ladder Rack Cable Runway
- Stringers shall be fabricated from ASTM A513 Steel tubing.
- Rungs shall be fabricated from 3/8"x1 ½" steel channel welded
- Rungs shall be spaced at 12.0" center to center
- Ladder Rack shall have a powder coat finished.
- Ladder Rack shall be individually boxed
- Ladder rack shall be a part of a total system that includes: manufacture bends, wall supports, joining hardware, etc.
- Ladder Rack shall be grounding per the TIA/EIA 607-A.
- Ladder Rack shall be UL listed- File number E60548
- Color: Ladder Rack will be BLACK
- Quantity: See Drawing for quantity and installation details.
- Part**#:** Cooper B-Line Ladder Rack, PN# SB17U12BFB or equal by CPI

7 Wire Basket Cable Runway
- Wire mesh cable tray shall be manufactured from round carbon steel wires that are 5 mm and 6 mm in diameter. Wires shall be welded at intersections to form a 2" x 4" grid pattern. The tray shall be U-shaped with equal height sidewalls.
- Individual tray sections shall be 10' long and 4", 6", 8", 12", 16", 18", 20", or 24" wide. Sidewalls shall be 4" high, as specified below.
- Wire mesh cable tray shall be zinc electroplated after fabrication, galvanized before fabrication (pre-galvanized) or painted black with powder coat paint, as specified below.
- Wire mesh cable tray that is 6" wide or wider shall be UL Classified for suitability as an equipment grounding conductor only. Pre-galvanized trays shall be UL Classified in the United States. Painted tray shall be UL Classified in the United States.
- Ladder Rack shall be grounding per the TIA/EIA 607-A.
- Color: Zinc Electroplate
- Quantity: See Drawing for quantity and installation details.

- Part#: Equal to Chatsworth Products OnTrac
  - Part Number 34821-504, 4” High x 4” Wide x 10’ Long.
  - Part Number 34821-506, 4” High x 6” Wide x 10’ Long.
  - Part Number 34821-508, 4” High x 8” Wide x 10’ Long.
  - Part Number 34821-512, 4” High x 12” Wide x 10’ Long.
  - Part Number 34821-516, 4” High x 16” Wide x 10’ Long.
  - Part Number 34821-518, 4” High x 18” Wide x 10’ Long.
  - Part Number 34821-520, 4” High x 20” Wide x 10’ Long.
  - Part Number 34821-524, 4” High x 24” Wide x 10’ Long.
- Provide all installation hardware required for installation whether shown on the plans or not. Some of the supports may require design build application and shall be included by the contractor without notice.
  - OnTrac Standard Splice Kit
  - OnTrac Splice Bar
  - OnTrac Splice Washer & Bolt Kit
  - OnTrac Spring Splice Kit
  - OnTrac Clamp Washer
  - OnTrac Carriage Bolt Hardware Kit
  - OnTrac 90° Splice Bar Kit
  - OnTrac Rack-Mount Hook
  - OnTrac Pedestal Clamp Bracket
  - Split Bolt Grounding Clamp
  - OnTrac Cable Tray Divider
  - OnTrac Cover
  - OnTrac Cable Tray Bottom Insert
  - OnTrac Cable Tray Liner
  - OnTrac Tool-Less Radius Drop
  - OnTrac Large Radius Drop
  - OnTrac Vertical Radius Bracket
  - OnTrac Electrical Box Bracket
  - OnTrac Conduit Bracket
  - OnTrac Auxiliary Side Bracket
  - OnTrac Section Support Bracket
  - OnTrac Label Holder
  - OnTrac Cable Tray Cutting Tool
  - Threaded Rod, 3/8-16
  - Threaded Rod Coupling Kit, 3/8-16
  - Threaded Rod I-Beam Clamp, 3/8-16
  - Hex Nut, 3/8-16
  - Split Lock Washer, 3/8”
  - Washer, 3/8”
  - Hex Lag Screw, 3/8-7 x 2” Long
  - Hex Lag Screw, 1/4-10 x 2” Long
  - Split Lock Washer, 1/4”
- Provide all support systems required for installation whether shown on the plans or not. Some of the supports may require design build application and shall be included by the contractor without notice.
  - OnTrac Wire Mesh Cable Tray System Supports
  - OnTrac Ceiling Center Support Bracket
  - OnTrac Ceiling Edge Hanger
  - OnTrac Ceiling Trapeze Support Bracket
  - OnTrac Wall/Ceiling C-Support Bracket
  - OnTrac Wall L-Support Bracket
  - OnTrac Wall Triangle Support Bracket
  - OnTrac Wall-Mount Angle
  - OnTrac Under Floor Support

- OnTrac Under Floor C-Bracket
- OnTrac Pedestal Clamp Bracket Kit

B Cabling Support System

1 Telco Backboards

- Backboards shall be 4’ x 8’ x .75” void free plywood (ACX Plywood with the “A” side turned out).
- The plywood shall be painted with two coats of white fire-retardant paint.
- Cut full size sheet to required size for application type, minimum 6” larger than equipment installed.

2 J-Hooks

- Cable supports shall provide a bearing surface of sufficient width to comply with required bend radii of high-performance cables; cULus Listed.
- Cable supports shall have flared edges to prevent damage while installing cables.
- Cable support system shall provide fasteners that allow them to be mounted to wall, concrete, joist, tee-bar wire, treaded rod, beams and raised floor supports.
- Fasteners shall have the ability to either be factory or jobsite assembled; rated for indoor use in non-corrosive environments; cULus Listed.
- Fastener to with one non-continuous cable support, factory or jobsite assembled.
- Color: NA
- Quantity: Contractor will provide quantities of j-hooks and hanger accessories in the amount necessary to support all horizontal cabling every 4-5 feet.
- Part**#:** ERICO CAT425, Cooper B-Line BCH12, BCH21, BCH32, BCH64 and accessories.

C Pull Rope

1 Pulling Ropes (Mule tape)

- Pull ropes shall be 1/2" flat tape with a minimum tensile strength of 1200 lbs.
- Ropes shall be pre-lubricated, woven polyester or aramid fiber tape made from low friction, high abrasion resistant yarns providing a low coefficient of friction. Tape shall be printed with sequential footage markings for accurate measurements.

2 Empty Conduits

- Pull rope shall be new 1/4” polypropylene over polyester rope with a minimum 1200 lb. tensile strength.
- Every empty conduit shall be equipped with a pull rope secured to the duct plug at each end.

3 Installed with Cables:

- Pull rope shall be new 1/8” polypropylene string with a minimum 750 lb. tensile strength.
- Contractor will be required to install a pull string into every conduit that they pull cabling.

2.3 Fire-Stop Systems

A General

1 Sleeves shall be 2”, 3” or 4" EMT or smaller. All cables penetrating walls must be sleeved.

2 Sleeves shall maintain a 40% conduit fill ratio.

3 Sleeves must be supported or attached at walls by apparatuses meant to do so. All sleeves shall be rigidly and properly supported.

4 Sleeves must extend past inaccessible areas.

5 Sleeves must be protected by a U.L. rated system at all firewalls designated on the construction drawings.

6 Fire stopping shall be a material, or combination of materials, to retain the integrity of time-rated construction by maintaining an effective barrier against the spread of flame, smoke, and gases. It shall be used in specific locations as follows:
- Duct, cables, conduit, piping, and cable tray penetrations through floor slab and through time-rated partitions or fire walls.
- Openings between floor slab and curtain walls, including inside hollow curtain walls at the floor slab.
- Penetrations of vertical service shafts.
- Openings and penetrations in time-rated partitions of fire walls containing fire doors.
- Locations where specifically shown on the drawings or where specified in other sections of the Standards.

7 Fire stopping materials shall be asbestos free and capable of maintaining an effective barrier against flame, smoke, and gasses in compliance with requirements of ASTM E 814, and UL 1479. Only listed fire stopping material acceptable to State, County, and City codes shall be used.

8 The rating of the fire stops shall in no case be less than the rating of the time rated floor or wall assembly.

9 All Fire stopping Locations (FSL) shall be labeled within 12" of the fire stopping material on each side of the penetrated fire barrier. The format for the Fire stopping Location identifier shall display the Telecom Room floor number, the Fire stopping Location number, and the hour rating of the fire rating system (e.g. 1-FLS001 (2)). Each fire stopping location shall be identified with a fire stopping warning label. The label shall include the manufacturer of the product, the installer and company name, the UL number for the product, the rating of the material, the installation date, and the number and type of cables passing through the opening. The fire stopping warning label can include the fire stopping location identifier, eliminating the need for a separate label. Penetration modifications requiring the repair/re-installation of the fire stopping material require the addition of a new fire stopping warning label. No previous fire stopping warning labels shall be removed or obscured by new labels. In the event the penetration is completely cleaned of existing fire stopping material, and new material is installed, the previous label shall be removed or obscured completely.

10 Manufacturers; Specified Technologies Inc., 3M & Hilti
- SSS - intumesant sealant
- SSP - putty and putty pads
- SSAMW - mineral wool
- IC 15WB+ - intumesant sealant
- CP 25WB+ - intumesant sealant
- Fire Barrier Moldable Putty+ - putty and putty pads
- FS-ONE - intumesant sealant
- CP 618 - putty and putty pads.

B Re-Enterable Smoke/Acoustic Stop System

1 EZ -Path Smoke & Acoustical Pathway is a pathway device designed to allow cables to penetrate nonrated walls and floors without the need for smoke sealing. This device features a built-in smoke sealing system that automatically adjusts to the amount of cables installed. Once installed in a barrier, cables can be easily added or removed at any time without the need to remove or reinstall caulking materials.

2 Its profile allows a maximum number of cables to be installed in a relatively small area. The pathway measures approximately 4.5" (114 mm) x 4.5" (114 mm) and is adjustable to accommodate wall and floor thicknesses between 4" (102 mm) and 8" (203 mm).

3 EZ-Path Smoke & Acoustical Pathways have been tested to measure air leakage. Leakage ratings per device are <1 CFM empty and <2.5 CFM at maximum 100% visual fill, attesting to the ability of the device to provide necessary sealing function in various applications. Acoustical testing confirmed that the product can restore the STC (Sound Transmission Classification) Ratings to walls that have been penetrated with a maximum STC of 61.
4 No additional fire stopping material shall be required to obtain proper Smoke/Acoustic stopping.
5 The system shall be self-contained, and shall automatically adjust to differing cable loads.
6 The system shall allow add, moves, and changes without additional materials.
7 All penetrations through unrated building structures (walls and floors) shall be sealed with an appropriate re-enterable Smoke/Acoustic stop system. This requirement applies to through penetrations (complete penetration) and membrane penetrations (through one side of a hollow unrated structure). Any penetrating item i.e., riser slots and sleeves, cables, conduit, cable tray, and raceways, etc. shall use the proper fire stop equipment.
8 Smoke/Acoustic stop systems shall be UL Classified to Plenum UL2043.
9 The system shall be gang-able using wall plates for additional capacity.
10 Quantity: See Drawing for quantity and installation details.
11 Part #: Equal to STI
- PN# NEZ33
- PN# NEZDP233
- PN# NEZDP433

C Single Entry System
1 The fire stop system is comprised of the item or items penetrating the fire rated structure, the opening in the structure and the materials and assembly of the materials used to seal the penetrated structure.
2 Fire stop systems comprise an effective block for fire, smoke, heat, vapor and pressurized water stream.
3 All penetrations through fire-rated building structures (walls and floors) shall be sealed with an appropriate fire stop system. This requirement applies to through penetrations (complete penetration) and membrane penetrations (through one side of a hollow fire rated structure). Any penetrating item i.e., riser slots and sleeves, cables, conduit, cable tray, and raceways, etc. shall use the proper fire stop equipment.
4 Fire stop systems shall be UL Classified to ASTM E814 (UL 1479).
5 Quantity: See Drawing for quantity and installation details.
6 Part#: Equal to STI, PN# SSS100

D Re-Enterable Fire Stop System
1 The re-enterable fire stop system is comprised of the item or items penetrating the fire rated structure, the opening in the structure and the materials and assembly of the materials used to seal the penetrated structure.
2 No additional fire stopping material shall be required to obtain proper fire stopping.
3 The system shall offer full fire resistance whether it is empty or 100% visually filled.
4 The system shall be self-contained, and shall automatically adjust to differing cable loads.
5 The system shall allow add, moves, and changes without additional materials.
6 All penetrations through fire-rated building structures (walls and floors) shall be sealed with an appropriate re-enterable fire stop system. This requirement applies to through penetrations (complete penetration) and membrane penetrations (through one side of a hollow fire rated structure). Any penetrating item i.e., riser slots and

sleeves, cables, conduit, cable tray, and raceways, etc. shall use the proper fire stop equipment.

7 Fire stop systems shall be UL Classified to ASTM E814 (UL 1479).
8 The system shall be gang-able using wall plates for additional capacity.
9 Quantity: See Drawing for quantity and installation details.
10 Part #: Equal to STI
- STI PN# EZDP33FWS
- STI PN# EZDP33WR

2.4 Grounding/Bonding Systems

A Grounding and Bonding Equipment

1 Telecommunications Main Grounding Busbar (TMGB)
- Telecommunications Main Grounding Busbar (TMGB) shall be constructed of .25” (6.4 mm) thick solid copper bar.
- The buss bar shall be 4” (100 mm) high and 12” (300 mm) long and shall have 18 attachment points (two rows of 9 each) for two-hole grounding lugs.
- The hole pattern for attaching grounding lugs shall meet the requirements of ANSI-J-STD – 607-A and shall accept 15 lugs with 5/8” (15. 8 mm) hole centers and 3 lugs with 1” (25.4 mm) hole centers.
- The busbar shall include wall-mount stand-off brackets, assembly screws and insulators creating a 4” (100 mm) standoff from the wall.
- The busbar shall be UL Listed as grounding and bonding equipment.
- Design Make shall be:
- Chatsworth Products, Inc. (CPI),
- Telecommunications Main Grounding Busbar: Part Number 40153-012, 12” x 4” (300 mm x 100 mm) Telecommunications Main Grounding Busbar, UL Listed.

2 Telecommunications Grounding Busbar (TGB)
- Telecommunications Grounding Busbar (TGB) shall be constructed of .25” (6.4 mm) thick solid copper bar.
- The busbar shall be 2” (50 mm) high and 10” (250 mm) long and shall have 7 attachment points (one row) for two-hole grounding lugs.
- The hole pattern for attaching grounding lugs shall meet the requirements of ANSI-J-STD – 607-A and shall accept 4 lugs with 5/8” (15.8 mm) hole centers and 3 lugs with 1” (25.4 mm) hole centers.
- The busbar shall include wall-mount stand-off brackets, assembly screws and insulators creating a 4” (100 mm) standoff from the wall.
- The busbar shall be UL Listed as grounding and bonding equipment.
- Design Make shall be:
- Chatsworth Products, Inc. (CPI),
- Telecommunications Grounding Busbar:
- Part Number 13622-010, 10” x 2” (250 mm x 50 mm) Telecommunications Grounding Busbar, UL Listed.

3 Horizontal Rack Busbar
- Horizontal rack-mount busbar shall be constructed of 3/16” (4.7 mm) thick by 3/4” (19.1 mm) high hard-drawn electrolytic tough pitch 110 alloy copper bar.
- Bar shall be 19” EIA or 23” rack mounting width (as specified below) for mounting on relay racks or in cabinets.
- Bar shall have eight 6-32 tapped ground mounting holes on 1” (25.4 mm) intervals and four 0.281” (7.1 mm) holes for the attachment of two-hole grounding lugs.
- Each bar shall include a copper splice bar of the same material (to transition between adjoining racks) and two each 12-24 x ¾” copper-plated steel screws and flat washers for attachment to the rack or cabinet.

- Bar shall be UL Listed as grounding and bonding equipment.
- Design Make shall be:
- Chatsworth Products, Inc. (CPI),
- Horizontal Rack Busbar: Part Number 10610-019, Ground Bar for 19” Rack.

4 Two Mounting Hole Ground Terminal Block
- Ground terminal block shall be made of electroplated tin aluminum extrusion.
- Ground terminal block shall accept conductors ranging from #14 AWG through 2/0.
- The conductors shall be held in place by two stainless steel set screws.
- Ground terminal block shall have two 1/4” (6.4 mm) holes spaced on 5/8” (15.8 mm) centers to allow secure two-bolt attachment to the rack or cabinet.
- Ground terminal block shall be UL Listed as a wire connector.
- Design Make shall be:
- Chatsworth Products, Inc. (CPI),
- Two Mounting Hole Ground Terminal Block:
- Part Number 40167-001, Two Mounting Hole Ground Terminal Block, 1 each
- Compression Lugs
- Compression lugs shall be manufactured from electroplated tinned copper.
- Compression lugs shall have two holes spaced on 5/8” (15.8 mm) or 1” (25.4 mm) centers, as stated below, to allow secure two bolt connections to busbars.
- Compression lugs shall be sized to fit a specific size conductor, sizes #6 to 4/0, as stated below.
- Compression lugs shall be UL Listed as wire connectors.
- Design Make shall be:
- Chatsworth Products, Inc. (CPI),
- Compression Lugs:
  - Part Number 40162-901, Compression Lug, #6 Awg, 5/8” (15.8 mm) hole spacing, 1 each.
  - Part Number 40162-903, Compression Lug, #6 Awg, 1” (25.4 mm) hole spacing, 1 each.
  - Part Number 40162-904, Compression Lug, #2 Awg, 5/8” (15.8 mm) hole spacing, 1 each.
  - Part Number 40162-907, Compression Lug, #2 Awg, 1” (25.4 mm) hole spacing, 1 each.
  - Part Number 40162-909, Compression Lug, 2/0 Awg, 1” (25. 4 mm) hole spacing, 1 each.
  - Part Number 40162-911, Compression Lug, 4/0 Awg, 1” (25.4 mm) hole spacing, 1 each.

5 Antioxidant Joint Compound
- Oxide inhibiting joint compound for copper-to-copper, aluminum-to-aluminum or aluminum-to-copper connections.
- Design Make shall be:
  - Chatsworth Products, Inc. (CPI),
  - Antioxidant Joint Compound:
  - Part Number 40168-101, Antioxidant Joint Compound, Copper-to-Copper Connections, .5 oz, 1 each.
  - Part Number 40168-801, Antioxidant Joint Compound, Copper-to-Copper Connections, 8 oz, 1 each.
  - Part Number 40166-101, Antioxidant Joint Compound, Aluminum-to-Aluminum or Aluminum-to-Copper Connections, .5 oz, 1 each.
  - Part Number 40166-801, Antioxidant Joint Compound, Aluminum-to-Aluminum or Aluminum-to-Copper Connections, 8 oz, 1 each.
  - Part Number 40168-150, Antioxidant Joint Compound, Copper-to-Copper Connections, .5 oz, 50 each.

- Part Number 40168-812, Antioxidant Joint Compound, Copper-to-Copper Connections, 8 oz, 12 each.
- Part Number 40166-150, Antioxidant Joint Compound, Aluminum-to-Aluminum or Aluminum-to-Copper Connections, .5 oz, 50 each.
- Part Number 40166-812, Antioxidant Joint Compound, Aluminum-to-Aluminum or Aluminum-to-Copper Connections, 8 oz, 12 each.

6 C-Type, Compression Taps
- Compression taps shall be manufactured from copper alloy.
- Compression taps shall be C-shaped connectors that wrap around two conductors forming an irreversible splice around the conductors; installation requires a hydraulic crimping tool
- Compression taps shall be sized to fit specific size conductors, sizes #2 AWG to 4/0, as stated below.
- Compression taps shall be UL Listed.
- Design Make shall be:
  - Chatsworth Products, Inc. (CPI),
  - Compression Taps:
  - Part Number 40163-001, Compression Tap, #6 AWG Solid Run to #6 AWG Solid Tap, 1 each.
  - Part Number 40163-007, Compression Tap, 2/0 Stranded Run to 2/0 Stranded Tap, 1 each.

7 Pipe Clamp with Grounding Connector
- Pipe clamp shall be made from electroplated tinned bronze. Installation hardware will be stainless steel.
- Pipe clamp shall be sized to fit up to two conductors ranging in size from #6 to 250 MCM; conductors must be the same size.
- Pipe clamp installation hardware shall be sized to attach to pipes, sizes 1” to 6” (.75” to 6.63” in diameter), as stated below.
- Pipe clamp shall be UL Listed as grounding and bonding equipment.
- Design Make shall be:
- Chatsworth Products, Inc. (CPI),
- Pipe Clamps:
  - Part Number 40170-002, Pipe Clamp, for 1” to 1-1/4” pipe, 1 each.
  - Part Number 40170-003, Pipe Clamp, for 1-1/2” to 2” pipe, 1 each.
  - Part Number 40170-004, Pipe Clamp, for 2-1/2” to 3” pipe, 1 each.
  - Part Number 40170-005, Pipe Clamp, for 3-1/2” to 4” pipe, 1 each.
  - Part Number 40170-006, Pipe Clamp, for 5” to 6” pipe, 1 each.

8 Equipment Ground Jumper Kit
- Kit includes one 24” L insulated ground jumper with a straight two hole compression lug on one end and an L-shaped two hole compression lug on the other end, two plated installation screws, an abrasive pad and a .5 once tube of antioxidant joint compound.
- Ground conductor is an insulated green/yellow stripe #6 AWG wire
- Lugs are made from electroplated tinned copper and have two mounting holes spaces .5” to .625” apart that accept 1/4” screws.
- Jumper will be made with UL Listed components
- Design Make shall be:
  - Chatsworth Products, Inc. (CPI),
  - Equipment Ground Jumper Kit:
  - Part Number 40159-010, Equipment Ground Jumper Kit, 1 each.

B Communications raceways, backboards and rack systems

1 The conduit system must be permanently and effectively grounded, in accordance with Title 24 of the California Code of Regulations, California Electric Code #250, and

National Electric Code or as required by local AHJ. If in confusion or conflict the most stringent specification shall apply.

2 Provide as a minimum a #1/0awg THHN conductor in conduit from the main building grounding point to a ¼" x 4" x 5.25" telecommunications grounding bus bar(TGB) at every backboard.

3 Provide as a minimum #6awg green THHN conductor from each equipment rack, cable tray or wall mounted equipment to a TGB.

2.5 Concrete for Telecom System

A All Concrete

1 Refer to Section 03xxxx Concrete; all concrete shall be governed by this specification.

2 Furnish to the AHJ a mix design showing the proposed weights of water, aggregate and cement per cubic foot of concrete a minimum of 7 days prior to beginning placement.

3 Proportion the cement, water and aggregate to obtain concrete with good workability.

4 Use Type I Portland Cement for slurry mix and Type II for riprap grout. according to ASTM C 150.

B Concrete Slurry

1 Fine aggregate for concrete slurry shall completely pass the 3/8" sieve with no more than 5% passing the No. 100 sieve. The fine aggregate shall contain no silt, loam, clay or organic particles.

C Concrete RipRap Grout

1 Fine aggregate for riprap grout shall completely pass the No. 4 sieve with no more than 5% passing the No. 100 sieve.

D General Concrete Notes

1 Ensure that the concrete slurry develops a 12-hour compressive strength of 500 psi and a slump of 7 inches, +/- 1 inch for concrete slurry; the riprap grout requires a 28-day minimum strength of 3000 psi and a slump of 4 inches +/- 1 inch. Furnish concrete for specimens.

2 Concrete shall be placed as nearly as practical to its final position to avoid flow causing segregation of the aggregate. Concrete should not be dropped more than 5 feet vertically without the use of a tremie or similar device. Do not place concrete in a manner that will cause the pipe to float. Vibrate or rod the concrete as necessary to remove voids.

Part 3 Execution

3.1 General

A Permits and Licensing

1 Contractor is responsible to procure all necessary permits before the commencement of their work to the city or state agencies as required. It is the contractor's responsibility to provide all documentation to the AHJ.

2 Contractor is responsible to procure all necessary licenses for the city or state they are commencing the work in, before the commencement of their work begins.

3 Contractor to procure all encroachment permits as it pertains to the work described in these documents.

4 No person may access or enter in any way, an underground vault or confined space without the training, staff, and safety equipment defined on the confined space permit. Accessing these spaces without a valid permit or without the required

support services will be cause for an order to stop work until all violations are resolved and may result in a fine or suspension of the workers involved.

B Safety

1 All federal (OSHA), state, and local safety rules, will be enforced at all times during the duration of the project. It is the responsibility of the Contractor to conduct frequent inspections of the job site to ensure compliance.

3.2 Installation

A Intra-Building Pathways

1 Communications Vaults

- Site Access
  - The general contractor shall be responsible for providing adequate access to the site to facilitate hauling, storage and proper handling of the precast concrete units.
- Installation
  - Precast concrete units shall be installed to the lines and grades shown in the contract documents or otherwise specified.
  - Precast concrete units shall be lifted by suitable lifting devices at points provided by the precast concrete producer.
  - Precast concrete units shall be installed in accordance with applicable industry standards. Upon request, the precast concrete producer shall provide installation instructions.
  - Field modifications to the product shall relieve the precast producer of liability regardless if such modifications result in the failure of the precast concrete unit.
- Water Tightness
  - Where water tightness is a necessary performance characteristic of the precast concrete unit's end use, watertight joints, pipe-entry connectors and inserts should be used to ensure the integrity of the entire system.

2 Conduit

- All conduit shall be routed parallel or perpendicular to walls.
- All conduit shall be installed in accordance with NEMA "Standard of Installation" and shall meet applicable local and national building and electrical codes or regulations.
- Conduit runs shall not exceed 100 feet or contain more than two 90-degree bends without utilizing appropriately sized pull boxes. No conduits may enter a pull box at a 90-degree angle. They are not to be installed into the side of a pull box. All conduits must enter the ends of the pull box.
- All conduits entering a building from outside shall be plugged with reusable stoppers to eliminate the entrance of water or gases into the entrance room. Building entrance conduits shall slope downward away from the building to reduce the potential of water entering the building. All building penetrations are to be sealed from wall to wall and on the outside and inside of the penetrations.
- All conduits penetrating a fire or smoke barrier shall be fully sealed between the conduit and the actual penetration following manufacturer's recommendations. Contractor shall label each fire stop location with the manufacturer's identification number of the product used and shall provide the inspector copies of each products system configuration.
- No communications outlet boxes shall be "daisy-chained." Each communications outlet shall be served by a separate 1-inch (minimum) conduit.
- In rooms with a drop or false ceiling, communications outlets shall be served by a 1-inch conduit stubbed six inches above the false ceiling, angled toward the

cable tray or open access area, and be equipped with a compression fitting and plastic bushing. All stubs shall be marked “Comm”.

- All conduit shall be equipped with an approved water or barrier seal in building access points.
- No communications conduit shall contain more than 180 degrees of bend without the use of a pull box. Pull boxes must be approved by Engineer of Record to ensure proper sizing and conduit entry placement.
- In areas where hard lid ceilings are in place, all conduits are to run to accessible location or to cable tray.
- Provide labels at both ends of conduits to identify location of far end.

3 Station Cable Support System

- All station cable support systems shall be braced for zone four seismic activity.
- In suspended ceiling and raised floor areas where duct, cable trays, or conduit are not available, station cables shall be bundled with Velcro straps at appropriate distances.
- Velcro straps shall not be over tightened to the point of deforming or crimping the cable sheath.
- Velcro straps shall be UL listed, rated for low smoke, and certified for use in a plenum environment.
- The station cable support system components shall be firmly attached to the existing building structure and installed not more than five feet apart.
- The station cable support system components shall be installed to provide at least three (3) inches of clear vertical space between the cables/optics and the ceiling tiles.
- The station cable support system components shall be spaced to prevent the cables/optics from sagging or buckling.
- No more than eighteen (18) Category 6 cables shall be supported by a J - hook.
- No more than thirty (30) Category 6 cables shall be supported by triangular galvanized metal bracket.
- The station cable support system shall be clearly and neatly labeled per TIA/EIA 606-A, Administration Standard for the Telecommunications Infrastructure of Commercial Buildings.

4 Raceways

- All dual channel raceway shall be installed with a complete end-to-end channel for future power service installation.
- The raceway shall be stubbed above the false ceiling space and capped so that each section of raceway can be connected to a power service in the future without a requirement to add raceway to visible portions of the system. If no false ceiling space is available, the power channel is to be stubbed up and capped next to the point at which the communication services enter the room.

5 Cable Tray

- The Contractor will be responsible for placement of the cable tray in concert with other trades, allowing sufficient room for the cable installers to gain access to all portions of the tray system. Cable tray location shall be coordinated with open ceiling areas, access panel locations, and feeder conduit positions to provide an accessible cable pathway throughout the facility.
- All metallic trays must be grounded and may be used as a ground conductor. Provide #2 AWG bare copper equipment grounding conductor through entire length of tray; bond to each component. Trays used as an equipment grounding conductor must be clearly marked.
- Trays shall be bonded end-to-end.
- Trays shall enter distribution rooms a minimum or six inches into the room, then utilize a drop out to protect station cables from potential damage from the end of the tray.

- Cable trays shall be placed a minimum of six (6) inches from any overhead light fixture and twelve (12) inches from any electrical ballast. A minimum of eight (8) inches of clearance above the tray shall be maintained at all times. All bends and T-joints in the tray shall be fully accessible from above (within 1 foot). Trays shall be mounted no higher than twelve (12) feet above the finished floor and shall not extend more than eight (8) feet over a fixed ceiling area.
- A separate conduit sleeve (minimum of four inches) must be provided as a pathway through any wall or over any obstruction (such as a rated hallway) from the cable tray into any room having a communications outlet.
- The Contractor shall fire stop around the tray and, after installation of the cables, within the tray using removable pillow-style products following manufacturers' guidelines. Sound deadening material shall be provided and installed after installation of cable.
- In rooms without a drop ceiling (open to the structure), the cable shall be mounted as high as possible to provide the greatest clearance above the finished floor, but within the limits in (e) above.

6 Wire Mesh Cable Tray

- Provide all components of the tray system (tray, supports, splices, fasteners, and accessories) from a single manufacturer.
- Wire mesh cable tray shall be secured to the structural ceiling, building truss system, wall or floor using manufacturer's recommended supports and appropriate hardware as defined by local code or the authority having jurisdiction (AHJ).
- When the pathway is overhead, wire mesh cable tray shall be installed with a minimum clearance of 12" (300 mm) above the tray. Leave 12" (300 mm) in between the tray and ceiling/building truss structure. Multiple tiers of wire mesh cable tray shall be installed with a minimum clearance of 12" (300 mm) in between the trays. When located above an acoustical drop ceiling, wire mesh cable tray shall be installed a minimum of 3" (75 mm) above the drop ceiling tiles.
- When installed under a raised floor, wire mesh cable tray shall be installed with a minimum 3/4" (19 mm) clearance between the top of the tray and the bottom of the floor tiles or floor system stringers, whichever are lower in elevation. Maintain a 3" (75 mm) clearance between trays wherever trays cross over.
- Wire mesh cable tray shall be supported every 6' (1.8 m) of span or less. Support wire mesh cable tray within 2' (0.6 m) of every splice and intersection. Support intersections on all sides. Support wire mesh cable tray on both sides of every change in elevation/direction. The weight of the load on the cable tray must not exceed the stated limits per span in the manufacturer's published load table. Use additional supports where needed.
- Secure wire mesh cable tray to each support with a minimum of one fastener. Follow the manufacturers' recommended assembly, splice and intersection-forming practices.
- Use installation tools and practices recommended by the manufacturer to field fabricate wire mesh cable tray intersections and changes in elevation. Use side-action bolt cutters with an offset head to cut wire mesh cable tray.
- Wire mesh cable tray shall be bonded to the Telecommunications Grounding Busbar (TGB) using an approved ground lug on the wire basket tray and a minimum #6 grounding wire or as recommended by the AHJ. Follow UL Classified splicing methods recommended by the manufacturer, ground the tray per NEC requirements and verify bonds at splices and intersections between individual cable tray sections. Cable pathway should be electrically continuous through bonding and attached to the TGB.
- The quantity of cables within the tray will not exceed a whole number value equal to 50% of the interior area of the tray divided by the cross-sectional area of the

cable. Cable fill will not exceed the depth of the cable tray's side rail [2" (50 mm), 4" (100 mm) or 6" (150 mm)].
- The combined weight of cables within the tray will not exceed stated load capacity in manufacturer's specifications.
- Separate different media type within the tray. Treat each type of media separately when determining cable fill limits.
- When pathways for other utilities or building services are within 2' (0.6 m) of the wire mesh cable tray, cover the tray after cables are installed.

7 Pull Boxes
- Pull boxes shall be installed in easily accessible locations.
- Pull boxes installed as part of a horizontal cabling pathway shall be installed immediately above suspended ceilings, where possible.
- Pull boxes shall not be used for splicing cable.
- Pull boxes shall be placed in conduit runs that exceed 100 feet or which require more than two 90-degree bends. The pull boxes shall be located in straight sections of conduit and must not be used for a right-angle bend. Installation shall allow cable to pass through from one conduit to another in a direct line.
- Pull boxes must have a length at least 12 times the diameter of the largest conduit.

B Grounding and Bonding Systems

1 General
- Installation: The Contractor shall provide grounding and bonding in accordance with the requirements of NFPA 70, IEEE 142, TIA/EIA 568, TIA/EIA 607, state and local codes, the campus standards and to requirements specified herein. Codes shall be complied with as a minimum requirement, with these specifications prevailing when they are more stringent.
- Bonding
  - Metallic conduits, wireways, metal enclosures of busways, cable boxes, equipment housings, cable racks and all non-current carrying metallic parts of the installed telecommunications services shall be grounded with #6 AWG copper wire. The metallic conduit system shall be used for equipment and enclosure grounding but not as a system ground conductor.
  - All metallic conduit stub-ups shall be grounded, and where multiple stub-ups are made within an equipment enclosure, they shall be equipped with grounding bushings and bonded together and to the enclosure and the enclosure ground bus.
  - Each metallic raceway, pipe, duct and other metal object entering the buildings shall be bonded together. The Contractor shall use #6 AWG bare copper conductors.
  - The Contractor shall bond telecommunications equipment and busbars separately.

2 Signal Reference Grounding and Bonding
- Each identified telecommunications space within a building shall have a common signal reference ground. The signal reference ground shall conform to the following:
  - Within the building, all communication spaces shall be separately bonded to each other and connected to the primary building ground in accordance with the provisions of TIA/EIA 607. The communication ground shall not ground any other equipment or be connected to any potential high voltage source. All racks, frames, drain wires, and all installed communication equipment shall only be grounded to this common reference ground with a minimum size #6 AWG copper wire.
  - The Contractor shall provide, as a minimum, a continuous #3/0 AWG green electrical conductor connected to a 1/4" x 4" x 5.25" telecommunications

grounding bus bar (TGB) 6" AFF on the plywood backboard of each IDF (or telecommunication space) to terminate chassis and other equipment grounds.
        - The ground wires from each individual IDF shall be routed directly to the Building Distribution Frame (BDF), terminated and bonded together via a telecommunications main grounding bus bar (TMGB) of minimum 1/4" x 4" x 12" dimensions. This point of single reference for all closets in a building shall in turn be grounded with a minimum #3/0 AWG ground conductor to the main building ground. If a main building ground is unavailable, the ground wire from the BDF shall be grounded to the nearest electrical panel ground bus bar. The building ground for signal reference shall be the building service entrance ground.
    - Riser/Tie Cable Bonding
        - There shall be no bonding between the entry cable and the inside riser or distribution cable.
        - All riser and tie cable shields shall be bonded into a single continuous path end-to-end and grounded on each floor in which pairs leave the sheath. Cable shields shall be grounded to the signal reference ground provided in each telecommunication space.
3 Grounding and Bonding Testing Inspection Procedures
    - As an exception to requirements that may be stated elsewhere in these documents, the Inspector of Record shall be given five (5) working days' notice prior to each test. The Contractor shall provide all test equipment and personnel and shall provide written copies of all test results.
    - Grounding and bonding system conductors and connections shall be inspected for tightness and proper installation.
    - The Contractor shall provide personnel and test equipment for point-to-point resistance tests before connecting equipment. Perform point-to-point tests in each building to determine the resistance between the main grounding system and all BDF/IDF ground bus bars. Investigate and correct point-to-point resistance values that exceed 0.5 ohm. The Contractor shall record resistance measurements at all test point locations.

C Information Outlets
1 General Requirements
    - Station outlets shall be mounted securely at work area locations.
    - Station outlets shall be located so that the cable required to reach the desktop equipment is no more than 10 feet long.
    - Station outlets should not be "daisy-chained."
    - Outlets shall be mounted as follows:
        - Wall phone: 48 inches above the finished floor.
        - Standard voice/data outlet: 15 inches above the finished floor.
        - Wall-mounted video outlet: 78 inches above the finished floor.
        - Counter top: 6 inches above the counter top.
2 Modular Furniture Telecommunications Outlets
    - The Contractor shall provide and install all components and labor necessary to completely install, test, and document voice and data telecommunications outlets at each modular furniture workstation location.
    - Category 6 station cable shall be placed from the BDF, through the riser sleeves, through the cable tray system into the conduit, ceiling or floor poles, etc. into the furniture to be served.
    - The Contractor shall coordinate the telecommunications and electrical installation so that the modular furniture is served from the joint signal/power floor monuments or joint power pole in a consistent manner. The Contractor shall provide and install all fittings, flex conduit, adapter plates, and

telecommunications cable and components necessary to install Category 6 station cable from the consolidation point box, through the ceiling or floor monument or pole, into the furniture raceway, and to the final user outlet location (including jacks, adapters, and faceplates).
- The telecommunications installers shall coordinate with the electrical drawings for the number and location of user voice and data outlets.
- Labels shall be numbered according to a scheme developed in consultation with the owner's representative.

D Grounding and Bonding

1 The facility shall be equipped with a Telecommunications Bonding Backbone (TBB). This backbone shall be used to ground all telecommunications cable shields, equipment, racks, cabinets, raceways, and other associated hardware that has the potential to act as a current carrying conductor.

2 The TBB shall be installed independent of the building's electrical and building ground and shall be designed in accordance with the recommendations contained in the ANSI/TIA/EIA-607 Telecommunications Bonding and Grounding Standard.

3 The main entrance facility/equipment room in each building shall be equipped with a telecommunications main grounding bus bar (TMGB).

4 The TMGB shall be connected to the building electrical entrance grounding facility. The intent of this system is to provide a grounding system that is equal in potential to the building electrical ground system. Therefore, ground loop current potential is minimized between telecommunications equipment and the electrical system to which it is attached.

5 All racks, metallic backboards, cable sheaths, metallic strength members, splice cases, cable trays, etc. shall be grounded to the respective TGB or TMGB using a minimum #6 AWG stranded copper bonding conductor and compression connectors.

6 All wires used for telecommunications grounding purposes shall be identified with a green insulation. Non-insulated wires shall be identified at each termination point with a wrap of green tape.

7 All cables and bus bars shall be identified and labeled in accordance with the System Documentation Section of this specification.

8 Wall-Mount Busbars
- Attach busbars to the wall with appropriate hardware according to the manufacturer's installation instructions.
- Conductor connections to the TMGB or TGB shall be made with two-hole bolt-on compression lugs sized to fit the busbar and the conductors.
- Each lug shall be attached with stainless steel hardware after preparing the bond according to manufacturer recommendations and treating the bonding surface on the busbar with antioxidant to help prevent corrosion at the bond.
- The wall-mount busbar shall be bonded to ground as part of the overall Telecommunications Bonding and Grounding System.

9 Rack Mount Busbars and Ground Bars
- When a rack or cabinet supports active equipment or any type of shielded cable or cable termination device requiring a ground connection, add a rack-mount horizontal or vertical busbar or ground bar to the rack or cabinet. The rack-mount busbar or ground bar provides multiple bonding points on the rack for rack and rack-mount equipment.
- Attach rack-mount busbars and ground bars to racks or cabinets according to the manufacturer's installation instructions.
- Bond the rack-mount busbar or ground bar to the room's TMGB or TGB with appropriately sized hardware and conductor.

10 Ground Terminal Block
- Every rack and cabinet shall be bonded to the TMGB or TGB.

- Minimum bonding connection to racks and cabinets shall be made with a rack-mount two-hole ground terminal block sized to fit the conductor and rack and installed according to manufacturer recommendations.
- Remove paint between rack/cabinet and terminal block, clean surface and use antioxidant between the rack and the terminal block to help prevent corrosion at the bond.

11 Pedestal Clamp
- At minimum, bond every sixth raised access floor pedestal with a minimum #6 AWG conductor to the TMGB or TGB using a pedestal clamp sized to fit the pedestal and the conductor and installed according to the manufacturer's recommendations.
- If pedestal clamps are used to construct a signal reference grid, bond the signal reference grid to the TMGB or TGB and bond each rack and/or cabinet to the signal reference grid using a compression tap or similar non-reversible bonding component sized to fit both conductors.
- Remove paint between the pedestal and pedestal clamp, clean surface and use antioxidant between the pedestal and the clamp to help prevent corrosion at the bond.
- Remove insulation from conductors where wires attach to the pedestal clamp.

12 Pipe Clamp
- Bond metal pipes located inside the data center computer room with a minimum #6 AWG conductor to the TMGB or TGB using a pipe clamp sized to fit the pipe and the conductor and installed according to the manufacturer's recommendations.
- Remove paint between the pipe and pipe clamp, clean surface and use antioxidant between the pipe and the clamp to help prevent corrosion at the bond.
- Remove insulation from conductors where wires attach to the pipe clamp.

13 Equipment Ground Jumper Kit
- Bond equipment to a vertical rack-mount busbar or ground bar using ground jumper according to the manufacturer's recommendations.
- Clean the surface and use antioxidant between the compression lugs on the jumper and the rack-mount busbar or ground bar to help prevent corrosion at the bond.

E Fire Stop System

1 The fire stop system is comprised of the item or items penetrating the fire rated structure, the opening in the structure and the materials and assembly of the materials used to seal the penetrated structure.

2 Fire stop systems comprise an effective block for fire, smoke, heat, vapor and pressurized water stream.

3 All penetrations through fire-rated building structures (walls and floors) shall be sealed with an appropriate fire stop system. This requirement applies to through penetrations (complete penetration) and membrane penetrations (through one side of a hollow fire rated structure). Any penetrating item i.e., riser slots and sleeves, cables, conduit, cable tray, and raceways, etc. shall use the proper fire stop equipment.

4 Fire stop systems shall be UL Classified to ASTM E814 (UL 1479).

3.3 System Close Out and As-Built Documentation

A Documentation

1 Refer to Section 27 0000 '4.5-A – Close Out Documentation' for requirements.

END OF SECTION

SECTION 27 1000

STRUCTURED CABLING SYSTEM

Part 1 General

1.1 Work Included

A. General

1. Provide all labor, materials, tools and equipment required for the complete installation of work called for on the Construction Drawings and described in the Specifying Documentation.
2. This document describes the requirements for the contractors, products and installation relating to furnishing and installing Telecommunications Cabling systems.
3. The Horizontal Cabling System as described in this document is comprised of cabling, infrastructure, J-hook pathways and termination devices for Data systems.
4. Contractor will provide a bid including all labor, materials, tools and equipment required for the complete installation of work called for on the Construction Drawings and described in this Document. It is the responsibility of the Contractor to provide all material necessary to provide a complete and operable system. If the contractor feels that the system described is incomplete, they must address this in writing to the Owner/Owner's Representative before providing a bid.
5. All questions concerning non-specified product and services will be address to the Owner's Representative before Contactor provides a bid. Owner expects that by accepting the Contractor's bid proposal that the Contractor has provided a competent bid for a complete solution.
6. Product specifications, general design considerations, and installation guidelines are provided in this document. Quantities of telecommunications outlets, typical installation details, cable routing and outlet types will be provided as an attachment to this document.

1.2 References

A. Regulatory References

1. Contractors will comply with all requirements as specified in Section 27 0000 '1.3. – Regulatory References'.

1.3 Safety and Indemnity

A. Requirements

1. Contractors will submit the necessary documentation to demonstrate their compliance with Section 27 0000 '2.1 – Safety and Indemnity'.

1.4 Contractor Qualifications

A. Requirements

1. Contractors will submit the necessary documentation to demonstrate their compliance with Section 27 0000 '2.2 – Contractor Qualifications'.

1.5 Quality Assurance

A. Requirements

1. Contractors shall comply with all requirements as specified in Section 27 0000 '2.3 – Quality Assurance'.

1.6 Equivalent Products

A. Approved Products

1. All Products described, and Part Numbers given in this Specification are those of Hubbell unless otherwise noted.

B. Pre-Approved Equals:

1. None

C. Other Than Approved Products

1. Contractors wishing to approve a system other than those specified in this document shall do so in accordance with Section 27 000 '3.1 Products'.

1.7 Submittal Documentation

A. Requirements

1. The successful contractor shall provide their submittal package in accordance with the Section '01 20 00 – Submittal Schedule' and Section 27 0000 '3.2 – Submittal Documentation'.

1.8 Acceptance

A. Requirements

1. The contractor shall comply with all requirements as listed in Section 27 0000 '3.3 – Acceptance'.

1.9 Warranty

A. Requirements

1. The contractor shall comply with all requirements as listed in Section 27 0000 '3.4 – Warranty'.

1.10 Technology Clause

A. General Requirements

1. As technology advances, it is understood that improved or enhanced products may supersede existing products in both price and performance and yet be essentially similar. This request for bids seeks to address the rapid advances in technology by allowing functionally similar or identical products that may be introduced in the future, during the term of this bid, to be included under the general umbrella of compatible product lines and are thus specifically included in this bid document.
2. Discontinued or end of life products shall be replaced with an equal product to the original specified product at no additional costs to the owner.

Part 2 Products

2.1 Work Area Subsystem

A. General

1. The Work Area shall consist of the connectivity equipment used to connect the horizontal cabling subsystem and the equipment in the work area. The connectivity equipment shall include the following options:
   - Patch Cords

- Modular Inserts, Jacks and Plugs
- Faceplates

B. Patch Cords

1. Category 6 Data/Voice Outlet Patch Cords
   - All category 6 channel patch cords shall be constructed with a snagless boot, made of molded PVC, colored matched to the color of the patch cord cable.
   - All category 6 channel patch cords shall be constructed with category 6 patch cable, 24 AWG, 7/32 tinned copper stranded patch cable, insulated with polyethylene and paired, jacketed with PVC, ETL Verified for ISO 11801, (UL) NEC type CM or CMR, 75º C, Article 800 CSA Type CMG.
   - All category 6 channel patch cords shall be 100% factory tested to pass return loss (RL) and near-end cross talk (NEXT).
   - All category 6 channel patch cords shall be manufactured using a T568-B plug-wiring format.
     - All patch cords will be delivered to the site and must be signed for by the Owner/Owner's Representative. It will be the responsibility of other to install all Work Area Data Patch Cords.
   - Length:
     - Data/Voice patch cords will be 15 feet long.
   - Color:
     - Data/Voice Black
   - Quantity
     - Data/Voice Contractor will provide 25% of all data outlets shown on the drawings, and contractor to provide one (1) 3ft patch cord for each television location.
   - Hubbell Premise Part #, or approved equal:
     - Data/Voice **HCL6BK15**
     - TV **HCL6BK03**

2. Category 6A Wireless Access Points Outlet Patch Cords
   - All category 6A channel patch cords shall be constructed with a snagless boot, made of molded PVC, colored matched to the color of the patch cord cable.
   - All category 6A channel patch cords shall be constructed with category 6A patch cable, 24 AWG, 7/32 tinned copper stranded patch cable, insulated with polyethylene and paired, jacketed with PVC, ETL Verified for ISO 11801, (UL) NEC type CM or CMR, 75º C, Article 800 CSA Type CMG.
   - All category 6A channel patch cords shall be 100% factory tested to pass return loss (RL) and near-end cross talk (NEXT).
   - All category 6A channel patch cords shall be manufactured using a T568-B plug-wiring format.
     - All patch cords will be delivered to the site and must be signed for by the Owner/Owner's Representative. It will be the responsibility of other to install all Work Area Data Patch Cords.
   - Length:
     - Wi-Fi patch cords will be 3 feet long.
   - Color:
     - Wi-Fi White
   - Quantity
     - Wi-Fi Contractor will provide one (1) patch cable for each Wi-Fi data outlet.
   - Hubbell Premise Part #, or approved equal:
     - Wi-Fi **HCL6AW03**

C. Modular Inserts and Jacks

1. Category 6 Data/Voice Jack & Camera Termination Plugs
   - Jack will meet the Category 6 Standard.
   - Jacks shall be 8 positions un-keyed
   - Each jack shall be an individually constructed unit and shall snap mount in an industry standard keystone opening (.760" x 580")
   - Jacks shall utilize a 2-layer printed circuit board to control NEXT
   - Jack termination shall follow the industry standard 110 IDC.
   - Jacks shall have a designation indicating Category 6 on the nose which can be plainly seen from the front of the faceplate. Bottom of jack shall have date code and an abbreviated catalog number.
   - Jacks shall utilize a paired punch down sequence. Cable pair twists shall be maintained up to the IDC, terminating all conductors adjacent to its pair mate to better maintain pair characteristics designed by the cable manufacturer.
   - Jacks shall terminate 22-26 AWG stranded or solid conductors.
   - Jacks shall be compatible with single conductor 110 impact termination tools.
   - Jacks shall be compatible with TIA/EIA 606 color code labeling
   - Jacks shall have universal wiring designation.
   - Jacks shall have an attached color-coded wiring instruction label housed between the IDC termination towers.
   - Jacks shall be manufactured in the USA
   - Jacks will be terminated according to theT568B wiring scheme
   - Color:
     - Data/Voice WHITE
     - Camera Factory
   - Quantity: Contractor will provide one jack for every outlet cable shown on the drawings.
   - Hubbell Premise Part #, or approved equal.
     - Data/Voice **HXJ6W**

2. Category 6A Wireless Access Point Jack
   - Jack will meet the Category 6A Standard.
   - Jacks shall be 8 positions un-keyed
   - Each jack shall be an individually constructed unit and shall snap mount in an industry standard keystone opening (.760" x 580")
   - Jacks shall utilize a 2-layer printed circuit board to control NEXT
   - Jack termination shall follow the industry standard 110 IDC.
   - Jacks shall have a designation indicating Category 6A on the nose which can be plainly seen from the front of the faceplate. Bottom of jack shall have date code and an abbreviated catalog number.
   - Jacks shall utilize a paired punch down sequence. Cable pair twists shall be maintained up to the IDC, terminating all conductors adjacent to its pair mate to better maintain pair characteristics designed by the cable manufacturer.
   - Jacks shall terminate 22-26 AWG stranded or solid conductors.
   - Jacks shall be compatible with single conductor 110 impact termination tools.
   - Jacks shall be compatible with TIA/EIA 606 color code labeling
   - Jacks shall have universal wiring designation.
   - Jacks shall have an attached color-coded wiring instruction label housed between the IDC termination towers.
   - Jacks shall be manufactured in the USA
   - Jacks will be terminated according to theT568B wiring scheme
   - Color:
     - Wi-Fi Purple

- Quantity: Contractor will provide one jack for every outlet cable shown on the drawings.
- Hubbell Premise Part #, or approved equal.
  - Wi-Fi **HJU6AP24**

D. Wall Mount and Modular Furniture Faceplates

1. Wall Plates
   - Faceplates shall be UL Listed and CSA Certified
   - Faceplates shall be 2.75" W x 4.5" H (69.8 mm x 114.3 mm)
   - Faceplates shall provide for TIA/EIA 606 compliant station labeling
   - Faceplates shall have plastic covers over the mounting screws that can be replaced with a clear plastic window over a printable paper insert
   - Color: WHITE or STAINLESS STEEL.
     - Contractor will field verify and match finish to the existing electrical outlet face plate cover.
   - Quantity: Contractor will provide one single gang faceplate for each outlet shown on the drawings.
   - Hubbell Premise Part #, or approved equal.
     - WHITE
       - **1 Port IFP11W**
       - **2 Port IFP12W**
       - **3 Port IFP13W**
       - **4 Port IFP14W**
       - **6 Port IFP16W**
     - STAINLESS STEEL
       - **1 Port SSFL11**
       - **2 Port SSFL12**
       - **3 Port SSFL13**
       - **4 Port SSFL14**
       - **6 Port SSFL16**
2. Blank Insert
   - Color: Blank Insert to be WHITE –
   - Quantity: Contractor will provide one insert for every unused port in a faceplate.
   - Hubbell Wiring, Part #: **SFBW10**, or approved equal.
3. Wall Phone Plates
   - Faceplate shall be a two-piece design, including a steel base and a stainless-steel cover plate.
   - Faceplates steel base shall incorporate six screw terminals, one 6 position jack and an insulating plastic sleeve.
   - Faceplate shall be equipped with screw studs to be used as the mounts for wall hung telephones.
   - Color: Faceplate to be STAINLESS STEEL
   - Quantity: Contractor will provide one faceplate for each Intercom Handset outlet shown on the drawings.
   - Allen Tel, Part #: **AT630A-6**, or approved equal. Tragic

4. Blank Wall Plates
   - Faceplate shall be constructed from stainless steel.
   - Faceplates shall be UL Listed and CSA Certified
   - Faceplates shall be 2.75" W x 4.5" H (69.8 mm x 114.3 mm) for single gang.
   - Color: Faceplate to be STAINLESS STEEL
   - Quantity: Contractor will provide one faceplate for each unused data/voice/video/intercom outlet shown on the drawings.

- Hubbell Wiring Part #: **S13**, or approved equal.

5. Surface Mount Raceway Insert –
   - Inserts for Hubble PB2, PB3, and PS3 Device Mounting Brackets
   - Insert shall allow for two category 6 jacks to be mounted flush.
   - Insert shall match the color of the Raceway installed.
   - Color: Faceplate to be IVORY
   - Quantity: Contractor will provide one 2port insert for each outlet in the Surface Mount Raceway shown on the drawings.
   - Hubbell Part #: **KP2162 or approved equal**.

2.2 Horizontal Distribution Cabling

1. The horizontal distribution cabling system is the portion of the telecommunications cabling system that extends from the Work Area (WA) telecommunications outlet/connector to the horizontal cross-connect in the Telecommunications Room (TR).
   - Cabling Support System
   - Copper Station Cabling
   - Copper Cross-Connect Cabling

B. Cabling Support System

1. J-Hooks
   - Cable supports shall provide a bearing surface of sufficient width to comply with required bend radii of high-performance cables; cULus Listed.
   - Cable supports shall have flared edges to prevent damage while installing cables.
   - Cable support system shall provide fasteners that allow them to be mounted to wall, concrete, joist, tee-bar wire, treaded rod, beams and raised floor supports.
   - Fasteners shall have the ability to either be factory or jobsite assembled; rated for indoor use in non-corrosive environments; cULus Listed.
   - Fastener to with one non-continuous cable support, factory or jobsite assembled.
   - Color: NA
   - Quantity: Contractor will provide quantities of j-hooks and hanger accessories in the amount necessary to support all horizontal cabling every 4-5 feet.
   - Part #:
     - ERICO CAT425
     - Cooper B-Line BCH12, BCH21, BCH32, BCH64 and accessories.

C. Copper Station Cable

1. Category 6 Data/Voice, Camera, and Intercom Unshielded Twisted Pair (UTP) Cable
   - Cable will meet or exceed the proposed requirements of ANSI/TIA/EIA 568-B.2, 568-B.2 Addendum #1 and ISO/IEC 11801 Category 6 Cable Standard for: NEXT and ELFEXT (Pair-To-Pair and Power Sum), Insertion Loss (Attenuation), Return Loss, and Delay Skew.
   - Cable shall be proven to support Gigabit Ethernet / 1000BASE-T / IEEE 802.3ab, ATM up to 155 Mbps, IEEE 802.3af Power Over Ethernet for VoIP, 100 Mbps Fast Ethernet / 100BASE-T / IEEE 802.3, ANSI.X3.263 FDDI TP-PMD, Ethernet / 10BASE-T / IEEE 802.3, 4 & 16 Mbps Token Ring / IEEE 802.5, T1/E1, xDSL, ISDN, 550 MHz Broadband Video and standards under development such as ATM at 622 Mbps, 1.2 and 2.4 Gbps.
   - The cable shall consist of four unshielded twisted pairs of thermoplastic insulated bare copper enclosed in a thermoplastic jacket.
   - All cable shall conform to the requirements for communications circuits defined by the National Electrical Code (Article 800) and the Canadian Building Code.

Cable listed to NEC Article 800-51(a) will be used for “Plenum” installations. Cable listed to NEC Article 800-51(b) shall be installed in vertical runs penetrating more than one floor.

- Cable shall have been certified with the UL 1666 Vertical Tray Flame Test.
- Cable shall be available in a Plenum, Riser and Indoor/Outdoor rated jackets.
- Contractor will use the indoor/outdoor rated cable for all locations where the cable pathway goes underground and/or run in exterior conduit.
- The listed Category 6 cables in this specification are manufactured by Mohawk/CDT. All other manufactures eligible for Hubbell’s Certified Premise Solution also have been pre-approved.
- Color:
  - Data/Voice BLUE
  - Camera WHITE
  - Intercom YELLOW
- Quantity: See Drawing for quantity and installation details.
- Part#:
  - For Riser Application:
    - Data/Voice Hubbell **HC6SRB**
    - Camera Hubbell **HC6RRW**
    - Intercom Hubbell **HC6SRY**
  - For Plenum Application:
    - Data/Voice Hubbell **C6RPEB**
    - Camera Hubbell **C6RPEW**
    - Intercom Hubbell **C6RPEY**
  - For Indoor/Outdoor Application:
    - Data/Voice, Mohawk PN# **M58722** (all cable jackets will be BLACK)

2. Category 6A Wireless Access Point Unshielded Twisted Pair (UTP) Cable
   - Cable will meet or exceed the proposed requirements of ANSI/TIA/EIA 568-B.2, 568-B.2 Addendum #1 and ISO/IEC 11801 Category 6 Cable Standard for: NEXT and ELFEXT (Pair-To-Pair and Power Sum), Insertion Loss (Attenuation), Return Loss, and Delay Skew.
   - Cable shall be proven to support Gigabit Ethernet / 1000BASE-T / IEEE 802.3ab, ATM up to 155 Mbps, IEEE 802.3af Power Over Ethernet for VoIP, 100 Mbps Fast Ethernet / 100BASE-T / IEEE 802.3, ANSI.X3.263 FDDI TP-PMD, Ethernet / 10BASE-T / IEEE 802.3, 4 & 16 Mbps Token Ring / IEEE 802.5, T1/E1, xDSL, ISDN, 550 MHz Broadband Video and standards under development such as ATM at 622 Mbps, 1.2 and 2.4 Gbps.
   - The cable shall consist of four unshielded twisted pairs of thermoplastic insulated bare copper enclosed in a thermoplastic jacket.
   - All cable shall conform to the requirements for communications circuits defined by the National Electrical Code (Article 800) and the Canadian Building Code. Cable listed to NEC Article 800-51(a) will be used for “Plenum” installations. Cable listed to NEC Article 800-51(b) shall be installed in vertical runs penetrating more than one floor.
   - Cable shall have been certified with the UL 1666 Vertical Tray Flame Test.
   - Cable shall be available in a Plenum, Riser and Indoor/Outdoor rated jackets.
   - Contractor will use the indoor/outdoor rated cable for all locations where the cable pathway goes underground and/or run in exterior conduit.
   - The listed Category 6 cables in this specification are manufactured by Mohawk/CDT. All other manufactures eligible for Hubbell’s Certified Premise Solution also have been pre-approved.
   - Color:
     - Wi-Fi BLUE
   - Quantity: See Drawing for quantity and installation details.

- Part#:
  - For Riser Application:
    - Wi-Fi Hubbell **C6ASRB**
  - For Plenum Application:
    - Wi-Fi Hubbell **C6ASPB**
  - For Indoor/Outdoor Application:
    - Wi-Fi, Mohawk PN# **M58722** (all cable jackets will be BLACK)

D. Horizontal Copper Cross-Connect Cabling

1. Voice Cross-Connect Cabling
   - Cable shall meet and/or exceed the UL Listed Type CMR and the ANSI/ICEA S-80-576 standard.
   - Core Construction
     - Conductors: Solid-copper conductors, 24 AWG.
     - Insulation: Flame retardant semi-rigid PVC.
     - Core Assembly: Cable core will be made up of 100 pair units consisting of four (4) 25 pair sub-units. Each group individually identifiable by color coded unit binders.
   - Jacket: Gray, flame retardant PVC jacket.
   - Color: Voice cable jacket will be GRAY
   - Quantity: See Drawing for quantity and installation details. The number of 25-pair cable between the MDF and the IDF shall be derived by multiplying the number of pairs required for the cross-connect by 1.25 to the nearest 25-pair increment.
   - Part#: Equal to Mohawk Cable:
     - 12 pair = PN# **09-094-02 – Superior Essex**
     - 25 pair = PN# **M58141**
     - 50 pair = PN# **M58522**
     - 100 pair = PN# **M585201**

2.3 Backbone Cabling

A. General

1. The backbone cabling system is the portion of the telecommunications cabling system that extends from the Intermediate Distribution Frame (IDF) to the Main Distribution Frame (MDF).
   - Fiber Optic Backbone Cabling
   - Copper Backbone Cabling

B. Fiber Optic Backbone Cabling –

1. Data System Backbone Cabling
   - Cable shall be UL/cUL OFNR/OFN FTA rated and be Flame Resistant in accordance with the UL 1666.
   - Cable shall an indoor/outdoor rated jacket.
   - Cable shall be constructed utilizing a loose tube design.
   - Cable will be fully water blocked combining overall water blocking tape and a moisture blocking gel for each individual tube.
   - Cable will maintain the following:
     - Crush Resistance (EIA-455-41) = 2000 N/cm
     - Impact Resistance (EIA-455-25) = 2000 Impacts w/1.6 N-m
     - Min Bend Radius:
       - Long Term - No Load = 15x Cable diameter
       - Short Term – Load = 20x Cable diameter
     - Operating Temp. = -40°C to +70°C
     - Storage Temp. = -40°C to +80°C

- Cable shall be constructed of 50/125µ Laser Optimized rated glass capable of:
  - 1 Gigabit Ethernet Link at 1000m/600m (@850nm/1300nm)
  - 10 Gigabit Ethernet Link at 300m/300m (@850nm/1300nm)
- The Fiber Optic Cable in this specification is manufactured by Mohawk/CDT. All other manufactures eligible for Hubbell's Certified Premise Solution that meet and/or exceed the below specifications have also been pre-approved.
- Color: Fiber Optic cable jacket will be BLACK
- Quantity: See Drawing for quantity and installation details.
- Hubbell Premise Part #:
  - 12 Strand Multi Mode Fiber **HFCD14012R4BK**

C. Copper System Backbone Cabling

1. Voice & Intercom System Backbone Cabling
   - Cable shall meet or exceed those specified in RUS Bulletin 1753F-208 (REA PE-89)
   - Core Construction
     - Conductors: Solid, annealed copper, 24 AWG unless otherwise noted on design documents.
     - Insulation: Dual insulation consisting of an inner layer of foamed polyolefin skin, colored coded in accordance with industry standards
     - Core Assembly: Cables of 25 pairs and less formed by assembling pairs together in a single group. Cables of more than 25 pairs formed by twisted pairs arranged in groups with each group having a color coded unit binder.
     - Filling Compound: The entire core assembly completely filled with ETPR compound, filling the interstices between the pairs and under the core tape.
     - Core Wrap: Non-hygroscopic dielectric tape applied longitudinally with an overlap.
     - Sheath Construction
     - Aluminum Shield: Corrosion protected plastic coated, corrugated 0.008" aluminum tape.
   - Jacket: Black, linear low-density polyethylene.
   - Color: Voice cable jacket will be BLACK
   - Quantity: See Drawing for quantity and installation details. The number of 25-pair cable between the MDF and the IDF shall be derived by multiplying the number of pairs serving the individual telephone handsets by 1.25 to the nearest 25-pair increment.
   - Part#: Equal to General Cable:
     - 12 pair = PN#**09-094-02 – Superior Essex**
     - 25 pair = PN# **7525758**
     - 50 pair = PN# **7525793**
     - 75 pair = PN# **7525801**
     - 100 pair = PN# **7525819**
     - 200 pair = PN# **7525835**

2.4 Telecommunication Room

A. General Requirements

1. The Telecommunication Room (TR) includes those products that terminate horizontal and backbone cabling subsystems and connect then to the network equipment.
   - Patch Cords
   - Horizontal Cabling Termination Equipment
   - Backbone Cabling Termination Equipment
   - Cabinets, Racks, and Enclosures
   - Cable Support System

B. Patch Cords
1. Category 6 Data/Voice & Camera TR Patch Cords
- TR Copper Patch Cords shall comply with those specified in 2.1 Work Area Subsystem, A. Patch Cords, 1. Category 6 Data Outlet Patch Cords
- All patch cords will be delivered to the site and must be signed for by the Owner/Owner's Representative. It will be the responsibility of other to install all TR Data and Voice Patch Cords.
- Color:
  - Data/Voice BLUE
  - Camera RED
- Quantity: Contractor will provide one patch cord for every data and voice outlet cable shown on the drawings. Contractor will provide the quantity of different length patch cords as follows:
- Part#:
  - Data/Voice Patch Cords
    - 3-Foot **HCL6B03**
  - Camera Patch Cords
    - 3-Foot **HCL6R03**

2. Category 6A Wireless Access Points TR Patch Cords
- TR Copper Patch Cords shall comply with those specified in 2.1 Work Area Subsystem, A. Patch Cords, 1. Category 6A Data Outlet Patch Cords
- All patch cords will be delivered to the site and must be signed for by the Owner/Owner's Representative. It will be the responsibility of other to install all TR Data and Voice Patch Cords.
- Color:
  - Wi-Fi PURPLE
- Quantity: Contractor will provide one patch cord for every data and voice outlet cable shown on the drawings. Contractor will provide the quantity of different length patch cords as follows:
- Part#:
  - Wi-Fi Patch Cords
    - 3-Foot **HCL6AP03**

3. Fiber Patch Cords
- Patch Cords shall be a Duplex LC to LC 50/125µm "Laser Optimize" Graded-Index Multimode Fiber Patch Cord.
- All patch cords shall be factory polished and 100% optically tested for superior performance.
- Cables shall have a Mated Pair MM Insertion Loss of less than 0.60 dB (0.25 dB Typical).
- Cable Retention: > 25 pounds
- All optical, mechanical and environmental performance shall meet and/or exceed the TIAEIA-568-B.3 specifications.
- Fiber patch cords will be 1-meter long.
- Color: NA
- Quantity: Contractor will provide two fiber patch cords for every New fiber optic backbone cable run shown on the drawings.
- Part#: **DFRCLCLCF1MM**

C. Horizontal Cable Termination Equipment
1. Modular Unloaded Patch Panels (Only 48-Port Patch Panels is Acceptable)
- Panels shall be made of black anodized aluminum in 24-, 48-, and 96- port configurations.

- Panels shall have modular jacks employing a tri-plane staggered contact array with a flat “hairpin” contact design made of Beryllium copper with a minimum 50-micro-inch gold plating on contact surfaces over 50-100 micro-inch of nickel compliant with FCC part 68.
- Panels shall be equipped with 110-style termination made of fire retardant UL 94V0 rated thermoplastic and tin lead solder plated IDC.
- Panels shall have optional rear cable support bar for strain relief. Cable support bar shall attach to the rear of the patch panel itself without the use of additional fasteners or screws.
- Panels shall have self-adhesive, clear label holders and white designation labels provided with the panel for each row of 24 ports.
- Panels shall provide wiring identification & color code and maintain an in-line, paired punch down sequence that does not require the splitting of conductors from individual cable pairs.
- Panels shall terminate 22-26 AWG solid conductors, maximum insulated conductor outside diameter 0.050”.
- Panels shall be ANSI/TIA/EIA-568-B.1, B.2 and ISO/IEC 11801 category 6 compliant.
- Panels shall be UL LISTED 1863 and CSA certified.
- Panels shall be made by an ISO 9002 Certified Manufacturer.
- Panels installed in a 4-connector channel with a category 6 modular jack, and category 6 patch cords, all from the same manufacturer, and a qualified category 6 cables shall meet or exceed the requirements of Draft 5 of the TIA UTP Systems Task Group PN3727, Category 6 Draft Addendum to the ANSI/TIA/EIA-568-B.2 standard.
- Color: Patch Panel shall be BLACK
- Quantity: See Drawing for quantity and installation details. The number of patch panels to be supplied shall be derived by multiplying the number of data/voice cables being terminated at the individual TR by 1.25 and providing additional panels in the nearest 24 port increment.
- Part#:
  - 24 port Category Patch Panel, **HWS14608C**
  - 48 port Category Patch Panel, **HWS14609C**
    - *Provide one Cable Management Bar, PN# **PCBLMGT**, for each 24 ports.

D. Horizontal Voice & Intercom Cross-Connect 66 Wiring Blocks

1. Wall Mount
   - Blocks shall be available in a 25 pair unit.
   - Blocks shall be wall mounted.
   - Wiring blocks shall be available as kits that include the wiring blocks, the proper number of connecting clips, wire management and label strips.
   - Blocks shall be constructed of a UL94 V0 rated polycarbonate blend.
   - Blocks shall be mounted to a rugged 16 ga steel distribution frame. Frame shall support the 66 blocks and allow for a through for cables to be routed through the rear of the blocks directly to the termination point.
   - Blocks shall be UL VERIFIED for TIA/EIA-568-B compliance.
   - Color: NA
   - Quantity: See Drawing for quantity and installation details.
   - Part#: 6 pair block, PN# **HPW66B16**
   - Part#: 25 pair block, PN# **HPW66B425**
   - Accessories to be provided with each installed 66 Block:
     - Mounting Bracket PN# **HPW89D**

E. Backbone Cable Termination Equipment
   1. Fiber Optic Cassette
      - ETL Tested per TIA/EIA-568-C.3
      - MM Mated Pair Insertion Loss: <0.5dB (0.35dB typical)
      - Return Loss: <-35dB
      - Operating temperature: 0-70°C
      - Materials:
        - Connector ferrule: Zirconia ceramic
        - Connector body/nut: Nickel plated brass/zinc or polymer
      - Strain relief boot: Flame retardant (UL-Rated 94-V0) polymer
      - Color: Aqua
      - Quantity: See Drawing for quantity and installation details.
      - Part#: **OCLC50G4CVI**

F. Copper Termination Panels
   1. Voice 110 Wiring Blocks
   2. Wall Mount
      - Blocks shall be available in a 300-pair unit.
      - Blocks shall be wall mounted.
      - Wiring blocks shall be available as kits that include the wiring blocks, the proper number of 5 pair connecting clips, wire management and label strips.
      - Blocks shall be constructed of a UL94 V0 rated polycarbonate blend.
      - Blocks shall be mounted to a rugged 16 ga steel distribution frame. Frame shall support the 110 blocks and allow for a through for cables to be routed through the rear of the blocks directly to the termination point.
      - Blocks shall be UL VERIFIED for TIA/EIA-568-B compliance.
      - Color: NA
      - Quantity: See Drawing for quantity and installation details. The number of 110 blocks to be supplied shall be derived by multiplying the number of voice/intercom cables being terminated at the individual TR by 1.25 and providing additional panels in the nearest 300 pair block increment.
      - Part#: 300 pair block, PN# **110WMK**
   3. OSP Protection Panels
      - 110 connector input and output
      - wall or frame mountable
      - designed with an internal splice chamber and cover over incoming and outgoing connections and protection modules
      - stackable to allow for future service expansion
      - equipped with an internal fuse link
      - external ground connectors accept 6-14 AWG ground wire
      - accommodates industry standard 5 pin protection modules
      - designed to exceed the requirements set forth in Underwriters Laboratory's UL497
      - Color: NA
      - Quantity: One protection panel will be installed per IDF home run to the MDF. Protection panels are not required at the IDF side of the cable run.
   4. Part#: Circa Enterprise inc. –
      25 pair block, PN# **1880ECA1-25**
      50 pair block, PN# **1880ECA1-50**
      100 pair block, PN# **1880ECA1-100**

G. Fiber Termination Panels
   1. MDF Rack Mount Fiber Panel

- Panels shall be constructed of cold rolled 16 ga. steel with a black powder paint finish and provide for fully enclosed fiber patching and termination.
- Panels shall have a removable smoked Plexiglas front cover with optional lock kit. The panel shall have a removable top, front and rear covers. The panel adapter tray shall be removable from the front of the panel by sliding the tray forward. Panels shall come with rack mounting brackets that allow it to be mounted with the front cover flush with the front of the rack, or with the front of the panel extended 5.0" in front of the rack.
- Panels shall be 2 rack spaces, accepting 9 adapter panels.
- Adapter panels shall be available with SC multimode adapters. Adapter shall have a zirconia alignment sleeve.
- Panel shall have a splice tray mounting stud incorporated into the base for mounting of mechanical or fusion splice trays. Adapter tray shall have cable management anchor points and come with cable anchors allowing for the maintenance of the incoming cable with the proper minimum bend radius.
- Panels shall have four cable entrance ports on the top and 2 on the bottom, which are covered by knock outs. Panels shall have two jumper ports in the bottom at the front of the panel with plastic dust covers for routing of jumpers.
- Color: Fiber Panel will be BLACK
- Quantity: See Drawing for quantity and installation details.
- Hubbell Premise Part #, or approved equal:
  - 4U Rack Mount Panel **FCR4U15SPL**
  - Insert Panels
    - Blanks **FSPB**

2. IDF Rack Mount Fiber Panel
   - Panels shall be constructed of cold rolled 16-gauge steel with a black powder paint finish.
   - The panel shall have a hinged swing-out fiber drawer. Panels shall come with rack mounting brackets that allow it to be mounted on a 19" or 23" rack. Panel shall occupy no more than one rack space.
   - Panel shall be constructed to accept up to 3 adaptor panels.
   - Panels shall have cable entrance points in the rear, which are covered by knock-outs
   - Color: Fiber Panel will be BLACK
   - Quantity: See Drawing for quantity and installation details.
   - Hubbell Premise Part #, or approved equal:
     - Rack Mount Panel
       - 1U Rack Mount Panel **FCR1U3SPL**
     - Insert Panels
       - Blanks **FSPB**

3. IDF Wall Mount Fiber Panel
   - Panels shall be constructed of cold rolled 16-gauge steel with a black powder paint finish.
   - Panel shall be constructed to accept up to 1 adaptor panels.
   - Color: Fiber Panel will be BLACK
   - Quantity: See Drawing for quantity and installation details.
   - Corning Cabling System Part #, or approved equal:
     - Wall Mount Panel
       - Single Panel Housing **SPH-01P**

H. Cabinets, Racks, and Enclosures
   1. Contractor will provide the following 'MDF/IDF' Cabinets, Racks, Enclosures and components based on the number of cables to that will be terminated:

1. Floor Mount Cabinets
   - Width: 750.0mm 29.52” (19” EIA)
   - Height: 1991.0mm 78.38” (42 RMU)
   - Depth: 39”
   - **Color:** Floor Mount Cabinet will be or **BLACK**
   - **Quantity:** See Drawing for quantity and installation details.
   - **Part#:**
     Floor Mount Cabinet
     AR3150 NetShelter SX 42U
     - Provide (3) for MDF see drawing detail 3T4.3 & Elevations 3T3.0

     In Row Air Conditioner
     ACRD100
     - Provide (1) for MDF see drawing detail 3T4.3 & Elevations 3T3.0

     AP9325
     - Provide (1) per In Row Air Conditioner

     Condenser
     ACCD75215
     - Provide (1) for MDF see drawing detail 3T4.3 & Elevations 3T3.0

     ACAC75009
     - Provide (2) per Condenser

     ACAC10022
     - Provide (1) per Condenser

     AR7701
     - Provide (1) per Condenser

2. Wall-Mounted Cabinets
   - Wall-mounted cabinets shall be manufactured from steel sheet.
   - Each cabinet will have a rear panel that attaches to the wall, a hinged cabinet body that swings open from the rear panel providing easy access to the rear of equipment and a locking front door.
   - The rear panel will provide cable access with pre-punched knockouts, up to 3”, for conduit along the top and bottom edges of the panel. There will also be cutouts in the back of the rear panel so that cables can enter the panel through the wall. The rear panel will provide attachment points for accessory equipment mounting brackets and cable tie points within the panel (cabinet).
   - The cabinet body will include a single pair of vertical 19” EIA equipment mounting rails. The mounting rails will be EIA-310-D compliant with the Universal hole pattern. Mounting holes will have #12-24 threads.
   - Mounting rails will be adjustable in depth so that they can be positioned at any point within the cabinet body. The design of all cabinets will allow an additional pair of mounting rails (for a total of two pairs of mounting rails per cabinet) to be added to the cabinet.
   - The wall-mount cabinet shall provide a hinge design that attaches the cabinet body and the rear panel and allow the rear panel to be removed during installation. The hinge design will allow the cabinet body to open at least 90°. The hasp used to secure the rear panel and the cabinet body together will assist in drawing the components together during the locking action.
   - The cabinet body will include vents that are designed to accept fan kits.
   - The front door will be hinged and locking. The front door and rear panel will be keyed alike. The front door will have rounded edges and corners. The cabinet body will allow the front door to be attached so that it will swing open from the right or left. The cabinet manufacture shall provide an option for a solid or a tinted

plexi-glass window front door. The plexi-glass in doors shall be bronze acrylic (not clear) with a UL flammability classification of 94HB or better.

- Finish shall be epoxy-polyester hybrid powder coat (paint).
- The cabinet shall have the option of being delivered fully assembled. All cabinets will include installation hardware (hex lag screws) for wood studs and 50 each #12-24 equipment mounting screws.
- Load bearing capacity for cabinets that wall-mount will be a minimum of 200 pounds per cabinet.
- Cabinets that are wall-mount only will be certified and UL Listed to standard UL 60950 under category NWIN.
- Color: Wall Mount Cabinet will be BLACK
- Quantity: See Drawing for size, quantity and installation details.
- Part#:
  - Wall Mount Cabinet **RE4X**

  - Accessories to be provided with each installed cabinet:
    - Sound Dampening Kit **REKS**
    - Fan Kit **REKF**
    - Fan Filter Kit **REKFF**

I. Telco Backboards

1. Backboards shall be 4’ x 8’ x .75” void free plywood (ACX Plywood with the “A” side turned out).
2. Sheets shall be but to size for the application intended.
3. The plywood shall be painted with two coats of white fire-retardant paint.
   - Flame Stop III paint additive ASTM E-84, NFPA 255, UL 723
   - Add one pint of Flame Stop III and one pint of water to one gallon of latex-based paint.

Part 3 Execution

3.1 Installation

A. Work Area Outlets Installation

1. No more than 12” of cable shall be stored in an outlet box, modular furniture raceway, or insulated walls.
2. Bend radius of the cable in the termination area shall not be less than 4 times the outside diameter of the cable.
3. The cable jacket shall be maintained to within 12.7mm (½ inch) of the termination point.
4. All UTP cables shall have no more than 12.7mm (½ inch) of pair untwist at the termination point.
5. Data jacks, unless otherwise noted in drawings, shall be located in the top position(s) of each faceplate. Data jacks in horizontally oriented faceplates shall occupy the left-most position(s).
6. Voice jacks, unless otherwise noted in drawings, shall occupy the next position(s) below the data on the faceplate. Voice jacks in horizontally oriented faceplates shall occupy the position left of the data jack.
7. Video jacks, unless otherwise noted in drawings, shall occupy the bottom position(s) on the faceplate. Video jacks in horizontally oriented faceplates shall occupy the position left of the data/voice jack.
8. All faceplates installed shall be level.
9. All outlets will be labeled according to the approved labeling scheme.

10. Each faceplate shall be machine labeled. The labeling shall be placed on the faceplate so that the individual jack can be clearly identified by its associated label.
11. Cables shall be identified by a self-adhesive label in accordance with the Identification and Labeling section of this specification and ANSI/TIA/EIA-606. The cable label shall be applied to the cable no further than 6” behind termination module, behind the faceplate on a section of cable that can be accessed by removing the cover plate.

B. Horizontal Distribution Cable Installation
1. Cable shall be installed in accordance with manufacturer’s recommendations and best industry practices.
2. Tie Wraps will not be allowed for supporting, bundling and/or dressing of any station cables on this project.
3. Contractor will provide a three foot “service loop” for all station cables. The service loop will be coiled and secured using Velcro in the accessible ceiling at the conduit stub to the work area outlet box.
4. A pull cord (nylon; 1/8" minimum) shall be co-installed with all cable installed in all “common” conduit runs. “Common” Conduit Runs are those that house more than one cable or set of cables that do not specifically feed a Work Station Outlet. Examples of “Common” Conduit Runs are: floor/ceiling penetrations, stub-throughs, distribution conduits, all conduits between J-boxes, etc.
5. Cable raceways shall not be filled greater than the TIA/EIA-569-A maximum fill for the particular raceway type or 40%.
6. Cables shall be installed in continuous lengths from origin to destination (no splices) except for transition points, or consolidation points.
7. The cable’s minimum bend radius and maximum pulling tension shall not be exceeded.
8. Pulling tension on 4-pair UTP cables shall not exceed 25-lb for a four-pair UTP cable.
9. The Cable Support System shall be installed in such away that will allow for future cables to be added and to provide sufficient protection of all cable.
10. For all installs where station cables are not installed in a continuous conduit run the following guidelines will apply. The Contractor will be responsible to reinstall all cables and pathways that do not meet with the following at no additional cost to the Owner:
11. J-hooks shall be installed to support all station cables every 4ft to 5ft.
12. All pathways shall be run at right angles. No diagonal pathways will be allowed unless otherwise noted on the drawings.
13. Horizontal cables shall be bundled in groups of no more than 25 cables per Cooper B-Line’s BCH21 J-hook, no more than 40 cables per Cooper B-Line’s BCH32 J-hook, and no more than 64 cables per Cooper B-Line’s BCH64 J-hook.
14. At no point shall cable(s) rest on acoustic ceiling grids, acoustic panels, or lighting fixtures.
15. All cables will be installed so that there is a minimum of 3” of clearance above all ceiling grid and tiles.
16. All cables will be installed so that there is a minimum of 12” of clearance above all florescent lighting.
17. All cables will be installed so that there is a minimum of 6” of clearance from all fire alarm and electrical system conduits.
18. Cables shall not be attached to the ceiling grid or lighting fixture wires. The contractor will provide their own carriers wires to support their horizontal cabling.
19. All cables shall be installed above fire-sprinkler systems and plumbing system fixtures and devises. Cables shall not be attached to or supported by these fixtures and/or their ancillary equipment or hardware.
20. The cable system and support hardware shall be installed so that it does not obscure any valves, fire alarm conduit, boxes, or other control devices.

21. Contractor is responsible for sealing around all cables that penetrate fire rated barriers.
22. Any cable damaged or exceeding recommended installation parameters during installation shall be replaced by the contractor prior to final acceptance at no cost to the Owner.

C. Horizontal Cross-Connect Installation
1. Cables shall be dressed and terminated in accordance with the recommendations made in the TIA/EIA-568-A standard, manufacturer's recommendations and best industry practices.
2. The cable jacket shall be maintained to within 12.7mm (½ inch) of the termination point.
3. All UTP cables shall have no more than 12.7mm (½ inch) of pair untwist at the termination point.
4. Bend radius of the cable in the termination area shall not exceed 4 times the outside diameter of the cable.
5. All cables shall be neatly bundled and dressed continuously from the entrance point of the Telecommunications Room to their respective panels or blocks. Each panel or block shall be fed by an individual bundle separated and dressed back to the point of cable entrance into the rack or frame. Contractor will use Velcro strip to bundle cables together. The use of Tie –Wraps is not permitted.
6. Each cable shall be clearly labeled on the cable jacket behind the patch panel at a location that can be viewed without removing the bundle support ties. Cables labeled within the bundle, where the label is obscured from view shall not be acceptable.

D. Backbone Cable Installation
1. Backbone cables shall be installed separately from horizontal distribution cables.
2. Where possible the backbone and horizontal cables shall be installed in separate conduits.
3. Where backbone cables and distribution cables are installed in a cable tray or wireway, backbone cables shall be installed first and bundled separately from the horizontal distribution cables.
4. Pulling tension on Backbone cables shall not exceed the manufacture’s limitations.
5. The minimum bend radius for all Backbone cables is 16 times the cable diameter or the manufactures specification, whichever is greater.
6. All OSP cables may not penetrate more than 50ft into the buildings before be terminated or splices to cable with a fire resistant jacket, unless the jacket is indoor/outdoor rated.
7. A pull cord (nylon; 1/8" minimum) shall be co-installed with all cable installed in any conduit.
8. A pull cord (nylon; 1/8" minimum) shall be installed with all empty OSP and Entrance Facility conduit.
9. All backbone cables shall be securely fastened to the sidewall of the TR on each floor.
10. Backbone cables spanning more than three floors shall be securely attached at the top of the cable run with a wire mesh grip and on alternating floors or as required by local codes.
11. Vertical runs of cable shall be supported to messenger strand, cable ladder, or other method to provide proper support for the weight of the cable.
12. Large bundles of cables and/or heavy cables shall be attached using metal clamps and/or metal banding to support the cables.

E. Backbone Cross-Connect Installation
1. Cables shall be dressed and terminated in accordance with the recommendations made in the TIA/EIA-568-A document, manufacturer's recommendations and best industry practices.

2. Bend radius of the cable in the termination area shall not exceed 16 times the outside diameter of the cable.
3. All cables shall be neatly bundled and dressed continuously from the entrance point of the Telecommunications Room to their respective panels or blocks.
4. Contractor will provide a minimum of a 3 foot “service loop” for each backbone cable before terminating to allow future rearrangement. Cables will be coiled and secured above the ceiling where possible or to the Telco Backboard where entrance point is from the floor.
5. Wall mounted termination block fields shall be installed with the lowest edge of the mounting frame 18” from the finished floor.
6. Contractor shall provide a machine label 1ft. to 2ft. from the entrance point of the TR and 6in. to 12in. from the termination point on each backbone cable. Cable shall be easily identified and fully legible without removing the bundle support ties.

F. Cabinets, Racks, Enclosures and Ladder Rack Installation
1. Wall Mount Racks/Cabinets shall be securely attached to the Telco Backboard using minimum 3/8” hardware or as required by local codes.
2. Floor Mount Racks/Cabinets shall be securely attached to the concrete floor using minimum 3/8” drop-in anchor hardware or as required by local codes.
3. All Floor Mount Racks/Cabinets will be either; secured on one side to the wall or attached to the closest wall with ladder rack.
4. All Racks/Cabinets shall be braced to meet Zone 4 seismic requirements.
5. Contractor will maintain a minimum of 36 inches of clearance from the front of the all rack/cabinets and all other obstructions.
6. Floor Mount Racks/Cabinets shall be installed to allow for a minimum of 36” from rear and all other obstructions.
7. All racks shall be grounded to the telecommunications ground bus bar.
8. Rack mount screws not used for installing patch panels and other hardware shall be bagged and left with the rack upon completion of the installation.
9. The plywood bottom edge shall be mounted vertically no less than 12” above the finished floor.
10. Contractor will provide all cutouts for the Electrical Contractors expansion rings and electric receptacles as shown on the drawings.
11. Ladder Rack must be securely attached to walls, backboards, and racks/cabinets to comply with all Zone 4 seismic requirements.
12. Ladder rack shall be installed so that there is a minimum of 8” of unobstructed clearance above rack.
13. Ladder Rack shall be installed so that there is a minimum of 12” of clearance from all: florescent lighting, electrical conduits/circuits, and fire alarm conduits/devices.

3.2 Identification and Labeling

A. General Requirements
1. The contractor shall develop and submit for approval a labeling system for the cable installation. The Owner will negotiate an appropriate labeling scheme with the successful contractor.
2. The approved system will comply with the TIA/EIA -606-A Class 2 designations and include at a minimum, identifiers for all major components of the system: telecommunication rooms, grounding bus bars, racks, cables, panels and outlets. The labeling system shall designate the cables origin and destination and a unique identifier for the cable within the system. Racks and patch panels shall be labeled to identify the location within the cable system infrastructure.
3. All label printing will be machine generated or hand-held printers using indelible ink ribbons or cartridges. Self-laminating labels will be used on cable jackets, appropriately sized to the OD of the cable, and placed within view at the termination

point on each end. Outlet, patch panel and wiring block labels shall be installed on, or in, the space provided on the device.

4. All labeling information shall be recorded on the as-built drawings and all test documents shall reflect the appropriate labeling scheme.

3.3 Testing and Acceptance

A. General

1. All cables and termination hardware shall be 100% tested for defects in installation and to verify cabling system performance under installed conditions according to the requirements of ANSI/TIA/EIA-568-A Addendum 5, TSB-67 and TSB-95. All pairs of each installed cable shall be verified prior to system acceptance. Any defect in the cabling system installation including but not limited to cable, connectors, feed through couplers, patch panels, and connector blocks shall be repaired or replaced in order to ensure 100% useable conductors in all cables installed.
2. All cables shall be tested in accordance with this document, the ANSI/TIA/EIA standards, the Manufacturer's Warranty guidelines and best industry practice. If any of these are in conflict, the Contractor shall bring any discrepancies to the attention of the project team for clarification and resolution.
3. Contractor will notify the Owner/Owner's Representative 72 hours before commencement of testing.
4. Upon receipt of the test documentation, the Customer reserves the right to have the contractor perform a 10% witnessed "spot testing" of the cabling system to validate test results provided in the test document, at no additional cost. If a significant amount of cables are marginal and/or fail during the "spot test" Contractor will retest the entire cable plant at no additional cost.

B. Copper Cable Testing

1. Twisted Pair Cable
   - All twisted-pair copper cable links (including backbone cables) shall be tested for continuity, pair reversals, shorts, opens and performance as indicated below.
   - Continuity - Each pair of each installed cable shall be tested using a test unit that shows opens, shorts, polarity and pair-reversals, crossed pairs and split pairs. Shielded/screened cables shall be tested with a device that verifies shield continuity in addition to the above stated tests. The test shall be recorded as pass/fail as indicated by the test unit in accordance with the manufacturers' recommended procedures, and referenced to the appropriate cable identification number and circuit or pair number. Any faults in the wiring shall be corrected and the cable re-tested prior to final acceptance.
   - Length - Each installed cable link shall be tested for installed length using a TDR type device. The cables shall be tested from patch panel to patch panel, block to block, patch panel to outlet or block to outlet as appropriate. The cable length shall conform to the maximum distances set forth in the ANSI/TIA/EIA-568-A Standard. Cable lengths shall be recorded, referencing the cable identification number and circuit or pair number. For multi-pair cables, the shortest pair length shall be recorded as the length for the cable.
2. Category 6 Performance
   - Follow the Standards requirements established in:
     - ANSI/TIA/EIA-568-A -TSB-67
     - Wire Map
     - Length
     - Attenuation
     - NEXT (Near end crosstalk)
     - • ANSI/TIA/EIA-568-A -TSB-95
     - Return Loss

- ELFEXT Loss
- Propagation Delay
- Delay skew
- • ANSI/TIA/EIA-568-A, Amendment 5.
- PSNEXT (Power sum near-end crosstalk loss)
- PSELFEXT (Power sum equal level far-end crosstalk loss)

- A Level III or better test unit is required to verify category 6 performances and must be updated to include the requirements of TSB-95 and Amendment 5. Testers will be equal to Fluke Network's DXT CableAnalyzer™ Series.
- All testers shall have been recalibrated with 6 months of use on this project. Contractor will be asked to provide proof of recalibration.
- Test results shall be automatically evaluated by the equipment, using the most up-to-date criteria from the TIA/EIA Standard, and the result shown as pass/fail. The approved Level Three tester shall provide a printed document for each test that is also available in a downloadable file using an application from the test equipment manufacturer. The printed test results shall include a print out of all tests performed, and the individual test results for each cable.

C. Fiber Optic Cable Testing

1. 50/125µ Backbone Fiber
   - Each fiber strand shall be tested for attenuation with an Optical Power Meter and light source and with an Optical Time Domain Reflectometer (OTDR) for actual length and splice/connector loss. Cable length shall be verified using sheath markings. The guidelines and procedures established for Tier 1 testing in TIA/TSB-140 shall apply.
   - All fiber optic cables shall be tested from the site's MDF to each fiber terminals located in the IDF. The results of OTDR testing to define the length of each riser cable shall be documented. The Contractor shall conduct a power meter (loss) test of each fiber optic station and riser cable at both wavelengths, 850/1300nm for MM and 1310/1550nm for SM, A to B, B to A, and OSPL (OSPL is defined as La + Lb). No individual station or riser fiber link segment (including connectors) shall measure more than 2.0 dB loss. Tests shall be conducted using ANSI/EIA/TIA/EIA-526-14A, Method B. Test results evaluation for the panel to panel (backbone) shall be based on the values set forth in ANSI/TIA/EIA-568-B.1.The Contractor shall provide an electronic printout for each strand tested with the Power Meter and the OTDR.
   - Where concatenated links are installed to complete a circuit between devices, the Contractor shall test each link from end to end to ensure the performance of the system. After the link performance test has been successfully completed, each link shall be concatenated and tested. The test method shall be the same used for the test described above. The evaluation criteria shall be established between the Owner and the Contractor prior to the start of the test.
   - All installed cables must meet or exceed the defined standards for performance. The Contractor shall take all steps necessary to repair or replace any optic not meeting the standard.
   - Fiber optic riser and station cable test results shall be provided in electronic format to the Owner.

3.4 System Closeout and As-built Documentation

A. General Requirements

1. Upon completion of the installation, the telecommunications contractor shall provide three (3) full documentation sets to the Owner's Representative/Engineer for approval. One (1) to be a hardcopy and two (2) to be electronic copies. Documentation shall include the items detailed in the sub-sections below.

2. Documentation shall be submitted within ten (10) working days of the completion of each testing phase. This is inclusive of all test results and draft as-built drawings. Draft drawings may include annotations done by hand. Machine generated (final) copies of all drawings shall be submitted within 30 calendar days of the completion of each testing phase. At the request of the Owner's Representative/Engineer, the telecommunications contractor shall provide copies of the original test results.
3. The Owner's Representative/Engineer will request that a 10% random field re-test be conducted on the cable system, at no additional cost, to verify documented findings. Tests shall be a repeat of those defined above. If findings contradict the documentation submitted by the telecommunications contractor, additional testing can be requested to the extent determined necessary by the Engineer, including a 100% re-test. This re-test shall be at no additional cost to the Owner.
4. Test Results documentation shall be provided in two media, as listed above, one (1) hardcopy and one (1) on disk within three weeks after the completion of the project. The documentation shall be clearly marked on the outside front cover with the words "Project Test Documentation", the project name, and the date of completion (month and year). The results shall include a record of test frequencies, cable type, conductor pair and cable (or outlet) I.D., measurement direction, reference setup, and crew member name(s). The test equipment name, manufacturer, model number, serial number, software version and last calibration date will also be provided at the end of the document. Unless the manufacturer specifies a more frequent calibration cycle, an bi-annual calibration cycle is anticipated on all test equipment used for this installation. The test document shall detail the test method used and the specific settings of the equipment during the test as well as the software version being used in the field test equipment.
5. Printouts generated for each cable by the wire test instrument shall be submitted as part of the documentation package.
6. When repairs and re-tests are performed, the problem found and corrective action taken shall be noted, and both the failed and passed test data shall be documented.
7. The As-Built drawings are to include cable routes, outlet locations and the approved labeling identifiers. Their sequential number as defined elsewhere in this document shall identify outlet locations. Numbering, icons, and drawing conventions used shall be consistent throughout all documentation provided. The Owner will provide floor plans in paper and electronic (DWG, AutoCAD 2008) formats on which as-built construction information can be added. These documents will be modified accordingly by the telecommunications contractor to denote as-built information as defined above and returned to the Owner.
8. Contractor will provide one laminated 11"x17" drawing at each IDF that includes the building layout for that IDF, along with the outlet locations and all of the approved labeling.

END OF SECTION

SECTION 27 2000

NETWORK ELECTRONICS – OWNER PROVIDED & OWNER INSTALLED

Part 1 General

1.1 Statement of Work

A General

1 Provide coordination with district staff for scheduling of this system.

2 271000 contractors shall be complete with work including all testing and labeling prior to owner work start.

3 The district requires minimum of 10 days to review test documents prior to network start up.

Part 2 Products

2.1 General

A Network Electronics

1 The Network system will be owner supplied (parts and smarts).

2 All network equipment and programming required for this system will be owner supplied.

Part 3 Execution

3.1 General

A Installation

1 It is the contractor's responsibility to inform the Owner and/or the Owner's Representative of any and all conflict's, between the project documents and the onsite conditions.

END OF SECTION

SECTION 27 2300

UNINTERRUPTIBLE POWER SUPPLY - OWNER PROVIDED & OWNER INSTALLED

Part 1 General

1.1 Statement of Work

A. General

1. This document describes the requirements for the contractors, products and installation relating to furnishing and installing an Uninterruptible Power Supply System. The Uninterruptible Power Supply system, hereafter referred to as the UPS, shall provide high-quality AC power to the telecommunications systems.
2. This specification describes the UPS, a modular uninterruptible power supply system for workstation, server, network telecom and other sensitive electronic equipment applications. It defines the electrical and mechanical characteristics and requirements for a continuous-duty single-phase, solid-state, uninterruptible power supply system.
3. Contractor will provide a bid including all labor, materials, tools and equipment required for the complete installation of work called for on the Construction Drawings and described in this Document. It is the responsibility of the Contractor to provide all material necessary to provide a complete and operable system. If the contractor feels that the system described is incomplete, they must address this in writing to the Owner/Owner's Representative before providing a bid.
4. All questions concerning non-specified product and services will be address to the Owner's Representative before Contactor provides a bid. Owner expects that by accepting the Contractor's bid proposal that the Contractor has provided a competent bid for a complete solution.
5. Product specifications, general design considerations, and installation guidelines are provided in this document. Quantities of UPSs, typical installation details, and outlet types will be provided as an attachment to this document.

1.2 References

A. Regulatory References

1. Contractors will comply with all requirements as specified in Section 27 0000 '1.3 – Regulatory References'.

1.3 Safety and Indemnity

A. Requirements

1. Contractors will submit the necessary documentation to demonstrate their compliance with Section 27 0000 '2.1 – Safety and Indemnity'.

1.4 Contractor Qualifications

A. Requirements

1. Contractors will submit the necessary documentation to demonstrate their compliance with Section 27 0000 '2.2 – Contractor Qualifications'.

1.5 Quality Assurance

A. Requirements

1. Contractors shall comply with all requirements as specified in Section 27 0000 ‘2.3 – Quality Assurance’.

1.6 Equivalent Products

A. Products

1. All products described, and part numbers given in this specification are those of Eaton unless otherwise noted.

B. Pre-Approved Equals

1. None at this time.

C. Other Than Specified

1. Contractors wishing to approve a system other than those specified in this document shall do so in accordance with Section 27 000 ‘3.1 Equivalent Products’.

1.7 Submittal Documentation

A. Requirements

1. The successful contractor shall provide their submittal package in accordance with the Section ‘01 20 00 – Submittal Schedule’ and Section 27 0000 ‘3.2 – Submittal Documentation’.

1.8 Acceptance

A. Requirements

1. The contractor shall comply with all requirements as listed in Section 27 0000 ‘3.3 – Acceptance’.

1.9 Warranty

A. Requirements

1. The contractor shall comply with all requirements as listed in Section 27 0000 ‘3.4 – Warranty’.

Part 2 Products

2.1 Uninterruptible Power Supply Systems (UPS)

A. Server Room UPS

1. General
   - Topology: Line Interactive
   - Configuration: Rack Mounted
   - Rating: 3kVA (3000 VA), 2,700W
   - UPS Bypass: Yes, included
   - Diagnostics: Full system self-test at power up
   - Dimensions: 3.4in H x 17.2in W x 22.6in D (1U)
   - Weight: 55 lbs.
   - Manufacturer’s Warranty: Lifetime
   - Rail Kit included: 4-Post rail kit and tower pedestals
   - Remote Emergency Power Off: Rear deck emergency stop connectors
2. Electrical Input
   - Connection: C19 to L6-20P
   - Input Cord: Included

- Input Voltage Range: 47-70 Hz (50Hz system), 56.5-70 Hz (60 Hz system), 40 Hz in low-sensitivity mode.
- Nominal Voltage: 230V default (200/208/220/230/240V/250V)

3. Electrical Output
   - Nominal Voltage: 230V default (200/208/220/230/240/250V)
   - Output receptacles
     - Six (6) C13
     - One (1) C19
   - Power Factor: 0.9
   - Transfer time: 0ms
   - Circuit Breaker: Three (3) for L6-20R; six (6) for 5-20R
4. Battery
   - Lithium
   - Maximum number of EBM: up to 5 extended battery modules, add up to 12 with supercharger module
   - Hot-Swappable extended battery modules, no internal batteries in UPS module
   - Start on Battery: Cold-start enabled, first cold start is always forbidden
5. Communications
   - User Interface
     - Graphical display, UPS status in a single view
   - LEDs: Four (4) status-indicating LEDs
   - Communication Ports: RS-232 (RJ-45) ports, USB port as standard (HID), 6 Foot RS-232 cables included
   - Communications Card Slot: Network Card included
   - Power Management Software: Included
6. Environmental
   - RoHS Compliance: Yes
   - IEEE ANSI C62.41 CatB2
7. The **MDF UPS** shall be equal to **N1C** model #: **N1C.L3000G (3KVA, 208/220/230/240V)**
   - Contractor to include the **N1C** model #: **N1C SNMP Card**.
   - Contractor will provide one (1) UPS units for the MDF's.
   - Contractor to include the **APC** model #: **AP9626**.
   - Contractor will provide one (1) step down transformer units for the MDF's.
   - Contractor to include the **IEC320 C20 to NEMA L6-30** model #: **PFC2012L63012**.
   - Contractor to include the **APC** model #: **AP7920B**.
   - Contractor will provide one (1) Rack Mount PDU per Rack/Cabinet Installed in the MDF's

Part 3 Execution

3.1 Installation

A. Inspection

1. The following inspections and test procedures shall be performed by factory trained field service personnel during the UPS start-up.
   - Visual Inspection
     - Inspect equipment for signs of shipping or installation damage.
     - Verify installation per drawings
     - Inspect cabinets for foreign objects
     - Verify neutral and ground connectors are properly sized and configured
   - Mechanical Inspection
     - Check all power modules are correctly fitted

        - Check all batter modules are correctly fitted
        - Check all terminals screws, nuts and/or spade lugs for tightness
    - Electrical Inspection
        - Confirm input voltage and phase rotation is correct
        - Verify bypass voltage jumper is correct for voltages being used

B. Unit Start Up and Site Testing
    1. The manufactures field service personnel shall provide site testing if requested. Site testing shall consist of a complete test of the UPS system and the associated accessories supplied by the manufacturer. A partial batter discharge test shall be provided as part of the standard start-up procedure. The test results shall be documented, signed and dated for future reference.

C. Manufacturer's Field Service
    1. Service Personnel
        - The UPS manufacturer shall directly employ a nationwide service organization, consisting of factory trained Customer Engineers dedicated to the start-up, maintenance, and repair of UPS and power equipment. The organization shall consist of factory-trained Customer Engineers working out of District Offices in most major cities. An automated procedure shall be in place to ensure that the manufacturer is dedicating the appropriate technical support resources to match escalating customer needs.
        - The manufacturer shall provide a fully automated national dispatch center to coordinate field service personnel schedules. One toll-free number shall reach a qualified support person 24 hours/day, 7 days/week, and 365 days/year. If emergency service is required, call back response time from a local Customer Engineer shall be 20 minutes or less.
    2. Replacement Parts Stocking
        - Parts shall be available through an extensive network to ensure around- the-clock parts availability throughout the country.
        - Local Customer Engineers shall stock replacement spare parts with back up available from District Service offices and the manufacturing location.
        - Customer Support Parts Coordinators shall be on-call 24 hours a day, 7 days a week, 365 days a year for immediate parts availability.
    3. UPS Maintenance Training
        - Maintenance training courses for customer employees shall be available by the UPS manufacturer. This training is in addition to the basic operator training conducted as a part of the system start-up.
        - The training course shall cover UPS theory, location of subassemblies, safety, battery considerations and UPS operational procedures. The course shall include AC to DC conversion and DC to AC inversion techniques as well as control and metering, Troubleshooting and fault isolation using alarm information and internal self-diagnostics shall be stressed.

3.2 System Close Out and As-Built Documentation

A. Testing
    1. Factory Testing
        - Before shipment, the manufacture shall fully and completely test the system to assure compliance with the specification. These tests shall include operational discharge and recharge tests on the internal battery to guarantee rated performance.
    2. General
        - All hardware shall be 100% tested for defects in installation and to verify system performance under installed conditions. Any defect in the system installation

shall be repaired or replaced in order to ensure 100% usage, at no cost to the Owner.

- The system shall be tested in accordance with this document, the manufacturer's warranty guidelines and best industry practice. If any of these are in conflict, the Contractor shall bring any discrepancies to the attention of the project team for clarification and resolution.
- Upon receipt of the test documentation, the customer reserves the right to have the contractor perform a witnessed 'spot testing' of the system to validate test results provided in the test document, at no additional cost.

B. Documentation
   1. Refer to Section 27 0000 '3.5 – Close Out Documentation' for requirements.

END OF SECTION

SECTION 27 3000

TELEPHONE SYSTEM – OWNER PROVIDED & OWNER INSTALLED

Part 1 General

1.1 Statement of Work

A General

1 Provide coordination with district staff for scheduling of this system.

2 271000 contractors shall be complete with work including all testing and labeling prior to owner work start.

3 The district requires minimum of 10 days to review test documents prior to telephone start up.

Part 2 Products

2.1 General

A Telephone System

1 The telephone system will be owner supplied (parts and smarts).

2 All telephone equipment and programming required for this system will be owner supplied.

Part 3 Execution

3.1 General

A Installation

1 It is the contractor's responsibility to inform the Owner and/or the Owner's Representative of any and all conflict's, between the project documents and the onsite conditions.

END OF SECTION

SECTION 27 5100

PAGING SYSTEMS – ADDING TO EXISTING INTERCOM SYSTEM

Part 1 General

1.1 Related Work in Other Sections

A General

1 All 120VAC power conductors and conduits associated with power circuits to all equipment locations shall be furnished and installed by Division 26 contractor.

2 All raceway systems including but not limited to conduit, j-boxes, outlet boxes, floor boxes, & surface mounted raceway shall be furnished and installed by Division 26 contractor.

1.2 Statement of Work

A General

1 Provide all labor, materials, tools and equipment required for the complete installation of work called for on the Construction Drawings and described in the Specifying Documentation.

2 This document describes the products and execution requirements relating to furnishing and installing Paging systems. Paging System Electronics and installation requirements are covered under this document.

3 The intent of these Specifications is to provide a complete Paging System and it is the responsibility of the bidding Contractor to provide a complete solution. It is also the responsibility of the Contractor to provide all material necessary to provide a complete system even if the material is not described specifically in the following documentation. All questions concerning non-specified product and services will be address to the Owner's Representative before the Contactor provides a bid. Owner expects that by accepting the Contractor's bid proposal that they [the Contractor] have provided a competent bid for a complete solution.

4 Product specifications, general design considerations, and installation guidelines are provided in this document. Quantities of devices, typical installation details, and mounting details will be provided as an attachment to this document. The successful vendor shall meet or exceed all requirements for the cable system described in this document.

1.3 Regulatory References

A Requirements

1 The contractor shall comply with all regulations listed in Section 27 0000 – '1.3 – Regulatory References'.

1.4 Safety and Indemnity

A Requirements

1 Contractors will submit the necessary documentation to demonstrate their compliance with Section 27 0000 '2.1 – A. Safety & Indemnity'.

1.5 Contractor Qualifications

A Requirements

1 Contractors will submit the necessary documentation to demonstrate their compliance with Section 27 0000 '2.2 – Contractor Qualification'.

1.6 Quality Assurance

A Requirements

1 Contractor shall comply with all requirements as specified in Section 27 0000 ‘2.3 Quality Assurance’.

1.7 Products

A Equivalent Products

1 All products approved in this specification are those of:

- Valcom Class Connect

B Pre-Approved Equals

1 None at this time.

2 The following Systems are designated as NOT EQUAL, and will not be accepted for review as a substitute

- Telecor
- Teradon

C Other Than Specified

1 Contractors wishing to approve a system other than those specified in this document shall do so in accordance with Section 27 0000 “3.1 Equivalent Products”.

1.8 Submittal Documentation

A Requirements

1 The successful contractor shall provide their submittal package in accordance with the Section 01 20 00 1.06 Submittal Schedule, and Section 27 0000 ‘3.2 – Submittal Documentation’.

1.9 Acceptance

A Requirements

1 Contractor shall comply with all requirements as specified in Section 27 0000 ‘3.3 – Acceptance’.

1.10 Warranty

A Requirements

1 Contractor shall comply with all requirements as specified in Section 27 0000 ‘3.4 – Acceptance & Warranties’.

1.11 Close-Out Documentation

A Requirements

1 Contractor shall comply with all requirements as specified in Section 27 0000 ‘3.5 – Close-Out Documentation’.

Part 2 Products

2.1 General

A System Description

1 The following products specifically list the acceptable equipment types and items for this project. Where quantities are not noted, they may be obtained from the project drawings. In the event of a discrepancy between the specifications and the project drawings, the greater quantity or better quality shall be furnished.

2 This section includes a fully functional school internal communications and system incorporating safety, including but not limited to the following features:

- Complete control of all functions of the system from a web based user interface.
- Direct dialed, hands-free, two-way communication from all administrative telephones to any location equipped with a talkback speaker.
- Automatic gain control on intercom speech to assure constant talkback speech level.
- Microprocessor based system capable of handling up to 360 points. A point is defined as a call-in switch or a speaker output.
- System shall be modular in design and capable of expanding in increments of 48 points allowing for budget flexibility and expandability.
- System shall interface with any telephone system, thus allowing the school(s) to upgrade or replace the telephone system without suffering a requirement to replace, or lose any feature of, their internal communications (intercom) system. Any system that limits system features based upon any selected telephone system, and/or is proprietary to one or only a few telephone systems shall not be acceptable.
- Automatically sound an alert to over any loudspeaker connected for two-way communication to alert the classroom teacher that this two-way call has been established. This is intended to prevent unauthorized monitoring. This tone must repeat every fifteen (15) seconds.
- Distribution of emergency announcement(s) from any authorized telephone to all areas furnished with a loudspeaker. Emergency announcements from any administrative telephone, staff telephone, classroom telephone. The system shall be capable of provide all-call, group call, multiple group call, or dial-on-the-fly page groups.
- Classroom speakers shall be software assignable to any or all of the seventy-two (72) paging groups.
- Provide unlimited time tone schedules/unlimited events with the ability to automatically administer eight (8) or more schedules at any given time. Each scheduled event shall be capable of utilizing any one of nine (9) user defined internal tones/auxiliary sources. Automatically administered schedules shall be capable of simultaneous operation. Schedule administration, modification and creation functions must be available through password protected web access. Systems that do not provide this function will not be accepted.
- Provide 1, 2, 3, or 4 digits numbering plan, thus allowing the classroom speaker and the classroom telephone to be the same architectural number.
- Provide facilities for up to seven (7) call-in priority levels. Each classroom call button shall be assignable to any one or two of these priority levels. The call button priority levels shall have the capacity to change state on the time of day basis. The priority levels shall be as follows:
  - Normal
  - Security
  - Normal/Emergency
  - Urgent/Emergency
  - Overhead Ring
  - Emergency Only
  - Ignore
- Call button priority levels shall determine call queue placement. Emergency calls will be answered first; urgent calls second and normal calls last.

- System shall be capable of placing intercoms call on hold in order to perform other administrative functions.
- Any classroom/area loudspeaker must have the flexibility to be programmed as a testing room. A testing room shall be excluded from receiving general announcements, class change tones, group announcements and program material. The testing room must receive emergency tones and announcements. A dial code must be provided that will access these testing rooms at the same time, allowing for an announcement to the testing rooms for applications such as standardized testing. The testing rooms may be reactivated to normal operation at any time by the administration staff as needed. Testing rooms shall automatically be reset to normal operation before start of class the next day.
- Programmable features shall be stored in non-volatile memory and shall not be lost due to power failures.
- Classroom initiated intercom calls must be able to be assigned to ring at specific administrative ports. These administrative ports shall have the flexibility to be forwarded to other administrative ports should a call go unanswered or should the assigned administrative port be busy.
- Facilities to annunciate incoming intercom calls at multiple administrative phones simultaneously. Calls may be answered from any of the administrative telephones by simply lifting handset, dialing the room number or pressing a button on telephone. Once answered, the call will automatically be cancelled for other administrative phones.
- System functionality must include the capability to manually distribute up to 5 (five) alert emergency tones via pushbuttons, contact closure, or dial up tones from any administrative telephone. These tones shall be customizable with respect to cadence, type and duration. Dial up tones must only be accessible by authorized users.
- The system must provide a minimum of 4 (four) ports to be connected to the telephone system from the intercom system. These 4 (four) intercom lines shall provide built-in Enhanced Caller Line Identification which will visually announce the name of the teacher or location, the architectural classroom number, and the status of the call-in level; thus allowing interfacing to any telephone system. Systems that require integration to a specific telephone system or systems in order to offer this feature, or any system feature, shall not be acceptable.
- The system shall have the ability to control all system relays. Relays shall be DTMF controlled, automatically cycle at a programmed time of day, follow time schedule events, follow time group events, follow security calls, and follow emergency and ADA calls. All relays must be software programmable with the flexibility to change as required.
- The system shall provide at least three simultaneously operating, non-restrictive program distribution channels. The audio program material shall be controlled and distributed with administration PC software allowing simple and easy changes. Systems that require manual operated switch-banks or cumbersome DTMF telephone codes for distribution shall not be acceptable.
- The Communication System shall feature the capability to operate a system of cameras such that visual and audible communication may be seamlessly synchronized. The resulting system of cameras and intercom (visual intercom) shall feature a capacity of at least 192 camera locations and 4 administrative monitors. The system shall provide functionality such that each monitor can display a full motion visual broadcast of the area corresponding to any active intercom path. The camera system shall feature a PC based setup utility and shall use standard UTP infrastructure. Systems that do not offer the capability to seamlessly integrate with a camera system as described above shall not be acceptable.
- The system shall have the ability to store wav. files directly onto the CPU and shall not be lost due to power outage.

    - The wav files shall be activated via the Administration Software, Telephone and/or Telephone system, and/or pushbuttons.
    - The wav files shall be programmable as to what level of priority they can be broadcast. They shall be programmable as to override any class change tones, normal all call, music, and intercom in the event of an emergency.
    - The wav files shall also have the ability to be broadcast into any one or all of the 72 audio groups as well to any zone within the system.
    - The wav files shall be have the ability to be broadcast via a schedule for any day of the week or time of the day. They shall also have the ability to be broadcast for any duration of time and repeat number of plays with the ability to select how long the duration is between each repeated broadcast.
    - The wav files shall be able to be broadcast via a pushbutton. When this pushbutton is activated it shall be programmable to select which wav file is broadcast, the priority level, where it is broadcast, and how many times it shall play.
    - The wav files shall also have the ability to be a part of the class change tones within the system. These files shall be able to replace any tone within the class change schedules as to offer the flexibility of customizable tones and or phrases in this class change mode.
    - The wav files shall be programmable as to replace the hands-free alert tone, repeated alert tone, or the all call alert tones.
- Provide pre-alert tone to classroom for intercom calls and general announcements.
- Ability to program and control the built-in master clock with unlimited events and unlimited time schedules with multiple time groups.
- Ability to control wireless or wired clocks (various correction methods).
- Ability to produce user defined tone signals for time tones or emergency tones.
- Ability to select the tone on an all-call basis from any, or selected, administrative telephones.
- Provide an RS-232 port, which will give ability to monitor operations and functions of the systems.
- Provide off-site programming and diagnostics of the system. It shall also be capable of determining basic circuit faults.
- The system shall be capable of simultaneous conversations between administrative ports.
- The system shall have a Windows® based PC administration programming tool which allows the administrative personnel to easily manage Audio Sources, Class Change schedules, paging groups, time updates, holiday schedules and day/night mode operation from their desktop PC. It shall also have the ability to activate on board .wav files on a schedule and/or immediately in the event of an emergency at the highest priority override level. Systems that require propriety consoles, special LCD displays or solely utilize DTMF for changes to perform these functions shall not be acceptable.
- System shall be capable of utilizing 45 (forty-five) ohm speakers for classroom type speakers.
- System shall be capable of utilizing existing operational 25-volt type speakers
- System shall use 45 (forty-five) ohm or 25-volt speakers for intercom talkback zones. System shall also be connected to Valcom self-amplified one-way speakers and horns with built-in volume controls. An unlimited quantity of Valcom one-way speakers and horns may be connected to each zone.
- System speakers shall be capable of utilizing standard CAT 3 (three), 5 (five) or 6 (six) telephone/data wiring for installation, thus allowing for only one type of wiring infrastructure within the school. The speakers and call buttons shall be capable of utilizing spare pairs in the telephone wire connected to the classroom, allowing for lower installation cost. Systems that waste infrastructure by requiring separate heavy gauge infrastructure wire shall not be acceptable.

- Provide 8 (eight) unrestricted audio paths for communication between administrative phones, program material, time tone distribution, and paging.
- Provide 6 (six) software programmable pushbutton inputs that can be used to activate tones, emergency tones, time tones, schedules, set system time, force a holiday schedule, door entry, etc.
- Provide 8 (eight) software programmable output contact closures which can be activated manually to turn on cameras, unlock doors, emergency lockdown, etc., or automatically via Master Time Control Center.
- Provide voice-synthesized call-in, which allows the administrative telephones to hear the incoming intercom call's room number over the handset.
- Provide call confirmation tone at speaker when an intercom call is placed. This verifies that the call has been placed in queue. If the call is upgraded to an emergency, a second confirmation tone shall be activated.
- Automatically announce the architectural room number over any one, group, or all speakers if an emergency call-in goes unanswered. Systems that do not announce emergency call-ins shall not be acceptable.
- Provide Emergency Override on Board Voice Messaging via the following methods:
  - Any authorized PC on the schools Lan/Wan Network
  - Any authorized telephone
  - Any pushbutton
- The Existing Intercom System is **Valcom ClassConnection** Model **V-PR72**.

B Paging and Program distribution

1 Incorporate district-wide announcements, either live or recorded through a direct connection to the WAN and telephone system.

2 Any authorized administrator shall be able to call from outside the school into any classroom, zone or entire campus directly via the School District supplied telephone network. This shall allow remote monitoring and two-way communication from outside the school building as well as paging into the system. This feature shall allow the user access to all functions via a user defined PIN code. Compliance with NEMA standard SB-40 for emergency communications in K-12 schools.

3 Authorized system users shall be able to record a minimum of ten (10) automated messages with emergency instruction and replay them. Automated message strings shall be either automatically distributed as part of the dial string, manually played from a single button access on the phone or through the master clock as a timed event.

4 The system shall allow users to exclude their classroom from paging and tones in the event of testing or other activities that should not be interrupted. This exclusion will not affect emergency paging. This exclusion must have the ability to 'reset' at midnight.

5 The system shall synchronize its system time to the network time server or a web-based time server.

C Master Clock System

1 The approved Master Clock System shall have the following features:
- TCP/IP Internet connection
- Frequency tuning circuit to allow for time correction with changes in temperature.
- Field enabled Daylight Savings Time
- Can act as an interface between existing systems and Valcom Wireless Systems
- Microprocessor based
- Can transmit up to 2,000 meters in open space
- LED Display for a clear, accurate read-out.
- Self-Testing mode allows the user to test the real-time clock, output relay, LED segments, and inputs.
- Simple interactive menu system.
- Analog and digital wireless clocks can be mixed on the same system.

- LED's for indication of transmission or receipt of Valcom digital signal (from the V-DCPI Digital Clock Protocol Interface)
- Transmits wireless signal every minute
  - The V-WMC shall be capable of transmitting data to the Valcom wireless analog clocks and the Valcom wireless digital clocks.
  - The VWMC shall be capable of receiving a signal from an atomic clock web site via the Internet.
  - The VWMC will be capable of receiving signals from all Valcom Master Clocks via Valcom digital, as well as 59 minute correction, 58 minute correction, National Time and Rauland, and Dukane.
  - The V-WMC shall have the capability of transferring a wired system into a wireless system.
  - The V-WMC shall have a programmable auxiliary relay and shall be programmed anywhere from 1—99 seconds. Upon utilization of the relay, the V-WMC will be capable of interfacing with a once a day closure or interfacing with intercom systems.
  - The V-WMC shall be capable of acting as a repeater while receiving a signal wired or wirelessly from the main transmitter. The time base shall be temperature controlled allowing calibration of the time base during temperature changes.
  - The V-WMC will have two (2) switches for operation of the menu system.
  - The V-WMC shall be capable of interfacing with the Valcom analog clocks via the V-VCU and the Valcom digital clocks via two (2) wire digital communication.
  - The V-WMC shall utilize 915–928 MHz frequency–hopping technology.
  - The V-WMC shall be FCC compliant, part 15 Section 15,247.
  - Loaded, half wave antenna
  - Input sensitivity: -103 dB
  - Power output: 30 dB (1 watt)
  - Programmable relay output
  - 915-928 MHz frequency-hopping technology
  - 85 - 265 VAC input voltage making it accessible for American
- The approved Master Clock shall be the **Valcom** model #: **V-WMCA**.

2 Quantity: Provide one (1) for each Class Connection Master System. Should the campus be larger than a 2,000-meter radius, building construction type, or site configuration restricts communication between clocks, provide additional transceivers as required. Repeater equipped clocks will also be accepted.

3 Location: The master clock will be in the MDF.

2.2 Devices

A Intercom Handset

1 None, Handsets are connected to the Telephone Switch.

B Cut-In Ceiling Speakers *(Contractor Provided Contractor Installed)*

1 The approved cut-in ceiling speakers shall have the following features:
- The ceiling flush mounted 8" talkback speaker, shall consist of a 45-ohm speaker and round grille
- The speaker assembly, housing and hardware shall be electrically and acoustically matched for a frequency response of 80 Hz to 12kHz.
- The speaker element shall be cone type with 5 oz. ceramic magnet. Diameter of speaker cone shall be 8.0". Voice coil diameter shall be .75".
- Voice coil impedance shall be 45 ohms. Speakers utilizing an 8-ohm impedance voice will not be acceptable.
- The grille shall be constructed of steel, finished in semi-gloss white enamel.
- The maximum dimensions shall be 13" diam. X 3" dp.

- Shipping weight shall be approximately 3.75 lbs.

2 Quantity: See drawing for quantities and locations.

3 The approved cut-in ceiling speaker shall be **Valcom** model #: **V-1060A**.
- Contractor shall provide a support bridge for all suspended ceiling mounted cameras and a Backbox for all hard lid ceiling mounts.
  - Backbox V-9915M-5
  - Support Bridge V-9914M-5

C Flush Mounted Vandal Resistant Horn *(Contractor Provided Contractor Installed)*

1 The approved flush mounted horn shall have the following features:
- The paging horn shall be a high efficiency re-entrant type weather-proof horn. It shall be equipped with a universal mounting bracket.
- The frequency response of the horn shall be 300 Hz to 11 kHz The horn shall have a continuous power rating of 3 watts.
- Dispersion shall be 120 degrees horizontal and 90 degrees vertical.
- The housing shall be constructed of filled polypropylene and be available in gray, white of beige.
- All hardware shall be stainless steel.
- The universal bracket shall be constructed of 16 awg CRS and finished with a weather resistant black E-Coat.
- Dimensions of the horn shall be 6.8" (17.3 cm) H x 8.3" (21.1 cm) W x 3.3" (8.4 cm) D.
- The weight shall be 2.75 lbs. (1.25 kg).
- Quantity: See drawings for quantities and locations.

2 The approved Horn shall be **Valcom** model #: **V-1090**.

3 The approved vandal resistant mounting box shall be **Valcom** model #: **V-9805**.

D 12” Round Wireless Clocks

1 The approved wireless clocks shall have the following features:
- The clock will be capable of receiving a signal from multiple clocks.
- The clock shall receive and transmit with 915–928 MHz frequency–hopping technology.
- The clock is to be capable of transmitting the time simultaneously without interfering with each other.
- The clocks shall include automatic calibration, as well as a diagnostic function that allows the user to view the quality of the signal, the last time the clock received a correction signal, a gearbox test and a comprehensive analysis of the entire clock.
- The clock shall have a maximum correction time of five (5) minutes.
- It shall be designed to be used with the Valcom VWMC, which can be regulated via Valcom wireless communication protocol. Upon receipt of the wireless signal, the clock will immediately self–correct.
- The clock shall have a semi–flush smooth surface ABS case.
- The dial is to be made of durable polystyrene material.
- The crystal is to be shatterproof, side molded polycarbonate.
- Glass and visible molding marks are unacceptable.
- The clock shall have black hour and minute hands as well as a red secondhand.
- The clock shall be FCC compliant, part 15 Section 15,247.

2 Quantity: See drawings for quantity and location.

3 The approved wireless clock shall be **Valcom** model #: **V-AW12**.
- Contractor shall provide the following as required:
  - Universal Mounting Bracket **V-UMB**
  - Wire Guards **V-WGA12**

E Uninterruptible Power Supply

1 See section 27 2300 for UPS specifications and approved manufactures.

F Equipment Racks

1 The contractor shall use the supplied 2-post racks in the MDF to house the intercom head end and card cages.

- The cables to/from the source equipment must be terminated on 66-M150 telephone type punch blocks and NEVER on 110 computer type punch blocks. The 66-M150 punch blocks must be snapped onto 89B brackets.
- The “house” cables for the speakers and any feeder cables must also be terminated on 66- M150 cables, NEVER on 110 type blocks.

G Wire & Cables – *(Yellow Cat 6 cable provided in separate contract)*

1 The approved Ceiling Speaker Cable shall be:

- 18awg stranded (7x26awg) ASTM bare copper
- 2 conductor twisted pair cable with PVC insulation and a Gray PVC jacket.
- The approved Speaker Cable shall be equal to West Penn, PN# 224.
- The approved low frequency Speaker Cable shall be:
- 12awg stranded (19x25awg) ASTM bare copper
- 2 conductor twisted pair cable with PVC insulation and a Gray PVC jacket.
- The approved Game Speaker Cable shall be equal to West Penn, PN# 227.
- The approved Microphone Cable shall be:
- 20awg stranded (7x28awg) ASTM tinned copper
- 2 conductor twisted pair cable with PVC insulation and a Gray PVC jacket.
- Cable shall have an overall 100% aluminum polyester foil shield and a 22awg tinned copper drain wire.
- The approved Microphone Cable shall be equal to West Penn, PN# 292.
- The approved inter-rack cabling shall be:
- 20awg stranded (7x28awg) ASTM tinned copper
- 2 conductor twisted pair cable with PVC insulation and a Gray PVC jacket.
- Cable shall have an overall 100% aluminum polyester foil shield and a 22awg tinned copper drain wire.
- The approved cable shall be equal to West Penn, PN# 452
- Connectors: 3.5mm Stereo Male to 3.5mm Stereo Male
- Fully molded connectors provide strain relief
- Braided shield prevents unwanted EMI/RFI interference
- Nickel-plated connectors
- The approved cable shall be equal to Cables To Go, PN# 40412
- Connectors: (2) RCA Male Plug to (2) RCA Male Plug
- Bonded construction design for neat, easy connection of audio signals
- Oxygen-free copper conductors deliver high-quality audio
- 100% foil and OFC shield protects against noise and interference
- Twisted pair construction of audio conductors fight noise and hum.
- Corrosion-resistant, precision 24K gold-plated connectors ensure long-lasting quality
- Ultra-flexible jacket for easy installation
- The approved cable shall be equal to Cables To Go, PN# 13032
- Connectors: 3.5mm Stereo Male to 2x RCA Stereo Male
- Fully molded connectors provide strain relief
- Foil shielded to prevent unwanted EMI/RFI interference
- Gold-Plated connectors
- The approved cable shall be equal to Cables To Go, PN# 40613

H Electrical Power Equipment

1 The approved Power Strip shall have:

- Shall be a one-rack-space unit in a magnetic shielding steel enclosure.

- Shall operate from 120 volts AC and have a 9-foot, grounded, 3-wire #14-line cord.
- There shall be 8 grounded AC receptacles on the back panel, with 6 switched and 2 always on.
- Overall dimensions shall be 1.75" H x 19" W x 10.5" D.
- Weight shall be 11 pounds.
- Shall have a load rating of 15 amps at 120 volts, a self-test circuit with visual indicator, and provide EMI/RFI filtering, inrush current elimination and catastrophic over/under-voltage shutdown.
- It shall meet Federal Grade A, Class 1, Mode 1 guidelines for powerline surge suppressors and withstand at least 1000 occurrences of surge pulse voltages up to 6000 volts.
- Thermal circuit breaker overload protection
- Self-test circuit with visual indicator
- 10-year warranty
- Made in U.S.A.
- The approved Power Sequencer shall be equal to the SurgeX, Model# SX1115.

I Installation Components

1 Device Outlets:
- Mic and Line:
  - Input: 3-pin female XLR-type, RCA (phono) type and 1/4" TRS jacks where shown on Drawings.
  - Microphone receptacles shall be Switchcraft J3FS or equal by Neutrik
  - Insulate RCA and TRS jacks from plate, do not ground pin 1 on XLRs.
  - Output: 3-pin male XLR-type, RCA (phono) type, and 1/4" TRS as specified above.

2 Terminal Blocks:
- Loudspeaker and DC Control Lines:
  - Terminal blocks providing any of these sets of features:
  - Screw-clamp-type terminals with wire guards, designed for max. 8 AWG wires.
  - Min. 9/16 in. terminal centers with barriers, 8-32 x 5/16 binder head screws, and closed bottom.
  - Variable length modular system designed for wire sizes AWG No. 22 to No. l0, with dual head screws and barrier, retaining track, and end stops no greater than 20 blocks apart.
- Acceptable Products:
  - Electrovert 16 EDS.
  - TRW Cinch Connectors 542 series.
  - AMP Special Industries FLEXI-BLOCK 8 Series Terminal BlockSystem.

3 Connectors:
- Microphone and Line Connectors (Panel Mount):
  - Balanced Input Receptacles: female gender "XLR"-type receptacles.
- Acceptable Products:
  - Switchcraft C3F or D3F.
  - Equivalent by Neutrik

4 Balanced Output Receptacles: Male gender "XLR"-type receptacles.
- Acceptable Products:
  - Switchcraft C3M or D3M.
  - Equivalent by Neutrik

5 Microphone and Line Connectors (Cable Mount):
- Balanced Input Connectors: female gender “XLR”-type connectors.
  - Acceptable Products:
    - Switchcraft A3F.
    - Neutrik NC3FX.
- Balanced Output Connectors: male gender “XLR” type connectors.

- Acceptable Products:
  - Switchcraft A3M.
  - Neutrik NC3MX.

Part 3 Execution

3.1 Installation

A General

1 Furnish components, racks, wire, cabinetry, connectors, materials, parts, equipment, labor, etc. necessary for the complete installation of the systems in full accordance with the recommendations of the equipment manufacturers and the requirements of the drawings and specifications.

2 Installation shall follow standard broadcast wiring and installation practice, and shall meet or exceed industry standards for such work.

3 Wire not installed in equipment racks, not portable, unrated ceiling space, or not installed in conduit shall be fire rated and meet all applicable codes.

4 All signal equipment control cables shall be stranded wire, appropriately shielded, of gauge and number of conductors required by the manufacturer for proper operation of the system or equipment item furnished.

5 All cables including control, network, low-voltage power, video and audio which are required to be on floor will be properly covered and secured so that they are protected by strain and safe of trip hazards.

6 Wire and cable for all other devices shall be supplied in accordance with the recommendations of the device manufacturer and the National Electrical Code.

7 Equipment shall be held firmly in place with proper types of mounting hardware. All equipment affixed to the building structure must be self-supporting with a safety factor of at least three. All equipment shall be installed so as to provide reasonable safety to the operator. Supply adequate ventilation for all enclosed equipment items which produce heat.

8 Furnish the system to facilitate expansion and servicing using modular, solid-state components. All equipment shall be designed and rated for continuous operation and shall be UL listed, or manufactured to UL standards.

9 Shields of audio cables shall be grounded at one end only, at the inputs of the various equipment items in the system.

10 Observe proper circuit polarity and loudspeaker wiring polarity. No cables shall be wired with a polarity reversal between connectors with respect to either end. Special care shall be taken when wiring microphone cables, to insure that constant polarity is maintained.

11 Terminate all unused inputs and outputs with proper precision shielded resistors.

12 Route cables and wiring within equipment racks and cabinetry according to function, separating wires of different signal levels (video, microphone, line level, amplifier output, AC, control, etc.) by as much physical distance as possible. Neatly arrange and bundle all cables loosely with hook and loop cable ties. Cables and wires shall be continuous lengths without splices.

13 All system wire, except spare wire, after being cut and stripped, shall have the wire strands twisted back to their original lay and be terminated by approved soldered or mechanical means. No unterminated wire ends will be accepted. Heat shrink type tubing shall be used to insulate and dress the ends of all wire and cables. Include a separate tube for the ground or drain wire.

14 All cables in conduits shall be insulated from each other and from the conduit the entire length and shall not be spliced. All cables and wires are to be continuous lengths without splices.

15 All solder joints and terminations shall be made with resin-core silver solder. Temperature regulated soldering irons rated at least 60 watts shall be used for all soldering work. No soldering guns or temperature unregulated irons shall be used on the job site.

16 Mechanical connections shall be made using approved connectors of the correct size and type for the connection. Wire nuts will not be accepted.
17 Each mechanical connector shall be attached using the proper size controlled-duty-cycle ratcheting crimp tool which has been approved by the manufacturer of the connectors.
18 Conventional non-ratcheting type crimping tools are unacceptable, and shall not be used on the job site.
19 Label all wires in racks and console as to destination and purpose. Clearly and permanently label all jacks, controls, and connections with permanent engraved laminated plastic labels or by engraving and filling mounting plates, unless otherwise noted. Attach laminated plastic labels with contact cement, being careful to clean off excess or visible cement. Embossed or printed label tape, and press-on or lift-off lettering systems will not be accepted. All labeling shall be completed prior to final system inspection.
20 The contractor shall provide necessary transient protection on the AC power feed, all copper station lines leaving or entering the building, and all central office trunks. All protection shall be as recommended by the equipment supplier and referenced to earth ground.
21 Wiring within Enclosures: Provide adequate length of conductors. Bundle, lace, and train the conductors to terminal points with no excess. Provide and use lacing bars.
22 Provide physical isolation from speaker-microphone, telephone, line-level wiring, and power wiring. Run in separate raceways, or where exposed or in same enclosure, provide 12 inch minimum separation between conductors to speaker-microphones, telephone wiring and adjacent parallel power. Provide physical separation as recommended by equipment manufacturer for other system conductors.
23 Identification of Conductors and Cables: Use color coding of conductors and apply wire and cable marking tape to designate wires and cables so all media are identified in coordination with system wiring diagrams.
24 Weatherproofing: Provide weatherproof enclosures for items to be mounted outdoors or exposed to weather.

3.2 Programming

A General

1 Contractor shall provide all necessary programming to provide a complete operating paging system.
2 Contractor shall include in their bid one (1) two (2) hour planning meeting with the owner and their Representatives to outline all specific programming issues, as well as, but limited to:
- Contractor will be informed of any specific requirements for use of the system.
- Contractor will provide overview of system capabilities.
- Contractor will address all concerns of the Owner and their Representatives.

3 Impedance and Level Matching: Carefully match input and output impedance's and signal levels at signal interfaces. Provide matching networks where required.
4 Control circuit wiring: Install control circuits in accordance with NFPA 70 and as indicated. Provide number of conductors as recommended by system manufacture to provide control functions as indicated or specified.

3.3 Grounding

A General

1 Provide equipment grounding connections for Integrated Electronic Communications Network systems as indicated. Tighten connections to comply with tightening torques specified in UL Standard 486A to assure permanent and effective grounds.
2 Ground equipment, conductor, and cable shields to eliminate shock hazard and to minimize to the greatest extent possible, ground loops, common mode returns, noise pickup, cross

talk, and other impairments. Provide 5-ohm ground at main equipment location. Measure, record, and report ground resistance.

3 Provide all necessary transient protection on the AC power feed and on all copper station lines leaving or entering the building. Note in system drawings, the type and location of these protection devices as well as all wiring information.

3.4 Testing

A General

1 The completed systems shall be physically inspected by the Owner's representative to assure that all equipment is installed in a neat and professional manner, and in accordance with these Specifications.

2 The final system testing and commissioning shall be performed after all installation and initial testing has been completed by the Installer, but prior to any use of the systems.

3 The Contractor, prior to requesting systems testing and demonstration to the Owner's representative, shall ensure that all systems are in first-class working condition and free of short circuits, ground loops, parasitic oscillations, excessive hum and noise, RF interference, or instability of any form.

4 The Contractor shall be responsible for properly performing all setup and alignment of systems, and all assembly and setup of portable equipment.

5 The Installer shall be responsible for properly performing the equalization of the sound system. After equalization and test the sound system shall meet or exceed the following specifications:

6 System shall be free of short circuits, ground loops, parasitic oscillation, excessive system noise, hum, RF interference, and instability of any form.

7 Maximum SPL with band-limited pink noise input to the system shall be 99dB before audible distortion occurs.

8 Acoustic response of the system shall be plus or minus 1.5dB along a line which is flat from 80Hz to 4000Hz and which rolls off at 1dB per octave to 16kHz.

3.5 Field Quality Control

A General

1 The Final Acceptance Testing shall be provided to the Owner or the Owners designated representative only. Final acceptance testing to any other trade or service provider for the project will not comply with the requirements of this section.

2 The contractor will provide a Final Acceptance Test record document signed by both the contractor and the Owner or designated Owner’s Representative establishing the “In Warranty” date. The warranty period will not commence until the Final Acceptance Test is completed. This document MUST list either the extension number, port number, or some other means so the owner will be able to look at the location of a speaker and cross reference it’s number/port on this list as to be able to make programming bell/zone type changes.

3 Be prepared to verify the performance of any portion of the installation by demonstration, listening and viewing test, and instrumented measurements. Make additional adjustments within the scope of work and which are deemed necessary by the Owner because of the acceptance test.

3.6 System Commissioning

A Commissioning

1 In the presence of the Owner’s Representative the Contractor shall perform the attached functions listed below:

- Check calculated Sound Pressure Levels (spl) readings at seating

- Inspection of equipment racks for neatness and proper termination
- Inspection of all terminations
- Inspection of all W/P connections
- Inspection of all inputs and output devices
- Verify bandwidth of sound system
- Verify polarity of speaker system and connectors
- Check wire types at all locations
- Verify connector types
- Check Impedance of speaker lines
- Verify frequency response of speaker system with RTA
- Verify coverage of speaker system

2 Contractor must provide man lift to speaker location
3 Contactor must provide access to all termination points
4 Check cooling system in equipment rack
5 Check general operation of control surface
6 Check programming of control surface for routing and proper function
7 Check power sequencing
8 All testing documentation will be supplied as a part of the Contractors As-built Documentation.
9 Contractor will include in their bid price six (6) hours for onsite commissioning. Contractor will provide the installation technician who was responsible for this project to be present at the system commissioning to tune, fix, repair, replace all system components that do not operate within the tolerance as set forth in this specification, the project documents, and industry standards.

B Acceptance
1 The final acceptance of the system by the Owner will be based upon the report of the Owner representative following inspection, testing, and commissioning. A list of items in need of completion or correction shall be generated by the owner, which must be corrected by the Installer before final acceptance will be granted.

3.7 Training
A General
1 Contractor shall provide no less than three (3) two (2) hour training sessions.
2 The first training session will be a “Train the Trainer”. The owner will appoint their representative to be provided extensive training so that he/she will be able to provide additional support once the project has been completed.
3 The additional training session will be provided as a general overview of the system operation for large groups or several smaller groups as designated by the owner. Usually these additional training events will coincide with a school function when the sound system will be used.
4 Provide sign in sheets for all training events. Deliver to architect in the close out documents.
5 System Training: Submit the following information describing the training programs and system trainers in accordance with the specifications.
6 Include with the submittal a preliminary staff development training program in outline form for review and approval by the owner’s representative.
7 Include with the submittal a current copy of the trainer’s certification from the manufacturer that certifies and identifies the trainer(s) who are eligible to provide training and support for the project.
8 Include with the submittal a current copy of trainer’s need’s assessment form which will be reviewed with the owner’s designated representative for the system’s preliminary system programming and configuration.

9 Include with the submittal copies of all documentation used to identify for the owner those participants attending and completing the training programs.

3.8 Warranty

A General

1 Contractor will provide a minimum of a 1-year Workmanship Warranty that includes Parts and Labor.

2 All equipment provided under this specification shall be warranted to be free from defects in materials and workmanship for a period of 12 months from the notice of completion.

3 The Contractor shall maintain regular service facilities and provide a qualified technician familiar with the work specified for this project. Contractor will respond to all notice of malfunction from the Owner within 24 hours of receiving trouble call. As part of this warranty, the Contractor shall provide, at no expense to the Owner, all material, devices, equipment, and personnel necessary and resolve malfunction and/or to provide alternate facilities, services, or equipment for the duration of repairs to any defective work as described in this section.

4 All repairs and service under warranty shall be at the jobsite unless in violation of manufacturer's warranty, wherein contractor shall provide substitute equipment for the duration of repairs. Transportation of substitute or test equipment and personnel to and from the jobsite shall be at no expense to the owner.

5 All repair and service work under warranty work, except emergency repairs can be performed during regular working hours of regular working days. Emergency repairs shall be made when a system or component malfunctions during use, and shall be performed on an immediate basis. All work shall be performed by personnel in the employ of contractor, having specific experience in the work of this specification and shall not be subcontracted or assigned to another company for service, unless Owner has approved such assignment in writing, in which event contractor shall nevertheless be responsible to the Owner for such work.

3.9 Occupancy Adjustments/Cleaning and Protection

A General

1 The contractor shall provide Occupancy Adjustments through a response scenario amenable to both the owner and the contractor that will be established for the first year of service.

2 Prior to final acceptance, the contractor shall vacuum and clean all system components and protect them from damage and deterioration. All blank spaces in equipment cabinets will be covered with blank panels. Top and side panels, and all cabinet doors will be installed. All general areas within and around all equipment rack/cabinets in the facility will be swept, vacuumed, and cleaned up. No cabinets will be left unlocked and all cabinet keys will be turned over to the owner or designated owner’s representative.

3.10 System Closeout and As-Built Documentation

A General

1 Contractor will comply with all requirements list in Section 27 0000 ‘1.8 – System Closeout and As-Built Documentation’.

END OF SECTION

Section 27 5200

Assistive Listening Systems - Owner Provided & Owner Installed

Part 1 General

1.1 Statement of Work

A. General

1. Provide all labor, materials, tools and equipment required for the complete installation of work called for on the Construction Drawings and described in the Specifying Documentation.
2. The intent of these Specifications is to provide a complete Assistive Listening System and it is the responsibility of the bidding Contractor to provide a complete solution.
3. It is the responsibility of the Contractor to provide all material necessary to provide a complete system even if the material is not described specifically in the following documentation.
   - All questions concerning non specified product and services will be address to the Owner's Representative before the Contactor provides a bid. Owner expects that by accepting the Contractor's bid proposal that they [the Contractor] have provided a competent bid for a complete solution.
4. Product specifications, general design considerations, and installation guidelines are provided in this document. Quantities of devices, typical installation details, and mounting details will be provided as an attachment to this document. The successful vendor shall meet or exceed all requirements for the cable system described in this document.

1.2 Related Work in Other Sections

A. General

1. All 120VAC power conductors and conduits associated with power circuits to all equipment locations shall be furnished and installed by Division 26 contractor.
2. All raceway systems including but not limited to conduit, j-boxes, outlet boxes, floor boxes, & surface mounted raceway shall be furnished and installed by Division 26 and 27 0528 contractors.

1.3 References

A. Regulatory References

1. Contractors will comply with all requirements as specified in Section 27 0000 '1.3 – Regulatory References'.

1.4 Safety and Indemnity

A. Requirements

1. Contractors will submit the necessary documentation to demonstrate their compliance with Section 27 0000 '2.1 – Safety and Indemnity'.

1.5 Contractor Qualifications

A. Requirements

1. Contractors will submit the necessary documentation to demonstrate their compliance with Section 27 0000 '2.2 – Contractor Qualifications'.

1.6 Quality Assurance

A. Requirements

1. Contractors shall comply with all requirements as specified in Section 27 0000 '2.3 – Quality Assurance'.

1.7 Equivalent Products

A. Products

1. All Product provided in this Specification are those of Listen Technologies.

B. Pre-Approved Equals:

1. Sennheiser

C. Other Products

1. Contractors wishing to approve a system other than those specified in this document shall do so in accordance with Section 27 0000 "3.1 Products".

1.8 Submittal Documentation

A. Requirements

1. The successful contractor shall provide their submittal package in accordance with the Section '01 20 00 – Submittal Schedule' and Section 27 0000 '3.2 – Submittal Documentation'.

1.9 Acceptance

A. Requirements

1. The contractor shall comply with all requirements as listed in Section 27 0000 '3.3 – Acceptance'.

1.10 Warranty

A. Requirements

1. The contractor shall comply with all requirements as listed in Section 27 0000 '3.4 – Warranty'.

Part 2 Compliance

2.1 CBC Access Compliance

A. SECTION *11B*- 216.10 – ASSITIVE LISTENING SYSTEMS

1. Each assembly area required by Section 11b-219 to provide assistive listening systems shall provide signs informing patrons of the availability of the assistive listening system. The sign shall include wording that states "Assistive-Listening System Available" and shall be posted in a prominent place at or near the assembly area entrance. Assistive listening signs shall comply with Section 11B-703.5 and shall include the International Symbol of Access for Hearing Loss complying with Section 11B-703.7.2.4.
2. **EXCEPTION:** Where ticket offices or windows are provided signs shall not be required at each assembly area provided that signs are displayed at each ticket office or window informing patrons of the availability of assistive listening systems.

B. SECTION *11B*-219 – ASSISTIVE LISTENING SYSTEMS

1. Section 11B-219.1 GENERAL - Assistive listening systems shall be provided in accordance with Section 11B-219 and shall comply with Section 11B-706.

2. *Section 11B-219.2 REQUIRED SYSTEMS – An assistive listening system shall be provided in assembly areas, including conference and meeting rooms.*
3. ***EXCEPTION:*** *This section does not apply to systems used exclusively for paging, background music, or a combination of these two uses.*
4. *Section 11B-219.3 RECEIVERS – The minimum number of receivers to be provided shall be equal to 4 percent (4%) of the total number of seats, but in no case less than two. Twenty-five percent (25%) minimum of receivers provided, but no fewer than two, shall be hearing-aid compatible in accordance with Section 11B-706.3*
   - EXCEPTIONS:
5. 1. Where a building contains more than one assembly area and the assembly areas required to provide assistive listening systems are under one management, the total number of required receivers shall be permitted to be calculated according to the total number of seats in the assembly areas in the building provided that all receivers are usable with all systems.
6. *2. Where all seats in an assembly area are served by an induction loop assistive listening system, the minimum number of receivers required by Section 11B-219.3 to be hearing aid compatible shall not be required to be provided.*
7. *Section 11B-219.4 – LOCATION – If the assistive-listening system provided is limited to specific areas or seats, then such areas or seats shall be within a 50-foot (15,240 mm) viewing distance of the stage or playing area and shall have a complete view of the stage or playing area.*
8. *Section 11B-219.5 PERMANENT AND PORTABLE SYSTEMS – Permanently installed assistive-listening systems are required in areas if (1) they accommodate at least 50 persons or if they have audio-amplification systems, and (2) they have fixed seating. If portable assistive listening systems are used for conference or meeting rooms, the system may serve more than one room. An adequate number of electrical outlets or other supplementary wiring necessary to support a portable assistive listening system shall be provided.*

C. SECTION *11B*-703.7.2.4 ASSISTIVE LISTENING SYSTEMS – Assistive listening systems shall be identified by the International Symbol of Access for Hearing Loss complying with Figure *11B-703.7.2.4.*
   1. Coordinate the location of ALS system signage with Architect drawings and documentation.

D. SECTION *11B*-706 ASSISTIVE LISTENING SYSTEM
   1. Section *11B*-706.1 GENERAL – Assistive listening systems required in assembly areas, *conference and meeting rooms* shall comply with *Section 11B*-706.

2. Section *11B*-706.2 RECEIVER JACKS – Receivers required for use with an assistive listening system shall include a 1/4”inch (3.2 mm) standard mono jack.
3. Section *11B*-706.3 RECEIVER HEARING AID COMPATIBILITY – Receivers required to be hearing-aid compatible shall interface with telecoils in hearing aids through the provision of neckloops.
4. Section *11B*-706.4 SOUND PRESSURE LEVEL – Assistive listening systems shall be capable of provided a sound pressure level of 110 dB minimum and 118 dB maxmum with a dynamic range on the volume control of 50 dB.
5. Section *11B*-706.5 SIGNAL-TO-NOISE RATIO – The signal-to-noise ratio for internally generated noise in assistive listening systems shall be 18 dB minimum.

6. Section *11B*-706.6 PEAK CLIPPLING LEVEL – Peak clipping shall not exceed 18 dB of clipping relative to the peaks of speech.

Part 3 Products

3.1 System Description

A. Assistive Listening System

1. Furnish and install an FM wireless assistive listening system for use by the hearing-impaired. The assistive listening system (ALS) shall be capable of broadcasting on 57 channels and be frequency agile. The ALS system shall have 80dB SNR or greater, end-to-end. Receivers shall be frequency agile and frequency set with a "seek" button. The receiver will incorporate a stereo headset jack that allows the user to plug in either a mono or stereo headset and listen to audio normally. The portable receivers and transmitters shall incorporate automatic battery charging circuitry for recharging of Ni-MH batteries. Listen Technologies Corporation products are specified
2. The following sections specifically list the acceptable equipment types and items for this project. Where quantities are not noted, they may be obtained from the project drawings. In the event of a discrepancy between the specifications and the project drawings, the greater quantity or better quality shall be furnished.

3.2 Stationary/Permanent Installation

A. System Components

1. For the system shall include the following components:
   - Transmitter
   - Receiver
   - Antenna
   - Ear Speaker
   - Neck Loop

B. Transmitter

1. The approved transmitter shall have the following features:
   - Audio
     - Audio Input 1
     - Rear panel: one (1) female XLR and 1/4-inch combo connector, balanced, 0 / -55dBu (line/mic) normal input level adjustable -30/ +21 dBu (line/mic) maximum input level, impedance 20k / 1k ohm (line/mic), phantom power +12VDC
     - Distortion: <2% total harmonic distortion (THD) ta 80% deviation
     - Signal to noise ratio: 62 dB
     - Contour: cuts and boots frequencies above 5kHz
     - Frequency Response: 50Hz – 15kHz
     - Audio Input 2: Rear panel, two (2) phono connectors, unbalanced, -10 / +10 dBu nominal input level adjustable, +30 dBu maximum, impedance 100k ohm

        - Audio Output: Input 1 and input 2, mixed output (rear panel), two (2) phono connectors, unbalanced, -10 dBu nominal output level, +15 dBu maximum, impedance 10 ohm
        - Audio Processing: Compression can be turned on/off. Slope internally adjustable from 1:1 to 4:1. Default 2:1
        - Headphone Output: Front panel, one (1) 3.5 mm (0.14 in.) stereo connector, unbalanced, adjustable output level, +3 dBu maximum, impedance 10 ohm
    - Controls
        - Internal Adjustments: Compression ratio for audio processor
        - User Controls: Front Panel: Power, Test Tone on/off, channel up/down, Input Levels, Mix Level, Contour, Monitor volume control Rear Panel: Input 1 Level, (Line, Mic, Mic-Phantom Power), Input 2 level (-10 / +10 dBu), RF power level (low, mid, high)
        - Programming: Process on/off, channel lock
    - Indicators
        - Audio Input Status LEDs: Indicates Input 1, Input 2, and Mix audio levels; 10 segment LED's (8 green, 2 red)
        - LCD: Channel Designation, lock status, RF power level (front panel)
        - RF Power: Indicated on the LCD (low, mid, high)
        - Processing: Indicated by a green LED when on (front panel)
        - Test Tone: Red LED illuminates when test tone is enabled
    - RF
        - Frequency Accuracy: ± .005% stability 32 to 122º (0 to 50ºC)
        - Number of Channels: 3 wide band
        - Frequency Range: (A) 72.100, (E) 72.900, (H) 75.900
        - Antenna Connector: BNC
        - Transmitter Stability: 50 PPM
        - Output Power: 80,000 uV at 3 m
        - Transmission Range: Up to 1,500 ft. (457.20 m)
        - Antenna Type: Various antennas available
    - Power
        - Power Supply Output: 12 VDC, 1.3 A, 15.6 W
        - Power Supply: In line power supply, Listen part number LA-207 (Line cord is determined by the each Country's AC power standards)
        - Power Supply Input: 100-240 VAC, 50-60 Hz, 0.4 A
        - Power Supply Connector: 0.02 in (5.0 mm) OD, 0.01 in. (2.5 mm) ID, barrel type
        - Compliance: UL, CE, GS, TÜV, RoHS
    - Physical
        - Height: 1.75 in. (4.5 cm)
        - Width: 8.50 in. (21.5 cm)
        - Color: Dark Grey with white silk screening
        - Unit Weight with Power Supply: 4.5 lbs. (2.0 kg)
        - Depth: 9.13 in. (23 cm)
        - Weight: 2.6 lbs. (1.2 kg)
        - Rack Mounting: One (1) rack space height, 1/2 rack space wide. One (1) or two (2) transmitters can be mounted in one rack space, optional rack mount (LA-326)
    - Compliance
        - FCC Part 15, Part 90
    - The approved Transmitter shall be equal to **Listen Technologies** model #: **LT-803-072-01**
        - Contractor will include one (1) rack mount kit equal to **Listen Technologies** model #: **LA-326** per two (2) transmitters.

C. Receiver
    1. The approved receiver shall the following features:

- Audio
  - System Distortion: <2% total harmonic distortion (THD) at 80% deviation
  - Output/s: Two (2) 3.5 mm (0.14 in.) connectors, unbalanced, 0 dBu nominal output level, 16 mW maximum, impedance 32 ohm
  - Frequency Response: 50 Hz - 15 kHz (±3 dB)
  - System Signal to Noise Ratio: SQ enabled 80 dB, SQ disabled 60 dB
- Controls
  - Set-up Controls: Press and hold up/down volume buttons for 5 seconds to enter channel adjust, use up/down to select channel
  - User Controls: Power, up/down volume, Listen button for end user channel selection
  - Programming: Via software and USB port
- Indicators
  - Display: Channel designation, battery level, unit number, charging status
  - LEDs: Flashes when batteries are low or to indicate charging, solid when fully charged
- RF
  - Sensitivity: .6uV typical, 1 uV maximum for 12 dB sinad
  - Frequency Range: 72.025 - 75.950 MHz
  - Number of Channels: 17 wide band, 40 narrow band
  - Antenna Type: Uses ear phone/neck loop lanyard and short ear phone cable or standard earphone cable
  - Frequency Accuracy: ± .005% stability 32 to 122 ºF (0 to 50 ºC)
  - Squelch: Programmable in 20 steps, automatic on loss of RF signal
- Power
  - Power Supply: Micro USB connector, 5 V, 500 mA
  - Battery Life: 8 Hours of continuous use
  - Battery Type: Lithium Ion 3.7 Vdc, 1200 mAh
  - Battery Charging Time: Fully charged in 2.5 Hours
- Physical
  - Dimensions with Belt Clip: 3.75 x 2.0 x 0.80 in.
  - Dimensions (H x W x D): 3.75 x 2.0 x 0.64 in.
  - Color: Black
  - Unit Weight 1.60 oz.
  - Unit Weight with Batteries: 2.40 oz.
- Compliance
  - FCC Part 15, Part 90
- The approved Receiver shall be equal to **Listen Technologies** model #: **LR-5200-072**

D. Antenna

1. The approved antenna shall have the following features:
   - Physical
     - Mounting: Wall mount, dual and single electrical box, ceiling electrical box, horizontal surface mount (such as on top of a rack), ceiling/inverse mounting, flexible mounting in-wall or in ceiling and mast or conduit mount.
     - Dipole Vertical Length: 72 MHz - 80 in. 216 MHz - 27 in.
     - Mounting Bracket
       - Dimensions (W x D x H): 4.5 in x 7.0 in x 2.5 in
       - Grounding Base Dimensions (W x D x H): 8.0 in x 8.0 in x 2.0 in
       - Mounting Plate Dimensions (W x D x H): 4.48 in x 4.55 in
     - Mounting: Includes self-tapping sheet metal screws, drywall anchors, and all hardware required to mount to electrical boxes. Does not provide hardware required to mount to a mast.
     - Weight 4.4 lbs. (2.0 kg)
   - Interconnections

        - Connector(s)s: BNC
    - RF
        - Antenna Type: Monopole and Dipole
        - Number of Channels: 72 MHz - 57 (17 wide band, 40 narrow band)
        - Frequency Range: 72 MHz - 72.025 MHz - 75.975 MHz
        - Unity Gain: 0 dB
    - The approved Antenna shall be equal to **Listen Technologies** model #: **LA-122**

E. Ear Speaker
1. The approved ear speaker shall have the following features:
    - Audio
        - Frequency Response: 20 Hz - 20 kHz
        - Impedance: 32 ohm +/- 15% @ 1 kHz
        - Rated Power Input: 50 mW
        - Max Power Input: 100 mW
        - Input Sensitivity: 115 dB +/- 4dB @ 1 kHz, 1 mW
    - Compliance
        - Standards: RoHS
    - Interconnections
        - Connector: male 3.5mm (TRS)
    - Physical
        - Color: Dark Gray
        - Cable Length: 13 in., extension cable is 28 in.
        - Unit Weight: 0.40 oz.
    - The approved Ear Speaker shall be equal to **Listen Technologies** model #: **LA-401**
        - Contractor shall provide one (1) ear speaker for each receiver provided.

F. Neck Loop
1. The approved neck loop shall have the following features:
    - Audio
        - Frequency Response: 20 Hz - 20 kHz
        - Impedance: 12 ohm +/- 15% @ 1 kHz
        - Max Power Input: 2 W
        - Rated Power Input: 75 mW
        - Headset Input Sensitivity: 110 dB +/- 4dB @ 1 kHz, 1 mW
        - Magnetic Field Strength: 100 mA/m 6 inches above loop at 85µW 1kHz input (IEC 60118-4)
    - Loop
        - Loop Cable Length: 33 inches
    - Compliance
        - Safety: RoHS
        - Standards: IEC 60118-4
    - Interconnections
        - Connector: 3.5mm stereo
    - Physical
        - Cable Length: 22 in. (55 cm)
        - Color: Dark Grey
        - Dimensions (H x W x D) 1.44 in. x 1.10 in. x 0.59 in.
        - Weight: 1.65 oz.
    - The approved Neck loop shall be equal to **Listen Technologies** model #: **LA-166**

G. Charging Station
1. The approved Charging Station shall have the following features:
    - Power
        - Power Supply Input :100-240VAC, 50-60 Hz

        - Power Supply Output: 5.0 VDC, 8 A, 40 W
        - Cord: 72 in Input Power Cord, 45 in Output Cord
        - Power Supply Connector: .22 in. OD x .09 in. ID, barrel type
    - Physical
        - Color: Black
        - Unit Capacity: 12 Units
        - Unit Weight: 5.0 lbs.
        - Dimensions (H x W x D): 1.75 in. x 14 in. x 7.5 in.
    - Compliance
        - Standards: UL, CE, RoHS
    - The approved Charging Station shall be equal to **Listen Technologies** model #: **LA-381**
        - Contractor will provide one (1) charging station for every 12 receivers allowing all receivers to be charged simultaneously.

H. Coax Cable
1. The approved coaxial cable shall be equal to **Listen Technologies** model #: **LA-390**.

Part 4 Execution

4.1 Installation

A. General
1. Furnish components, materials, parts, equipment, labor, etc. necessary for the complete installation of the systems in full accordance with the recommendations of the equipment manufacturers and the requirements of the drawings and specifications.

4.2 Programming

A. General
1. Contractor shall provide all necessary programming to provide a complete operating system.

4.3 Testing

A. General
1. The completed systems shall be physically inspected by the Owner's representative to assure that all equipment is installed in a neat and professional manner, and in accordance with these Specifications.
2. The final system testing and commissioning shall be performed after all installation and initial testing has been completed by the Installer, but prior to any use of the systems.
3. The Contractor, prior to requesting systems testing and demonstration to the Owner's representative, shall ensure that all systems are in first-class working condition and free of short circuits, ground loops, parasitic oscillations, excessive hum and noise, RF interference, or instability of any form.

4.4 Training

A. General
1. Contractor shall provide no less than one (1) two (2) hour training session.
    - The training session will be a “Train the Trainer”. The owner will appoint their representative to be provided extensive training so that he/she will be able to provide additional support once the project has been completed.
    - Provide sign in sheets for all training events. Deliver to architect in the close out documents.

4.5 Warranty

A. General

1. Contractor will provide a minimum of a 1-year Workmanship Warranty that includes Parts and Labor.
2. All equipment provided under this specification shall be warranted to be free from defects in materials and workmanship for a period of 12 months from the notice of completion.

4.6 System Documentation

1. Contractor will comply with all requirements listed in Section 27 0000 '3.5 – System Closeout and As-Built Documentation'.

END OF SECTION

SECTION 28 1600

BURGLAR ALARM SYSTEM – SEPARATE CONTRACT WITH SONITROL

Part 1 General

1.1 Work Included

1.2 Related Work in Other Sections

A General

1 All 120VAC power conductors and conduits associated with power circuits to all equipment locations shall be furnished and installed by Division 260000 contractor.

2 All raceway systems including but not limited to conduit, j-boxes, outlet boxes, floor boxes, surface mounted raceway, grounding & bonding, communication backboards shall be furnished and installed by Division 260000 contractor.

1.3 Statement of Work

A General

1 Provide all labor, materials, tools and equipment required for the complete installation of work called for on the Construction Drawings and described in the Specifying Documentation.

2 Provide all cabling required to supply a complete and operable system at the locations shown on the drawings and to the “future” locations. See drawing for locations.

3 Product specifications, general design considerations, and installation guidelines are provided in this document. The drawings indicate the locations of the devices. If the bid documents are in conflict, this specification shall take precedence. The successful vendor shall meet or exceed all requirements for the fire alarm system described in this document.

4 The system shall be monitored off-site by the security monitoring station via the network. No additional telephone lines shall be required to accommodate this feature.

5 The Contractor shall include in their bid documentation the cost of a yearly maintenance contract to maintain this system and a separate proposal on the cost of the second year of the maintenance contract.

6 Supply and install all grounding, bonding, and fireproofing required by the local authorities and by code. All cables installed through fire rated walls shall be fire-proofed.

B System Requirements

1 The work described by this part includes the furnishings of all materials, equipment, supplies, and labor and the performing of all operations necessary for the installation of a complete operating system. The monitoring shall be Supervised Networked Internet Monitoring.

2 The conduit, outlets, terminal cabinets, etc., which form a part of the rough-in work shall be furnished and installed complete by the division 26 contractor if required. The balance of the system, including the furnishing and installation of cable, furnishing and installation of equipment, making all connections, etc., shall be installed by the Alarm Contractor, and the entire responsibility of the system, its operation, function, testing and maintenance for one year after final acceptance of the project by the owner, shall be the responsibility of the Alarm Contractor.

3 The Alarm Contractor shall furnish and install all equipment, cables, devices, which are necessary for the proper integration of the system so that the system shall perform the function listed herein in compliance with all the specified requirements.

4 The specified equipment for the alarm systems is that of the GE Alliance Systems or Equal. All mechanical, electrical and general information set forth on the respective data sheets for each specified item shall be considered as part of these specifications and binding herein. Any proposed equal item offered shall be substantiated fully to prove equality and must be pre-approved prior to bid. Alternate systems shall not be bid without pre-approval. The Owner reserves the right to require a complete sample of any proposed equal item and may, if necessary, request a sample tested by an independent testing laboratory to prove equality. The decision of Owner regarding equality of proposed equal items will be final.

5 The Alarm Contractor shall furnish a letter which certifies that the equipment has been installed according to factory intended practices and that the system is operating satisfactorily. The Alarm Contractor shall also furnish a written unconditional guarantee, guaranteeing all parts and labor for a period of one year after final acceptance of the project by the owner.

1.4 Regulatory References

A Requirements

1 Contractor will comply with all references listed in Section 27 0000 '1.3 – Regulatory References'.

1.5 Safety and Indemnity

A Requirements

1 Contractors will submit the necessary documentation to demonstrate their compliance with Section 27 0000 '2.1 – Safety & Indemnity'.

1.6 Contractor Qualifications

A Requirements

1 Contractors will submit the necessary documentation to demonstrate their compliance with Section 27 0000 '2.2 – Contractor Qualifications'.

1.7 Quality Assurance

A Requirements

1 Contractor shall comply with all requirements as specified in Section 27 0000 '2.3 C – Quality Assurance'.

1.8 Products

A Specified Equals

1 All Products described, and Part Numbers given in this Specification are those of GE, Belden unless otherwise noted herein or on the project drawings.

B Pre-Approved Equals:

1 Bosch
2 DSC
3 Honeywell

C Other Than Approved Products

1 Contractors wishing to approve a system other than those specified in this document must comply with all requirements listed in Section 27 0000 '3.1 – Products'.

1.9 Submittal Documentation

A Requirements

1 The successful contractor shall provide their submittal package in accordance with the Section 01 20 00 1.06 Submittal Schedule, and Section 27 0000 '3.2 – Submittal Documentation'.

1.10 Acceptance

A Requirements

1 Contractor shall comply with all requirements as specified in Section 27 0000 '3.3 – Acceptance'.

1.11 Warranties

A Requirements

1 Contractor shall comply with all requirements as specified in Section 27 0000 '3.4 Acceptance & Warranties'.

Part 2 System

2.1 System Description

A Basic Function

1 The first basic intent of the alarm system is to detect unauthorized entry into the building and identify, immediately, the specific zone of entry to a 24-hour central Station that provides supervised internet monitoring and/or to the District's on site security staff.
2 Zones of entry to be monitored will be all outside doors unless specified otherwise.
3 Selected corridors have passive detector coverage to supplement the door entry protection.
4 All doors and windows on the outside of the building shall be equipped with door sensors and window break-glass detectors.
5 The second basic intent is to minimize response to false alarm. Alarm pads placed in protected buildings shall have appropriate time delays to avoid false activations.
6 The third basic intent is to provide a flexible, expandable system, which is fully electronically supervised.
7 The system shall have the capability of connection for audible alarm and/or internet monitoring.

2.2 Control Design

A General

1 The system presented is based on a GE Alliance # AL4617 Alarm control panel.

2.3 System Function

A General

1 The activation of any alarm initiating device in the system shall cause the alarm panel to go into alarm mode.
2 The alarm shall then be digitally transmitted to the alarm pad. It shall annunciate, by zone on the alpha-numeric display and transmit all signals to the central monitoring station.

3 The system shall include required network interfaces to monitor over the internet.
4 The system shall be completely programmable either locally from a keypad or remotely through the central monitoring station.

2.4 System Description

A Input/Output Capacity

1 This system shall be capable of monitoring a minimum of 256 individual zones and controlling up to 255 fully programmable relays.

B User/Authorization Level Capacity

1 The system shall have a minimum of 200 Personal Identification Numbers (PIN) codes with each code having its own custom authority level.

C Zone Configuration

1 Each zone shall function in any of the following configurations: Night, Day, Exit, Fire, Supervisory, Emergency, Panic, Auxiliary 1, Auxiliary 2, Fire Verification, Cross Zone, Priority, Key switch Arming.

D Communication

1 The system shall be capable of supporting DSL multiplex communication with digital dialer backup, existing data networks, satellite communication, fiber optic networks, local area networks, wide area networks, cellular communication, and retail data networks.

Part 3 Products

3.1 Control Panel

A Features

1 Integrated intrusion alarm and access control system
2 Up to 16 remote arming stations (key pad or reader)
3 Built-in dialer for monitoring and remote management
4 Up to 256 zone inputs and 64 doors
5 Up to 255 outputs
6 Up to 15 additional remote panels
7 Logs 2,000 alarm and access events

3.2 Electronic Components

A General

1 All electronic components of the system shall be of the solid-state type, mounted on printed circuit boards conforming to UL 294, 609, 365, 1610 & 1635 standards.

B Relays

1 Relays and similar switching devices shall be solid-state type or electromechanical.

C Test Modes

1 The system shall include a provision that permits testing from any alphanumeric keypad. The test shall include standby battery, alarm bell or siren, and communication to the central station.
2 The system shall include a provision for an automatic, daily, weekly, thirty day, or up to sixty day test of the communication link from the panel site to the central station.
3 The system shall include a provision for displaying the condition of the internal system power and wiring. Internal monitors shall include the bell circuit, AC power,

battery voltage level, charging voltage, panel box tamper, phone trouble line 1, phone trouble line 2, and transmit trouble.

D Power Supplies
1 Power supplies for the Detection devices shall operate from 120 VAC, Supplied at the respective protected areas.
2 Standby batteries shall be supplied to power the system in the event of a utility power failure. Batteries shall be sized to provide 105% capacity for eight hours. Standby batteries shall be sealed lead-acid.
3 Power supplies shall be Solid State.
4 Controls shall be designed to maintain full battery charge when alternating current is available.
5 Batteries shall be recharged to 85% capacity within 24 hours from battery use.
6 The system shall be automatically transferred to battery power upon loss of alternating current power and return to alternating current power upon restoration.
7 Intrusion alarms shall not be initiated during switch over; a signal shall be initiated upon failure of battery and/or alternating current power.

E Control Panel Components
1 System Control Panel
- GE Model # AL-4617
2 Transformer
- GE Model # AL-1690
3 Metal Enclosure
- GE Model # AL-1680
4 Serial PC communications port
- GE Model # AL-1801
5 TCP/IP network interface module
- GE Model # AL-1806
6 8-zone expansion module
- GE Model # AL-1206
7 4-relay expansion module
- GE Model # AL-1810
8 8-relay expansion module
- GE Model # AL-1813

F Alarm Pad
1 Master Key Pad
- Alarm pads shall be semi-flush, outlet box mounted, push button Arm, Monitor and Clear commands.
- 4-line LCD display
- GE Model # AL-1111

G Remote Key Pad
1 Alarm pads shall be semi-flush, outlet box mounted, push button Arm, Monitor and Clear commands.
2 2-line LCD display
3 GE Model # AL-1103

H Door Contacts
1 Press Fit
2 Flush, concealed type

3 Suitable for wood or steel doors and sash
4 Wide break distance
5 Magnetic, reed type switch rated, 1,000,000 cycles (minimum)
6 GE Model # 1075 series.

I Passive Motion Detectors
1 Passive infrared detector shall be designed to minimize false alarms and to fully sense protected areas.
2 Wall box mounted
3 Flush, concealed type for use in a standard single gang outlet box
4 360deg ceiling and wall mount coverage of 15'
5 Wide angle range of 30'
6 Single spot range of 40'
7 GE Model # 6255FM

J Glass break Detector
1 Glass break detector shall be designed to operate when glass has been broken or removed to gain entry into the building.
- 3x3 technology
- Microprocessor Based
- Automatic adjustment
- Detects all types of glass
- ceiling or wall mounted
- GE Model # Solution 2200

K Wire
1 All wiring shall be of the type and size recommended by the equipment supplier, and as approved by the authority having jurisdiction. Wire color-coding shall remain the same throughout the system.
2 From each door switch and, pair of door switches, or glass break station
- 1 pair # 22 gauge
- vinyl insulated
- PVC jacketed
- Belden # AW27137

3 To each alarm pad
- one 4 conductor # 18 gauge
- PVC insulated and jacketed
- Belden # AW38137

4 To each motion detector
- 4 conductor # 18 gauge
- polyethylene insulated
- PVC jacketed
- loop connected
- Belden # AW38137

5 No wiring other than that directly associated with the alarm system functions (NO 110 VAC), shall be permitted in alarm conduits. All wiring shall be tested for opens, shorts or grounds prior to the connection of any devices. All alarm system junction boxes shall be clearly marked for easy identification. Wire nut splices shall no be permitted.

Part 4 Execution

4.1 End of Line Devices

A General

1 Each detection device to be individually annunciated using n/o contacts with full E.O.L supervision.

4.2 Testing

A General

1 Upon completion of the installation, the Contractor shall test each and every detection, initiating, and control device for proper operation.

2 A monitoring report shall be submitted to the owner, or his representative, indicating proper operation, compliance, date of testing and the Contractor's signature.

3 On completion of the acceptance tests, the Owner or his representative shall be instructed in the operation and testing of the system. A minimum of two hours training shall be provided.

4.3 System Closeout and As-Built Documentation

A Requirements

1 The contractor will comply with all requirements listed in Section 27 0000 '1.8 – System Closeout and As-Built Documentation'.

4.4 Manufacturer's Responsibility

A General

1 It is mandatory, under this section of the specification, that the factory authorized representative, install and connect, supervise the installation and connection, or at the minimum, inspect and test the entire system after completion. A letter from the factory authorized representative certifying that this inspection and testing has been done and that the complete system is in full and proper operation and in compliance with this specification and the manufacturer's recommendations, shall be submitted before the project will be accepted.

4.5 Central Station

A General

1 The intrusion alarm equipment manufacturer's factory authorized representative shall have available a 24-hour, 7 day per week central station service to receive and respond to alarms from the intrusion alarm system

4.6 Service

A General

1 The intrusion alarm equipment manufacturer's factory authorized representative shall have a 24-hour (maximum) response capability to service calls.

END OF SECTION

SECTION 28 2300
SURVEILLANCE CAMERA SYSTEM - OWNER PROVIDED & OWNER INSTALLED

Part 1 General

1.1 Statement of Work

A General

1 Provide coordination with the District staff for scheduling of this system.

2 27 1000 contractors shall be complete with work including all testing and labeling prior to owner work start.

3 The District requires a minimum of 10 days to review test documents prior to system start up.

Part 2 Products

2.1 General

A Surveillance Camera System

1 The Surveillance Camera System shall be owner supplied (parts and smarts).

2 All system equipment and programming for this system will be owner supplied.

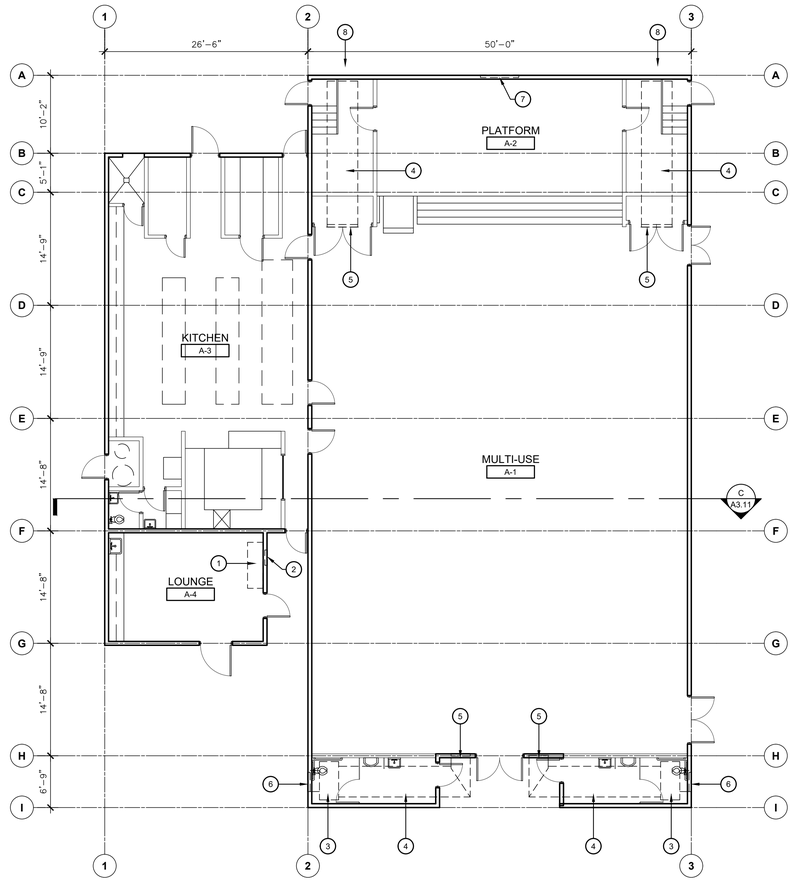
Part 3 Execution

3.1 General

A Installation

1 It is the contractor's responsibility to inform the Owner and/or the Owner's Representative of any and all conflict's, between the project documents and the onsite conditions.

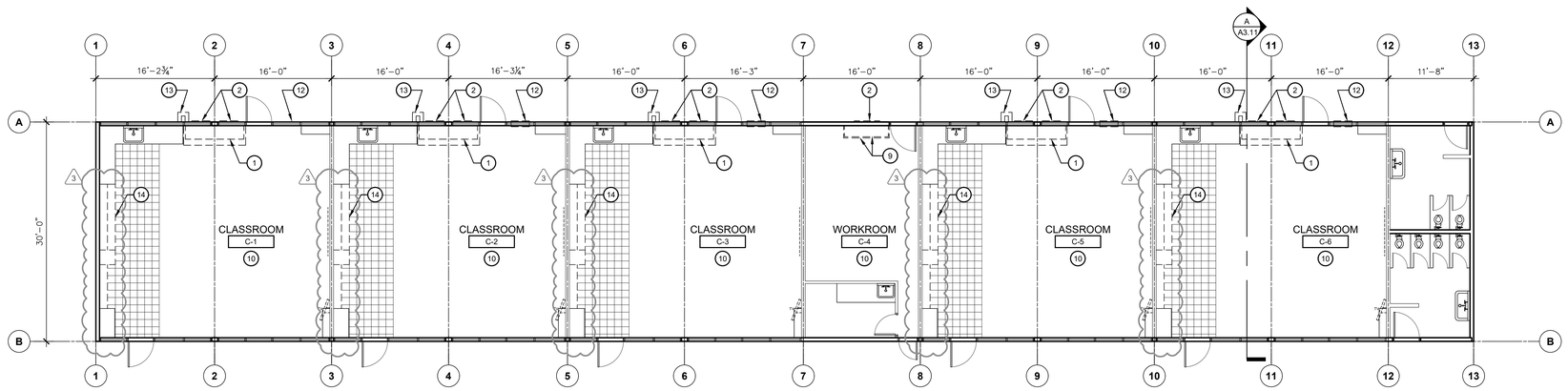
END OF SECTION



DEMOLITION PLANS - BUILDING A

HVAC REPLACEMENT

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



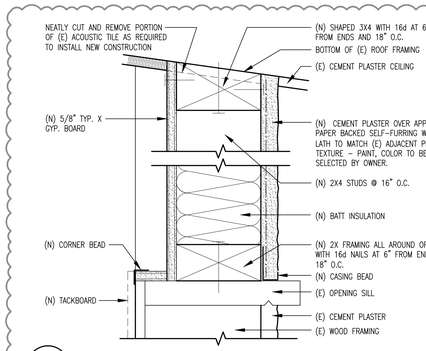
DEMOLITION PLANS - BUILDING C

HVAC REPLACEMENT

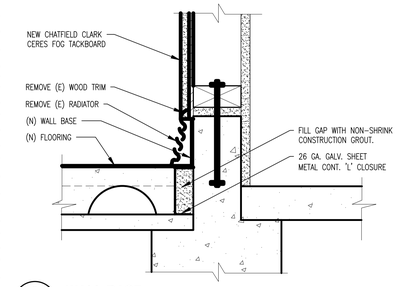
SCALE: 1/8" = 1'-0"

KEY NOTES

1. REMOVE EXISTING UNIT VENTILATOR AND ALL RELATED COMPONENTS, CONTROLS, ETC. TYP.
2. REMOVE EXISTING OUTSIDE AIR LOUVER AND DUCT THRU WALL.
3. REMOVE (E) UNIT HEATER AND ALL RELATED COMPONENTS, PIPES AND RELATED APPURTENANCES
4. REMOVE (E) AIR DUCT
5. REMOVE (E) SUPPLY GRILL
6. REMOVE (E) OUTSIDE AIR LOUVER
7. REMOVE (E) AIR LOUVER AND AIR RELIEF DAMPER
8. REMOVE (E) EVAPORATIVE COOLER
9. REMOVE (E) FAN COIL
10. REMOVE (E) CARPET, VAT TILE FLOORING AND MASTIC
11. NOT USED
12. REMOVE EXISTING RELIEF DAMPER LOUVER
13. REMOVE EXISTING SHEET METAL PIPE COVER, CONCRETE PAD, AND UTILITY PIPES CAP AND ABANDON REMAINING PIPES UNDERGROUND - SEE DETAIL 3/A3.11
14. REMOVE EXISTING CABINETS.



1 A2.10 — **WALL INFILL** AWB147-01 SCALE: N.T.S.



2 A2.10 — **WALL BASE** AWB147-02 SCALE: 1 1/2" = 1'-0"

Owner:

BAKERSFIELD CITY SCHOOL DISTRICT
1300 BAKER STREET
BAKERSFIELD, CA 93305

Project Name:

HVAC REPLACEMENT

Project Address:

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Sheet Title:

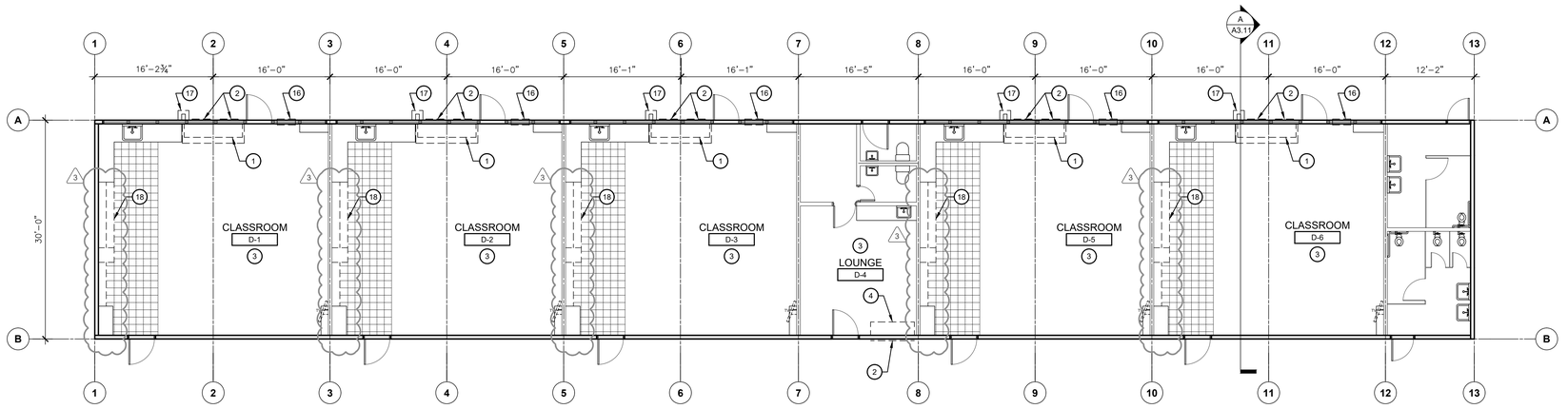
DEMOLITION PLANS
BUILDINGS A & C

Job No.: **5524**

Sheet No.: **A2.10**

Release: ADDENDUM 3 (3) 11/28/22

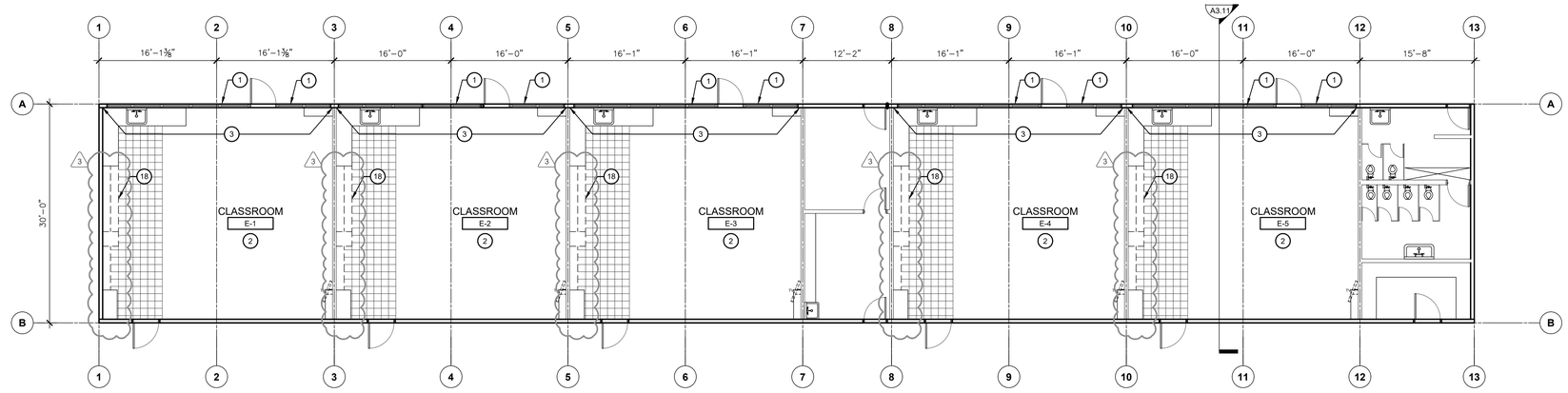
EXHIBIT 3-17



DEMOLITION PLANS - BUILDING D

HVAC REPLACEMENT

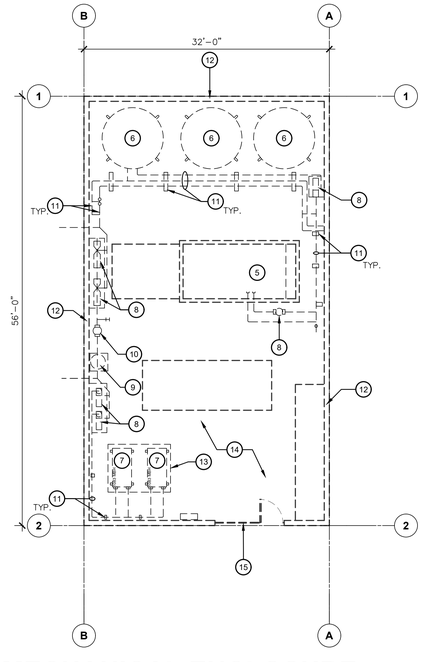
SCALE: 1/8" = 1'-0"



DEMOLITION PLANS - BUILDING E

HVAC REPLACEMENT

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



NOTE:

ALL CHILLER EQUIPMENT SHALL REMAIN OPERATIONAL UNTIL ALL NEW AIR CONDITIONING EQUIPMENT HAS BEEN INSTALLED, APPROVED AND FULLY OPERABLE

DEMOLITION PLANS - MECHANICAL ENCLOSURE

HVAC REPLACEMENT

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

KEY NOTES

1. REMOVE EXISTING UNIT VENTILATOR AND ALL RELATED COMPONENTS, CONTROLS, ETC. COORDINATE WITH MECHANICAL DRAWINGS, TYP.
2. REMOVE EXISTING OUTSIDE AIR LOUVER AND DUCT THRU WALL.
3. REMOVE (E) CARPET, VAT FLOORING AND MASTIC
4. REMOVE (E) FAN COIL UNIT
5. REMOVE EXISTING AIR COOLED CHILLER, PIPING AND CONTROLS
6. REMOVE EXISTING ICE STORAGE TANK
7. REMOVE EXISTING HYDRONIC BOILER, PIPING AND CONTROLS
8. REMOVE EXISTING PUMP, PIPING AND CONTROLS
9. REMOVE EXISTING EXPANSION TANK AND PIPING
10. REMOVE EXISTING AIR SEPARATOR AND PIPING
11. REMOVE EXISTING PIPING AND SUPPORT
12. REMOVE AND DISPOSE OF (E) CMU WALLS, INCLUDING CONCRETE FOUNDATION AND CHAIN-LINK FENCE ON TOP OF WALL. COORDINATE DEMOLITION WITH REMOVAL OF CHILLER EQUIPMENT TIME FRAME
13. REMOVE AND DISPOSE OF (E) EQUIPMENT CONCRETE HOUSEKEEPING PADS. COORDINATE DEMOLITION WITH REMOVAL OF CHILLER EQUIPMENT TIME FRAME
14. REMOVE AND DISPOSE OF (E) CONCRETE PAVING. COORDINATE DEMOLITION WITH REMOVAL OF CHILLER EQUIPMENT TIME FRAME
15. REMOVE AND DISPOSE OF (E) WOODEN FENCE AND GATE
16. REMOVE EXISTING RELIEF DAMPER LOUVER
17. REMOVE EXISTING SHEET METAL PIPE COVER, CONCRETE PAD, AND UTILITY PIPES CAP AND ABANDON REMAINING PIPES UNDERGROUND - SEE DETAIL 3/A3.11
18. REMOVE EXISTING CABINETS.

Owner:

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Project Name:

HVAC REPLACEMENT

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Sheet Title:

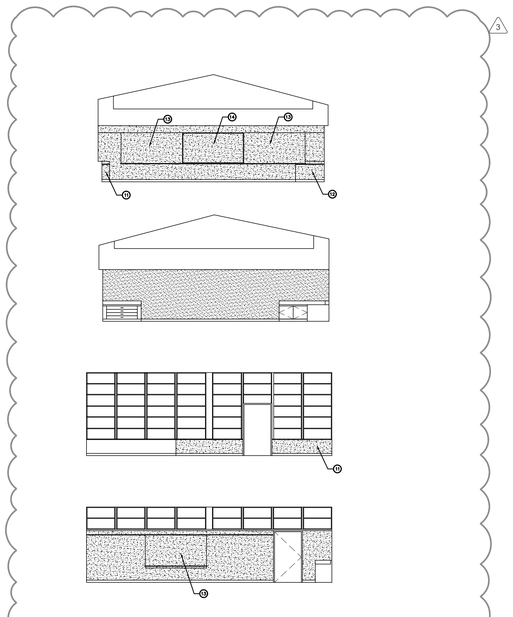
DEMOLITION PLANS
BUILDINGS D, E & MECH. ENCLOSURE

Job No.: **5524**

Sheet No.: **A2.11**

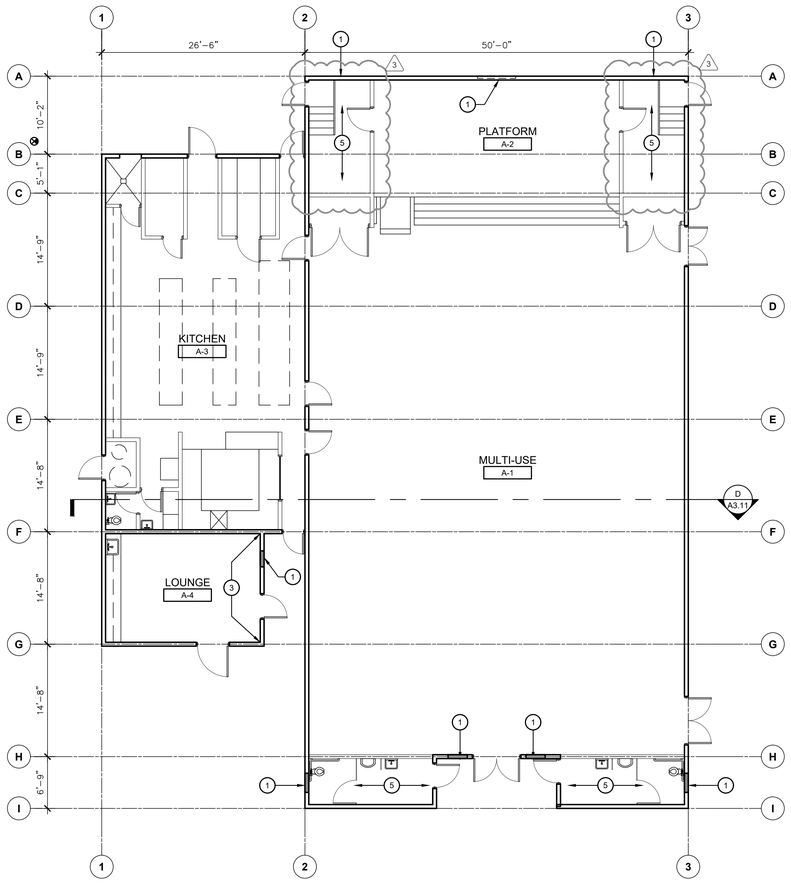
Release: ADDENDUM 3 (3) 11/28/22

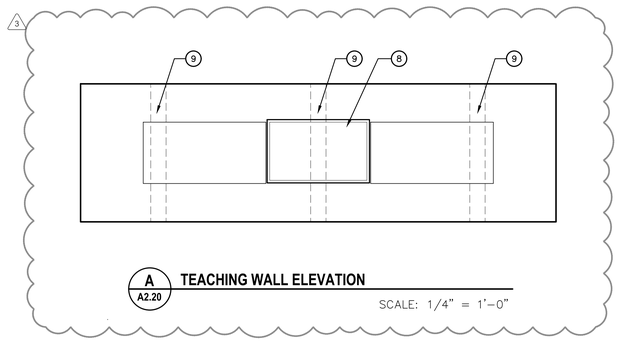
EXHIBIT 3-18



B A2.20 **TYP. CLASSROOM INTERIOR ELEVATIONS**

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





A A2.20 **TEACHING WALL ELEVATION**

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

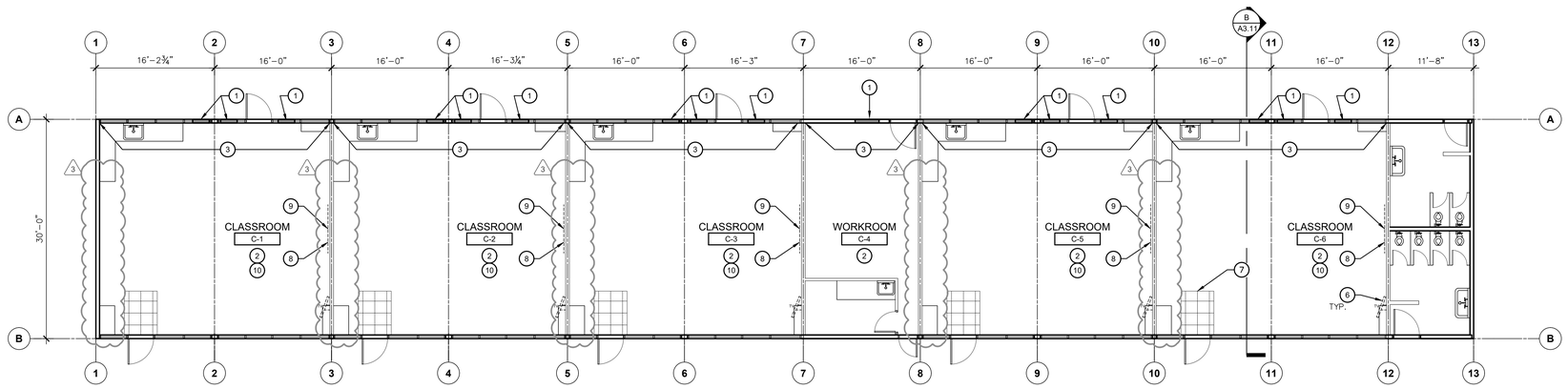
KEY NOTES

1. INFILL OPENING WITH WOOD STUDS, CEMENT PLASTER TO MATCH EXISTING ADJACENT COLOR AND TEXTURE ON THE OUTSIDE AND GYPSUM BOARD TO MATCH EXISTING ADJACENT THICKNESS, COLOR, AND TEXTURE ON THE INSIDE. PROVIDE R-19 BATT INSULATION. SEE 2/A3.11.
2. PROVIDE NEW CARPET AS PER SPECIFICATIONS - COLOR TO BE SELECTED BY OWNER.
3. PAINT WALL, WINDOW FRAME, COLUMN, DOOR FRAME AND DOOR - COLOR TO BE SELECTED BY OWNER.
4. NOT USED.
5. REMOVED EXISTING CEILING AND REPLACE WITH NEW T-BAR CEILING, -PER 1/A8.01.
6. (N) T.V. BRACKET, SEE DETAIL 14/A8.01. OWNER PROVIDED, OWNER INSTALLED.
7. PROVIDE NEW WALK-OFF MAT (C-1) PER SPECIFICATIONS SECTION 096813.
8. REMOVE (E) LCD TV MONITOR & SALVAGE FOR RELOCATION.
9. REMOVE PORTION OF (E) TACKBOARD, DRYWALL AND SHEATHING AS REQUIRED TO INSTALL NEW ELECTRICAL WORK. SEE ELEVATION 2/EO.O1. REPLACE DRYWALL AND SHEATHING TO MATCH (E) AND PUT BACK TACKLE BOARD.
10. NEW CHATFIELD CLARK CERES FOG TACKBOARD AS INDICATED ON WALL ELEVATIONS ON B/A2.20.
11. REMOVE (E) BOOKSHELF AND SALVAGE TO RE-INSTALLATION ON THE SAME LOCATION AFTER THE NEW TACKBOARD IS INSTALLED.
12. (E) MAGAZINE RACK.
13. (E) CHALKBOARD.
14. (E) LCD TV/MONITOR.

FLOOR PLANS - BUILDING A - IMPROVEMENTS

HVAC REPLACEMENT

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



FLOOR PLANS - BUILDING C - IMPROVEMENTS

HVAC REPLACEMENT

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

EXHIBIT 3-19

G:\2022frs\22-5524 BCSD Munsey ES\Sheets\5524-A2.20 FLOOR PLANS.dwg FRANK AYALA 2/5/24

Owner:

BAKERSFIELD CITY SCHOOL DISTRICT
1300 BAKER STREET
BAKERSFIELD, CA 93305

Project Name:

HVAC REPLACEMENT

Project Address:

MUNSEY ELEMENTARY SCHOOL
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Sheet Title:

FLOOR PLANS
IMPROVEMENTS
BUILDINGS A & C

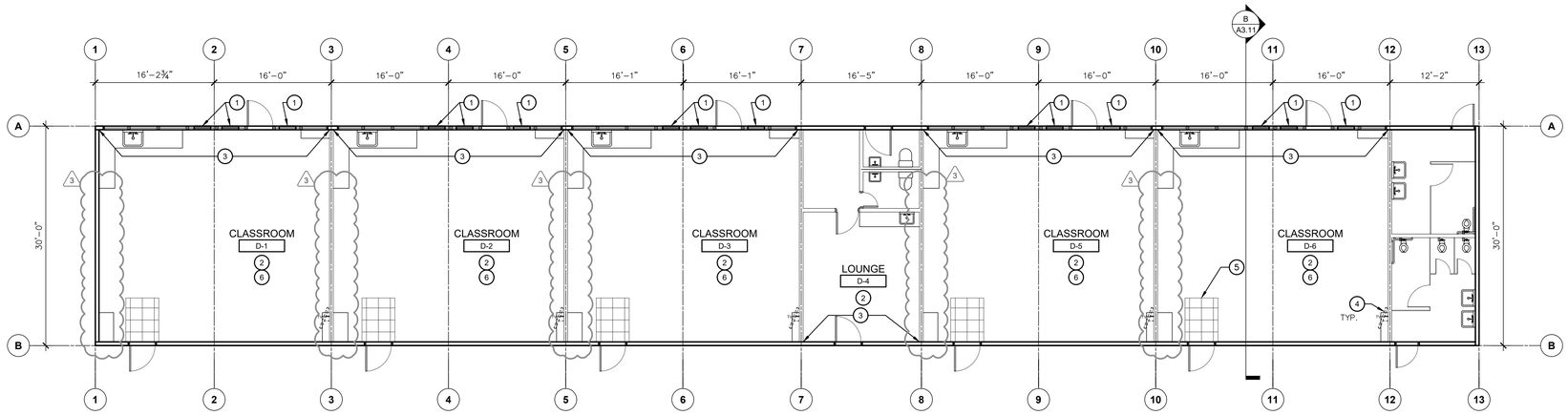
Job No.: **5524**

Sheet No.: **A2.20**

Release: ADDENDUM 3 △3 11/28/22

KEY NOTES (#)

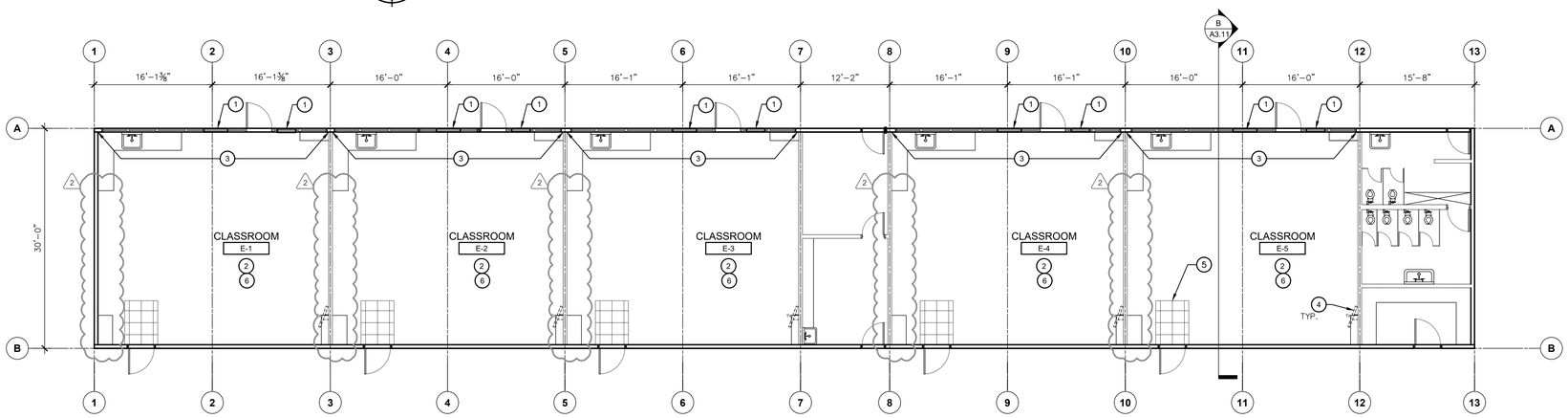
1. INFILL OPENING WITH WOOD STUDS, CEMENT PLASTER TO MATCH EXISTING ADJACENT COLOR AND TEXTURE ON THE OUTSIDE AND GYPSUM BOARD TO MATCH EXISTING ADJACENT THICKNESS, COLOR, AND TEXTURE ON THE INSIDE. PROVIDE R-19 BATT INSULATION. SEE DETAIL 2/A3.11
2. PROVIDE NEW CARPET AS PER SPECIFICATIONS - COLOR TO BE SELECTED BY OWNER
3. PAINT WALL, WINDOW FRAME, COLUMN, DOOR FRAME AND DOOR - COLOR TO BE SELECTED BY OWNER.
4. (N) T.V. BRACKET, SEE DETAIL 14/A8.01. OWNER PROVIDED, OWNER INSTALLED.
5. PROVIDE NEW WALK-OFF MAT (C-1) PER SPECIFICATIONS SECTION 096813.
6. NEW CHATFIELD CLARK CERES FOG TACKBOARD AS INDICATED ON WALL ELEVATIONS ON B/A2.20.



FLOOR PLANS - BUILDING D - IMPROVEMENTS

HVAC REPLACEMENT

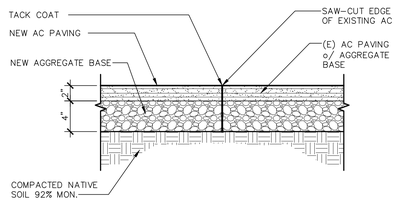
SCALE: 1/8" = 1'-0"



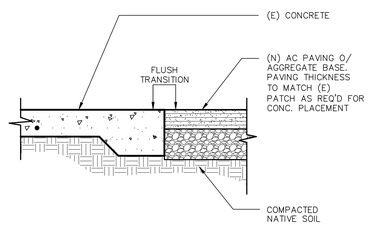
FLOOR PLANS - BUILDING E - IMPROVEMENTS

HVAC REPLACEMENT

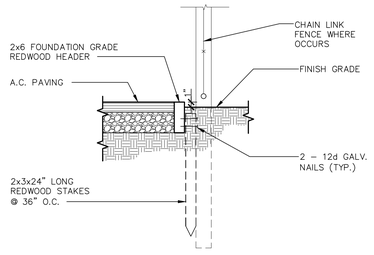
SCALE: 1/8" = 1'-0"



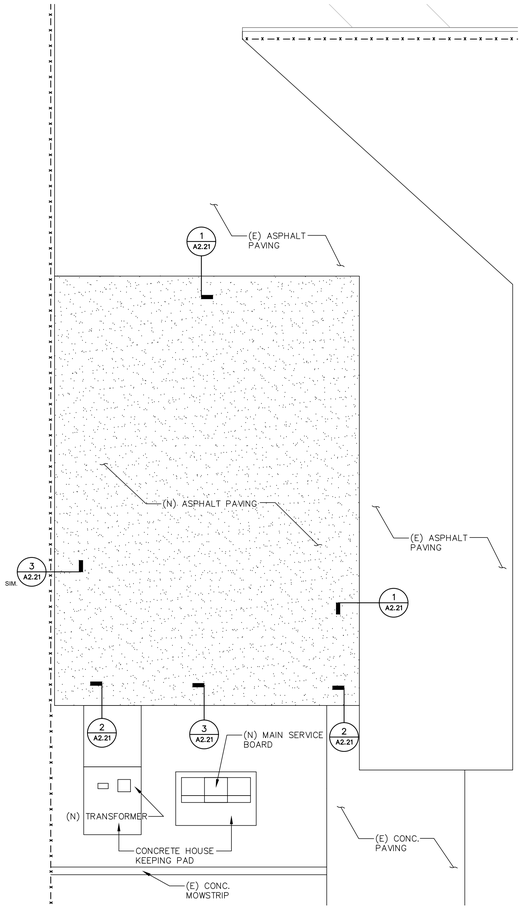
1 / A2.21 NEW TO EXISTING A.C. PAVING — ADS100-07 — SCALE: 1 1/2" = 1'-0"



2 / A2.21 (E) CONC WALK TO (N) AC PAVING — ADS100-27 — SCALE: 1 1/2" = 1'-0"



3 / A2.21 REDWOOD HEADER EDGING — ADS100-17 — SCALE: 1" = 1'-0"



A

PARTIAL SITE PLAN

HVAC REPLACEMENT

EXHIBIT 3-20

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

G:\2022frs\22-5524 BCSD Munsey ES\Sheets\5524-A2.21 FLOOR PLANS.dwg FRANK AYALA 2/5/24

Owner:

BAKERSFIELD CITY SCHOOL DISTRICT
1300 BAKER STREET
BAKERSFIELD, CA 93305

Project Name:

HVAC REPLACEMENT

Project Address:

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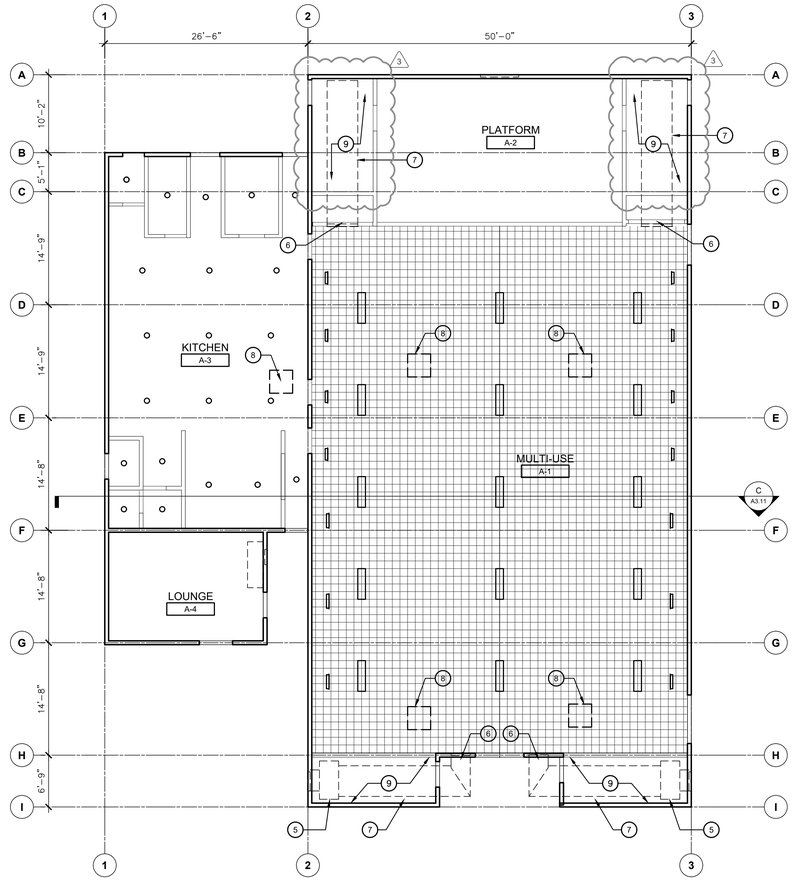
FLOOR PLANS IMPROVEMENTS
BUILDINGS D & E

Job No.: **5524**

Sheet No.: **A2.21**

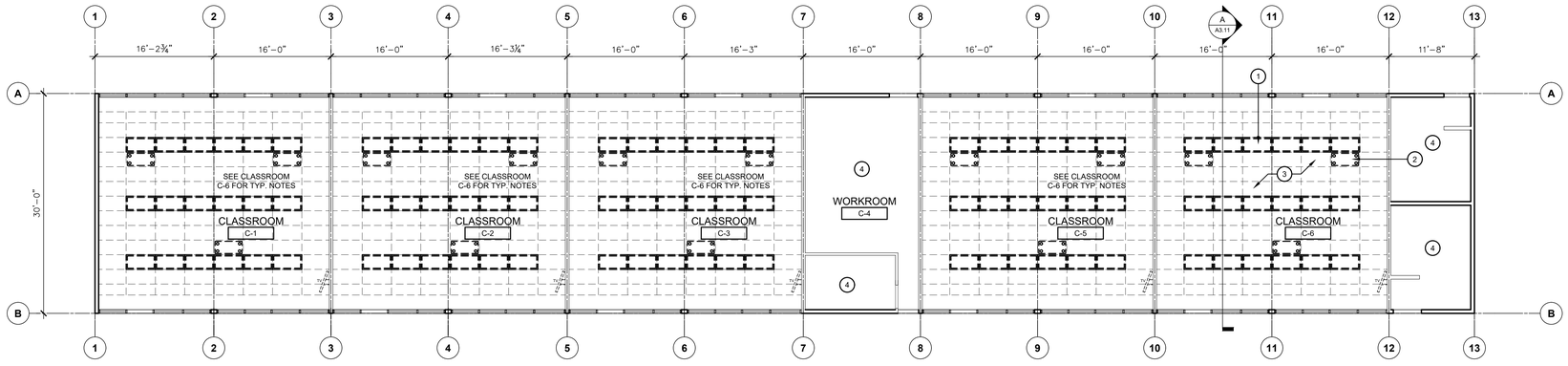
Release ADDENDUM 3/3 11/28/22



DEMO REFLECTED CEILING PLAN - BUILDING A

HVAC REPLACEMENT

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



DEMO REFLECTED CEILING PLAN - BUILDING C

HVAC REPLACEMENT

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

KEY NOTES (#)

1. REMOVE (E) FLUORESCENT LIGHT FIXTURES
2. REMOVE (E) IONIZERS AND SALVAGE FOR RELOCATION. SEE SHEET A6.20 FOR NEW LOCATION.
3. REMOVE (E) SUSPENDED ACOUSTICAL CEILING. SPEAKERS, PROJECTORS, STROBE LIGHTS, SENSORS, ETC. SHALL BE SALVAGED FOR RELOCATION. THE DISTRICT WILL SELECT THE ITEMS TO BE RELOCATED.
4. NO WORK IN THIS ROOM
5. REMOVE (E) FAN COIL AND ALL RELATED COMPONENTS, PIPING CONTROLS , RTC.
6. REMOVE (E) WALL GRILL AND PATCH OPENING TO MATCH (E) ADJACENT SURFACES
7. REMOVE (E) DUCTWORK
8. REMOVE PORTION OF (E) ACCOUSTICAL TILES OVER 5/8" GYP. BOARD AS REQUIRED TO INSTALL NEW DUCTWORK - SEE MECHANICAL DRAWING FOR ADDITIONAL INFORMATION.
9. REMOVE EXISTING HARD CEILING.

GENERAL NOTES

LEGEND

EXHIBIT 3-21

Owner:

BAKERSFIELD CITY SCHOOL DISTRICT
1300 BAKER STREET
BAKERSFIELD, CA 93305

Project Name:

HVAC REPLACEMENT

Project Address:

MUNSEY ELEMENTARY SCHOOL
3801 BRAVE AVENUE
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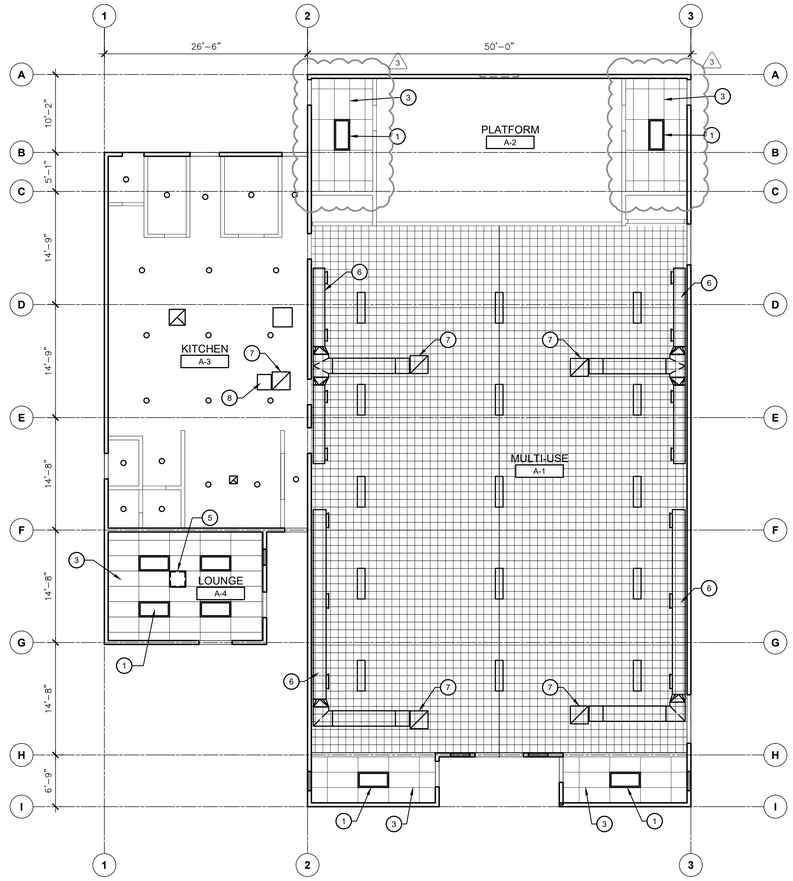
Sheet Title:

DEMO REFLECTED CEILING PLAN
BUILDINGS A & C

Job No.: **5524**

Sheet No.: **A6.10**

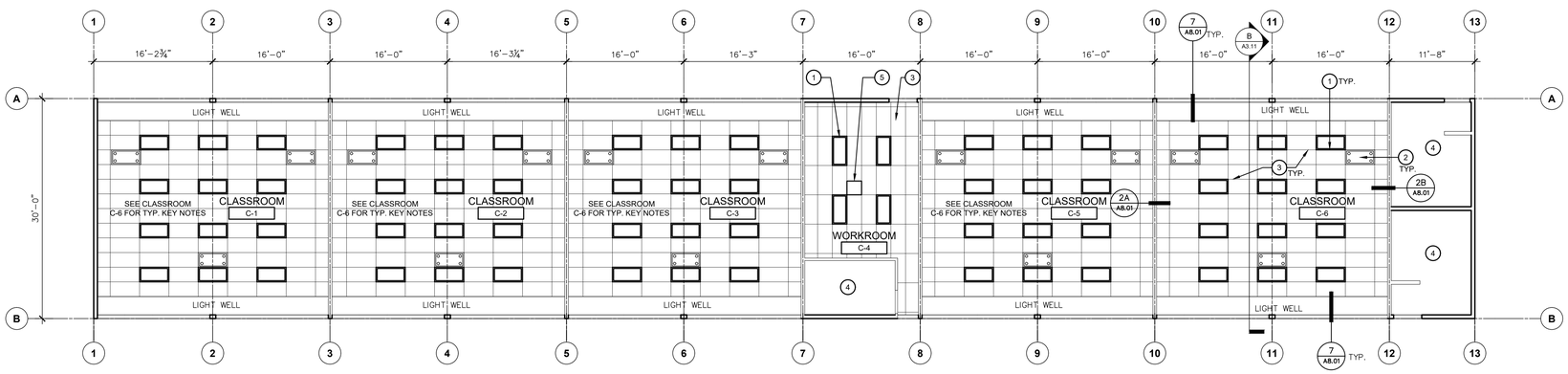
Release: ADDENDUM 3 (3) 11/28/23



REFLECTED CEILING PLAN - BUILDING A

HVAC REPLACEMENT

SCALE: 1/8" = 1'–0"



REFLECTED CEILING PLAN - BUILDING C

HVAC REPLACEMENT

SCALE: 1/8" = 1'–0"

KEY NOTES

1. INSTALL NEW LIGHT FIXTURES - SEE ELECTRICAL DRAWINGS FOR ADDITIONAL INFORMATION AND DETAIL 9/A8.01
2. REINSTALL SALVAGED IONIZERS PER DETAIL 11/A8.01 - SEE ELECTRICAL & MECHANICAL DRAWINGS FOR ADDITIONAL INFORMATION.
3. INSTALL A NEW SUSPENDED ACOUSTICAL TILE CEILING - SEE DETAIL 1/A8.01
4. NO WORK IN THIS ROOM
5. NEW INDOOR UNIT - SEE MECHANICAL DRAWINGS FOR ADDITIONAL INFORMATION AND DETAIL 11/M0.11
6. AIR SUPPLY DUCTWORK - SEE MECHANICAL SHEET M2.12 FOR ADDITIONAL INFORMATION.
7. RETURN AIR GRILL - SEE MECHANICAL DRAWINGS FOR SIZE, TYPE, ETC.
8. SUPPLY AIR GRILL - SEE MECHANICAL DRAWINGS FOR SIZE, TYPE, ETC.

GENERAL NOTES

LEGEND

EXHIBIT 3-22

Owner:

BAKERSFIELD CITY SCHOOL DISTRICT
1300 BAKER STREET
BAKERSFIELD, CA 93305

Project Name:

HVAC REPLACEMENT

Project Address:

MUNSEY ELEMENTARY SCHOOL
3801 BRAVE AVENUE
BAKERSFIELD, CA 93309

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LICENSED ARCHITECT CURTIS E. FINN No. C 29695 REN. 5-31-25 STATE OF CALIFORNIA

Sheet Title:

REFLECTED CEILING PLAN
BUILDINGS A & C

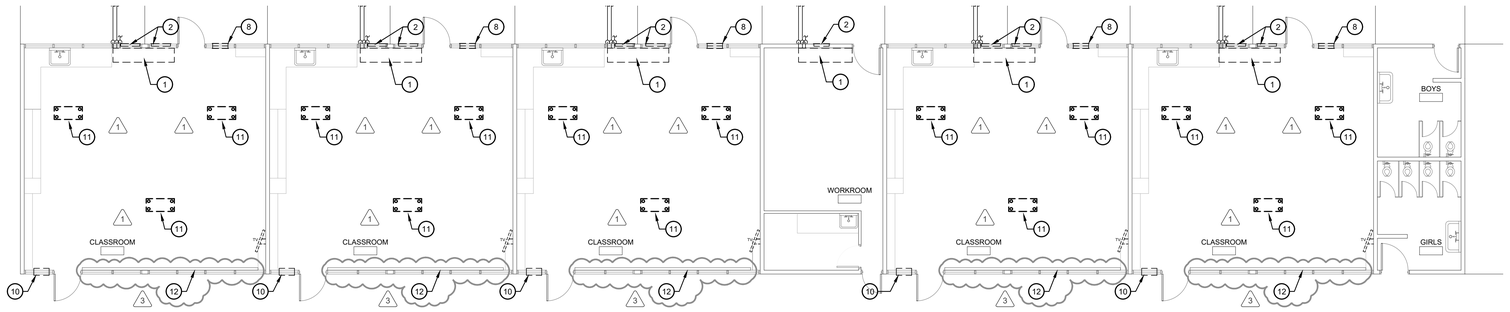
Job No.: **5524**

Sheet No.: **A6.20**

Release: ADDENDUM 3 11/28/22

2/5/24

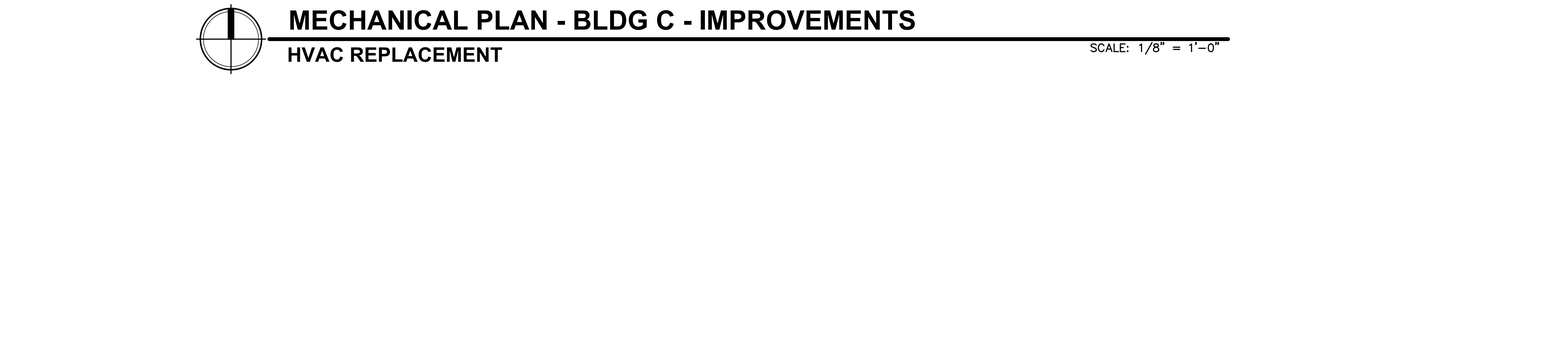
G:\2022\frs\22-5524 BCSD Munsey ES\Sheets\5524-A6.20 REFLECTED CEILING PLAN.dwg FRANK AYALA



MECHANICAL PLAN - BLDG C - DEMO

HVAC REPLACEMENT

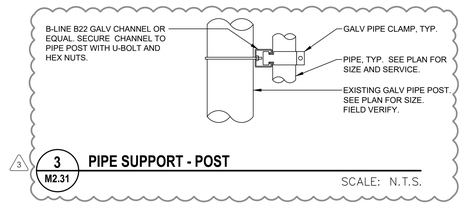
SCALE: 1/8" = 1'-0"



MECHANICAL PLAN - BLDG C - IMPROVEMENTS

HVAC REPLACEMENT

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



3 / M2.31 **PIPE SUPPORT - POST**

SCALE: N.T.S.

KEY NOTES

1. REMOVE EXISTING UNIT VENTILATOR AND ALL RELATED COMPONENTS, ETC. TYP. SALVAGE EMS CONTROLLERS AND/OR DEVICES AND DELIVER TO OWNER. REMOVE (E) PIPING TO 5 FEET OUTSIDE EXTERIOR WALL AND CAP, TYP.
2. REMOVE EXISTING OSA LOUVER AND DUCT THRU WALL. PATCH OPENINGS TO MATCH EXISTING, TYP.
3. AC UNIT ON ROOF WITH 18x14(L) SA PLENUM AND 26x12(L) RA PLENUM DROP THRU ROOF, BETWEEN EXISTING STRUCTURAL MEMBERS, TYP. PROVIDE TRANSITIONS AS NEEDED. FIELD VERIFY EXACT LOCATION. SEE 3/M0.11
4. INDOOR UNIT RECESSED IN CEILING SUSPENDED FROM STRUCTURE. PROVIDE 6" ROUND OSA DUCT THRU ROOF. TURNED DOWN WITH 1/4" ALUMINUM MESH. EXTEND REFRIGERANT PIPING TO OUTDOOR UNIT. SEE 11/M0.11
5. OUTDOOR UNIT ON ROOF. EXTEND REFRIGERANT PIPING TO INDOOR UNIT. SEE 12/M0.11
6. CONNECT 3/4" CD TO AC UNIT ON ROOF WITH TRAP PER 6/M0.11
7. INDOOR UNIT WITH INTEGRAL CONDENSATE PUMP. CONNECT 1" DRAIN TO INDOOR UNIT AND DISCHARGE TO TAILPIECE OF SINK. PATCH OPENINGS TO MATCH EXISTING.
8. REMOVE EXISTING RELIEF DAMPER LOUVER AT EXTERIOR WALL, PATCH OPENING TO MATCH EXISTING, TYP.
9. HVAC WIRELESS REPEATER. COORDINATE EXACT LOCATION WITH OWNER. PROVIDE 120/1 WALL OUTLET.
10. (3) REMOVE EXISTING BAROMETRIC RELIEF ASSEMBLY IN WALL, TYP. SEE 2/A2.10 FOR INFILL.
11. (3) EXISTING T-BAR CEILING TO BE REMOVED AND REPLACED. SEE ARCH. PLANS. DISCONNECT AND REMOVE ALL EXISTING CEILING IONIZERS. CLEAN IONIZERS AND RE-INSTALL IN NEW CEILING AS CLOSE AS POSSIBLE TO EXISTING LOCATION, TYP.
12. (3) REMOVE ABANDONED HOT WATER RADIATOR HEATER ON WALL AND ASSOCIATED CONTROLS. CAP PIPING BEHIND FINISH SURFACES. PATCH SURFACES PER 1/A2.10.
13. P.O.C. NEW 1" CD TO (E) 2" CD BELOW GRADE. FIELD VERIFY SIZE, DEPTH, AND LOCATION OF EXISTING PIPING. CONTRACTOR SHALL POTHOLE AND DETERMINE IF ANY CONFLICT EXISTS WITH NEW INSTALLATION AT POINT OF CONNECTION AND ALONG NEW ROUTE AHEAD OF CONSTRUCTION.

EXHIBIT 3-23

Owner:

BAKERSFIELD CITY SCHOOL DISTRICT
1300 BAKER STREET
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Project Name:

HVAC REPLACEMENT

Project Address:

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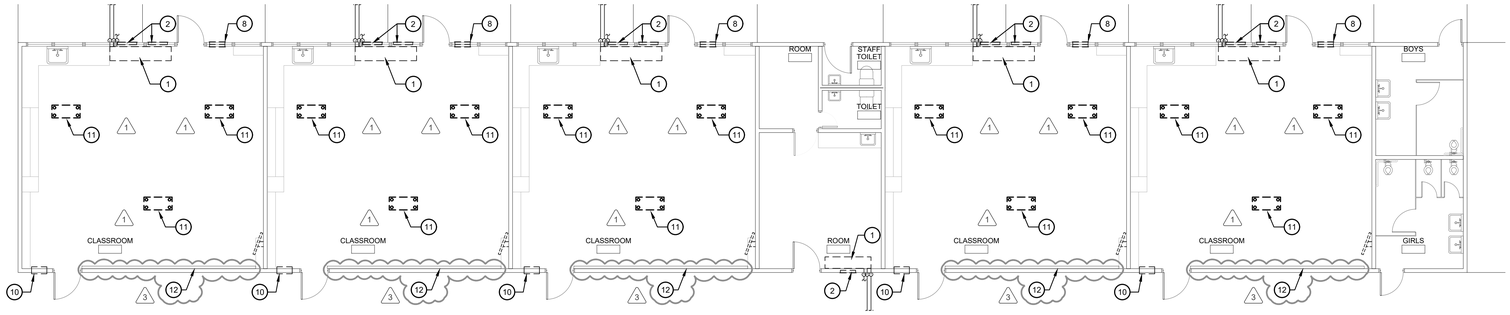
Sheet Title:

MECHANICAL PLAN - BLDG C

Job No.: **5524**

Sheet No.: **M2.31**

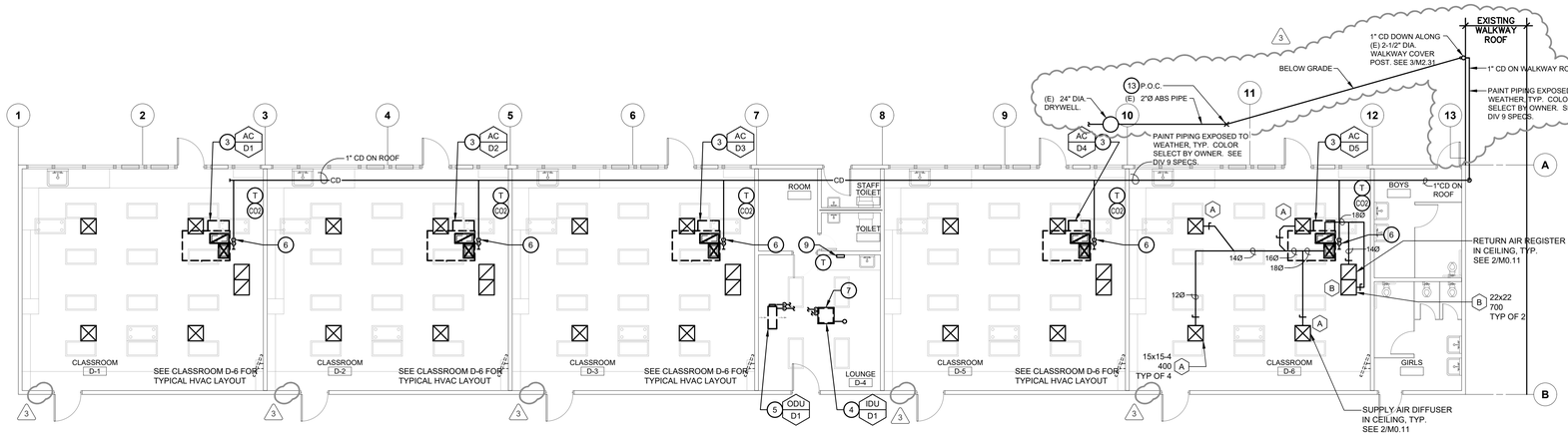
Release: ADDENDUM 3 (3) 11/28/22



MECHANICAL PLAN - BLDG D - DEMO

HVAC REPLACEMENT

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



MECHANICAL PLAN - BLDG D - IMPROVEMENTS

HVAC REPLACEMENT

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

KEY NOTES

1. REMOVE EXISTING UNIT VENTILATOR AND ALL RELATED COMPONENTS, ETC, TYP. SALVAGE EMS CONTROLLERS AND/OR DEVICES AND DELIVER TO OWNER. REMOVE (E) PIPING TO 5 FEET OUTSIDE EXTERIOR WALL AND CAP, TYP.
2. REMOVE EXISTING OSA LOUVER AND DUCT THRU WALL. PATCH OPENINGS TO MATCH EXISTING, TYP.
3. AC UNIT ON ROOF WITH 18x14(L) SA PLENUM AND 26x11(L) RA PLENUM DROP THRU ROOF, BETWEEN EXISTING STRUCTURAL MEMBERS, TYP. PROVIDE TRANSITIONS AS NEEDED. FIELD VERIFY EXACT LOCATION. SEE 3/M0.11
4. INDOOR UNIT RECESSED IN CEILING SUSPENDED FROM STRUCTURE. PROVIDE 6" ROUND OSA DUCT THRU ROOF. TURNED DOWN WITH 1/4" ALUMINUM MESH. EXTEND REFRIGERANT PIPING TO OUTDOOR UNIT. SEE 11/M0.11
5. OUTDOOR UNIT ON ROOF. EXTEND REFRIGERANT PIPING TO INDOOR UNIT. SEE 12/M0.11
6. CONNECT 3/4" CD TO AC UNIT ON ROOF WITH TRAP PER 6/M0.11
7. INDOOR UNIT WITH INTEGRAL CONDENSATE PUMP. CONNECT 1" DRAIN TO INDOOR UNIT AND DISCHARGE TO TAILPIECE OF SINK. PATCH OPENINGS TO MATCH EXISTING.
8. REMOVE EXISTING RELIEF DAMPER LOUVER AT EXTERIOR WALL, PATCH OPENING TO MATCH EXISTING, TYP.
9. HVAC WIRELESS REPEATER. COORDINATE EXACT LOCATION WITH OWNER. PROVIDE 120/1 WALL OUTLET.
10. REMOVE EXISTING BAROMETRIC RELIEF ASSEMBLY IN WALL, TYP. SEE 2/A2.10 FOR INFILL.
11. EXISTING T-BAR CEILING TO BE REMOVED AND REPLACED. SEE ARCH. PLANS. DISCONNECT AND REMOVE ALL EXISTING CEILING IONIZERS. CLEAN IONIZERS AND RE-INSTALL IN NEW CEILING AS CLOSE AS POSSIBLE TO EXISTING LOCATION, TYP.
12. REMOVE ABANDONED HOT WATER RADIATOR HEATER ON WALL AND ASSOCIATED CONTROLS. CAP PIPING BEHIND FINISH SURFACES. PATCH SURFACES PER 1/A2.10.
13. P.O.C. NEW 1" CD TO (E) 2" CD BELOW GRADE. FIELD VERIFY SIZE, DEPTH, AND LOCATION OF EXISTING PIPING. CONTRACTOR SHALL POTHOLE AND DETERMINE IF ANY CONFLICT EXISTS WITH NEW INSTALLATION AT POINT OF CONNECTION AND ALONG NEW ROUTE AHEAD OF CONSTRUCTION.

Owner:

BAKERSFIELD CITY SCHOOL DISTRICT
1300 BAKER STREET
BAKERSFIELD, CA 93305

Project Name:

HVAC REPLACEMENT

Project Address:

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Sheet Title:

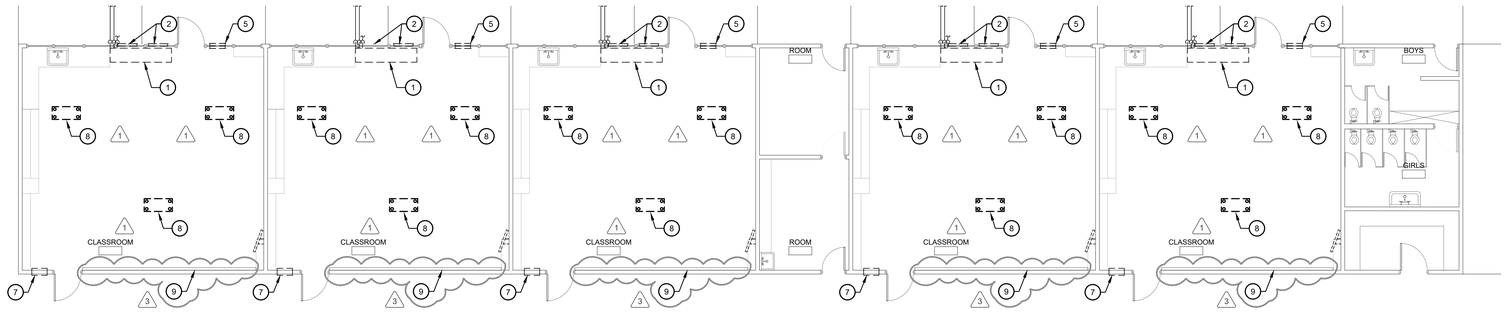
MECHANICAL PLAN - BLDG D

Job No.: **5524**

Sheet No.: **M2.41**

Release: ADDENDUM 3 — 11/28/22

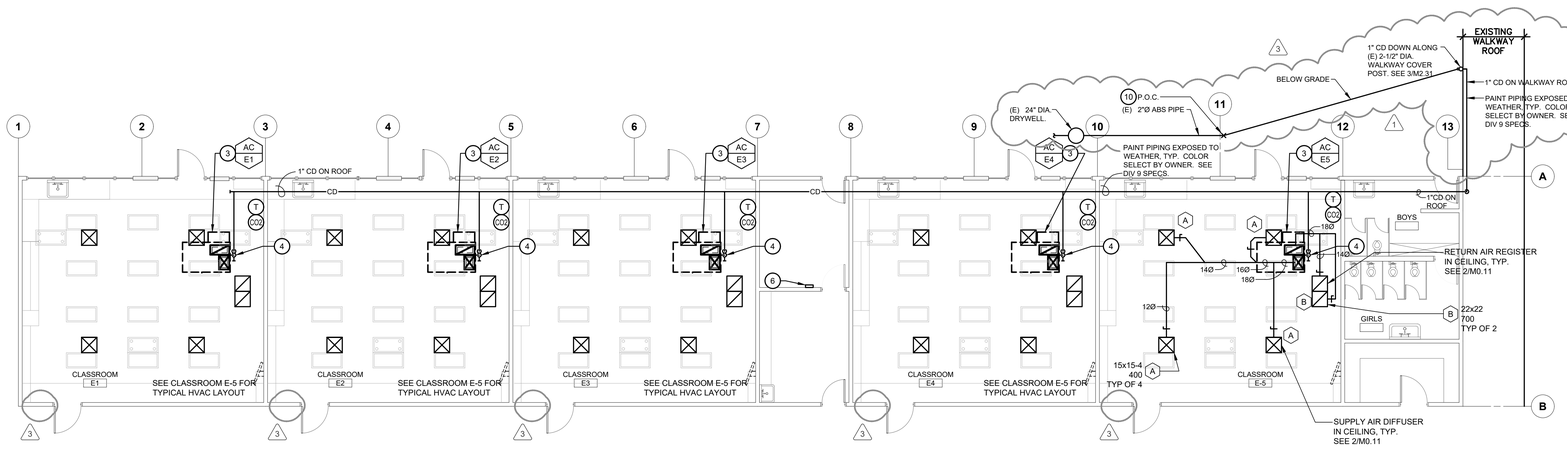
EXHIBIT 3-24



MECHANICAL PLAN - BLDG E - DEMO

HVAC REPLACEMENT

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



MECHANICAL PLAN - BLDG E - IMPROVEMENTS

HVAC REPLACEMENT

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

KEY NOTES

1. REMOVE EXISTING UNIT VENTILATOR AND ALL RELATED COMPONENTS, ETC, TYP. SALVAGE EMS CONTROLLERS AND/OR DEVICES AND DELIVER TO OWNER. REMOVE (E) PIPING TO 5 FEET OUTSIDE EXTERIOR WALL AND CAP, TYP.
2. REMOVE EXISTING OSA LOUVER AND DUCT THRU WALL. PATCH OPENINGS TO MATCH EXISTING, TYP.
3. AC UNIT ON ROOF WITH 18x14(L) SA PLENUM AND 26x12(L) RA PLENUM DROP THRU ROOF, BETWEEN EXISTING STRUCTURAL MEMBERS, TYP. PROVIDE TRANSITIONS AS NEEDED. FIELD VERIFY EXACT LOCATION. SEE 3/M0.11
4. CONNECT 3/4" CD TO AC UNIT ON ROOF WITH TRAP PER 6/M0.11
5. REMOVE EXISTING RELIEF DAMPER LOUVER AT EXTERIOR WALL, PATCH OPENING TO MATCH EXISTING, TYP.
6. HVAC WIRELESS REPEATER. COORDINATE EXACT LOCATION WITH OWNER. PROVIDE 120/1 WALL OUTLET.
7. REMOVE EXISTING BAROMETRIC RELIEF ASSEMBLY IN WALL, TYP. SEE 2/A2.10 FOR INFILL.
8. EXISTING T-BAR CEILING TO BE REMOVED AND REPLACED. SEE ARCH. PLANS. DISCONNECT AND REMOVE ALL EXISTING CEILING IONIZERS. CLEAN IONIZERS AND RE-INSTALL IN NEW CEILING AS CLOSE AS POSSIBLE TO EXISTING LOCATION, TYP.
9. REMOVE ABANDONED HOT WATER RADIATOR HEATER ON WALL AND ASSOCIATED CONTROLS. CAP PIPING BEHIND FINISH SURFACES. PATCH SURFACES PER 1/A2.10.
10. P.O.C. NEW 1" CD TO (E) 2" CD BELOW GRADE. FIELD VERIFY SIZE, DEPTH, AND LOCATION OF EXISTING PIPING. CONTRACTOR SHALL POTHOLE AND DETERMINE IF ANY CONFLICT EXISTS WITH NEW INSTALLATION AT POINT OF CONNECTION AND ALONG NEW ROUTE AHEAD OF CONSTRUCTION.

Owner:

BAKERSFIELD CITY SCHOOL DISTRICT
1300 BAKER STREET
BAKERSFIELD, CA 93305

Project Name:

HVAC REPLACEMENT

Project Address:

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3801 BRAVE AVENUE
BAKERSFIELD, CA 93309

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REGISTERED PROFESSIONAL ENGINEER
LISA LUM
32712
Exp. 6-30-24
MECHANICAL
STATE OF CALIFORNIA

Sheet Title:

MECHANICAL PLAN - BLDG E

Job No.:

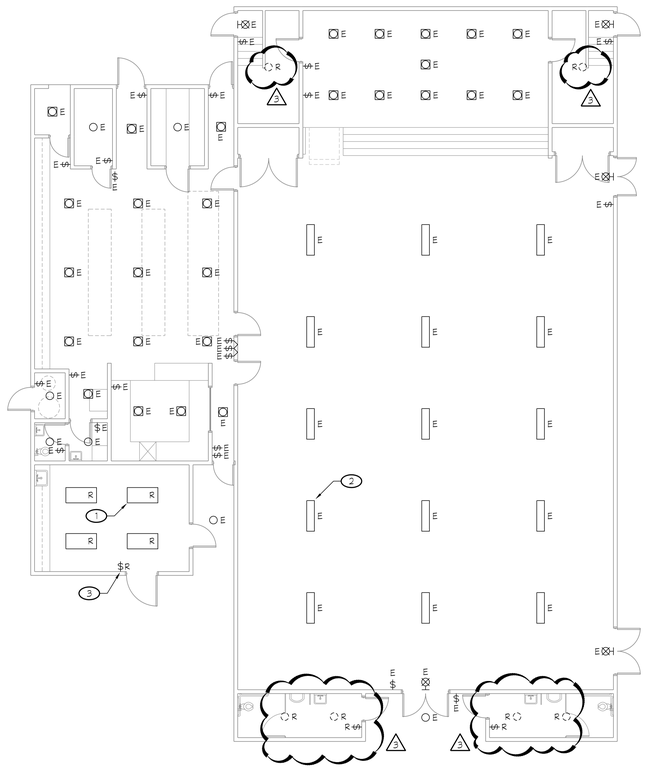
5524

Sheet No.:

M2.51

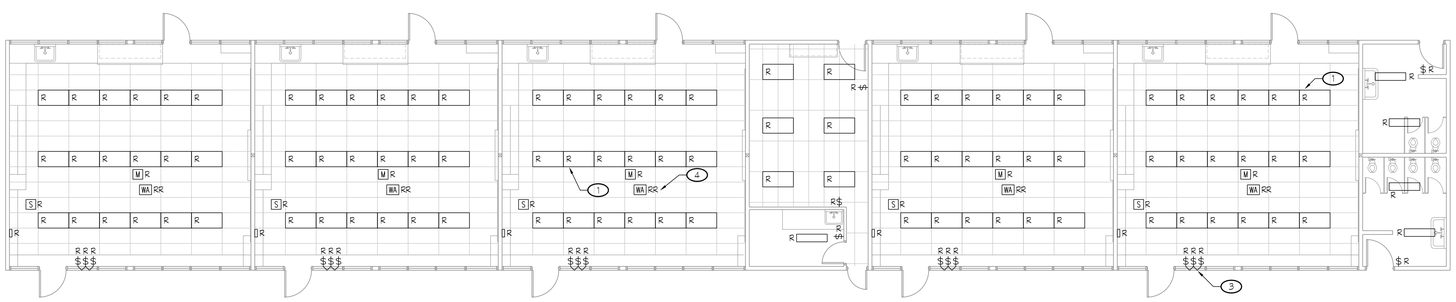
Release: ADDENDUM 3 11/28/22

EXHIBIT 3-25



DEMOLITION LIGHTING PLAN - BUILDING "A"
CENTRAL PLANT REPLACEMENT

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



DEMOLITION LIGHTING PLAN - BUILDING "C"
CENTRAL PLANT REPLACEMENT

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

NOTES (THIS SHEET ONLY):

1. TYPICAL OF ELECTRICAL DEVICES, KEYNOTED WITH SUBSCRIPT 'R': DISCONNECT AND REMOVE EXISTING DEVICE INCLUDING CIRCUIT WIRING AND CONDUIT TO SOURCE OF SUPPLY OR REMAINING FEEDING DEVICE, U.O.N..
2. TYPICAL OF EXISTING ELECTRICAL DEVICES, KEYNOTED WITH SUBSCRIPT 'E', U.O.N.. EXISTING DEVICE TO REMAIN. RECONNECT TO EXISTING CIRCUIT AS REQUIRED FOR ANY UPSTREAM DEVICES REMOVED.
3. EXISTING SWITCH LOCATION SHALL BE REUSED WITH NEW CONTROL DEVICES AS SHOWN ON NEW CONTROLS AND LIGHTING LAYOUTS. TYPICAL FOR ALL SWITCH LOCATIONS.
4. TYPICAL OF ELECTRICAL DEVICES, KEYNOTED WITH SUBSCRIPT 'RR' REMOVE AND RELOCATED EXISTING DEVICE IN SIMILAR LOCATION, ADJUST WIRING AND CONDUIT TO RECONNECT TO REPLACED DEVICE AS REQUIRED TO CLEAR WAY FOR NEW CONSTRUCTION.

Owner:

BAKERSFIELD CITY SCHOOL DISTRICT
1300 BAKER STREET
BAKERSFIELD, CA 93309

Project Name:

CENTRAL PLANT REPLACEMENT

Project Address:

MUNSEY ELEMENTARY SCHOOL
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BAKERSFIELD, CA 93309

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Sheet Title:

DEMOLITION LIGHTING PLANS BUILDINGS "A &C"

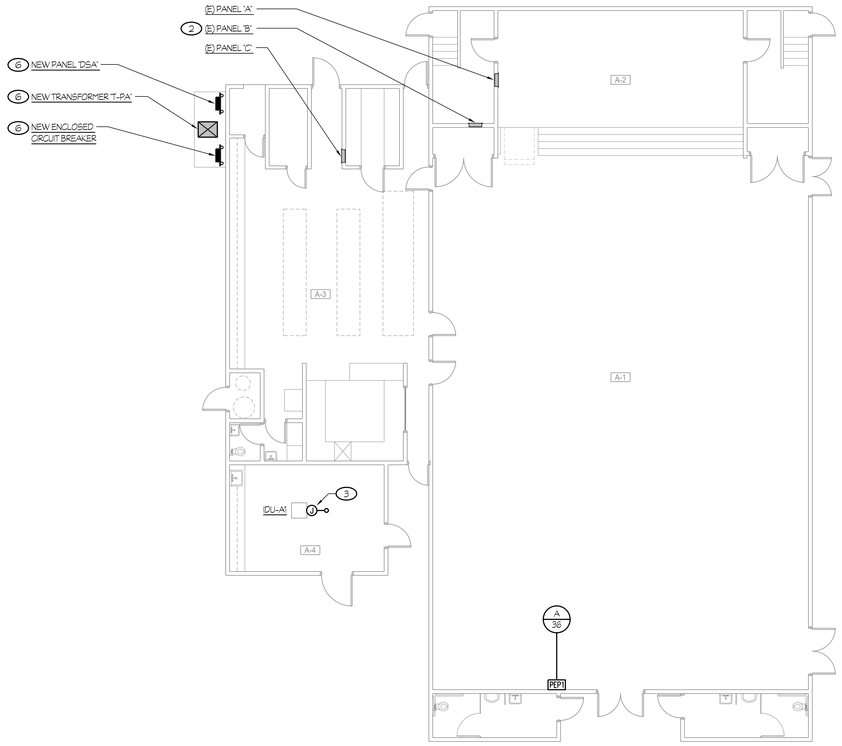
Job No.: **5524**

Sheet No.: E2.02

Release: ADDENDUM #3 (3) Issue Date: 01-17-2024

EXHIBIT 3-26

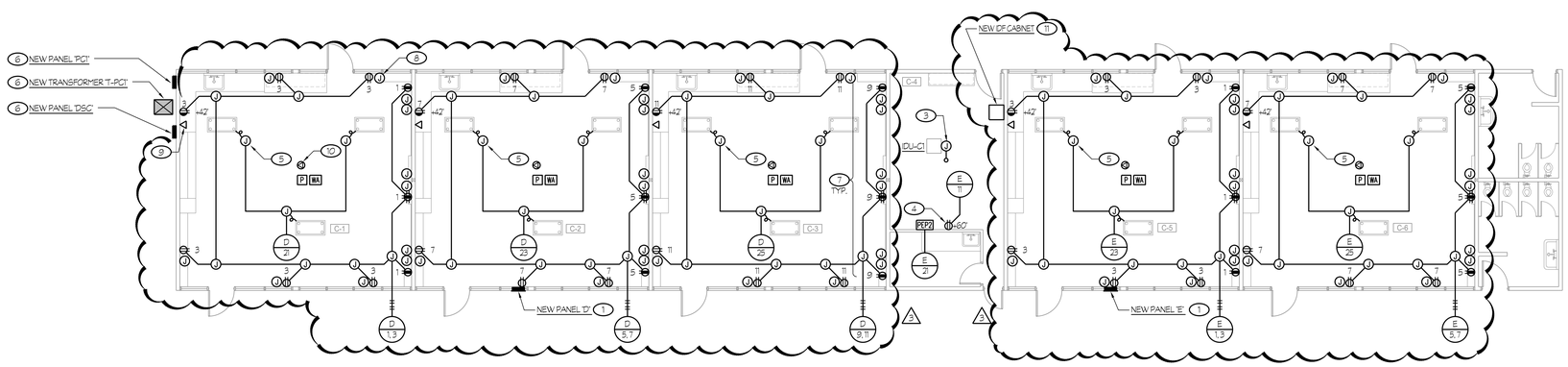
Rose Sing Eastham & Associates
Electrical Consultants
131 S. Dunworth - (559)733-2671
Visalia, California 93292-6705



NEW POWER PLAN - BUILDING "A"

CENTRAL PLANT REPLACEMENT

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



NEW POWER PLAN - BUILDING "C"

CENTRAL PLANT REPLACEMENT

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

NOTES (THIS SHEET ONLY):

1. REPLACE EXISTING PANEL WITH NEW PANEL PER ONE-LINE DIAGRAM. EXISTING CIRCUIT SHALL BE RECONNECTED, WALL SHALL BE PATCHED AND REPAIRED AS REQUIRED. REFER TO DETAIL #6/E5.00 FOR MOUNTING REQUIREMENTS.
2. EXISTING PANEL (INSTALLED UNDER DSA #52427) SHALL BE RECONNECTED TO NEW FEED AS REQUIRED.
3. PROVIDE 3/4"C - 2 #12 + 1 #12 TO ROOF TOP UNIT FOR POWER CONNECTION AS REQUIRED. REFER TO DETAIL #2/E5.01.
4. COORDINATE EXACT LOCATION OF RECEPTACLE WITH MECHANICAL CONTROLLER AS REQUIRED.
5. RECONNECT EXISTING MECHANICAL EQUIPMENT. EXTEND EXISTING CIRCUIT AS REQUIRED. TYPICAL.
6. REFER TO ONE-LINE DIAGRAM, SHEET #E4.01 AND DETAIL #9 / E5.00 FOR ADDITIONAL INFORMATION.
7. REFER TO DETAIL #2/E0.01 FOR TYPICAL TEACHER WALL ELEVATION.
8. PROVIDE 3/4" CONDUIT TO ACCESSIBLE CEILING SPACE.
9. PROVIDE 3/4" CONDUIT, (2) PORT DATA OUTLETS, AND (2) CAT6 CABLES TO IDF CABINET.
10. PROVIDE (4) CAT6 DATA CABLES WITH RJ-45 TERMINATION ABOVE THE CEILING WITH 30' OF SPARE LENGTH.
11. REPLACE EXISTING CABINET WITH NEW IDF CABINET. REFER TO DETAIL #3/E5.01 FOR MOUNTING REQUIREMENTS. RECONNECT EXISTING FIBER OPTIC CABLES IN NEW FIBER PATCH PANEL. PROVIDE NEW PATCH PANEL FOR COPPER CONNECTIONS AS REQUIRED.

GENERAL NOTES

1. EXISTING RECEPTACLES SHALL REMAIN INCLUDING RESPECTIVE CIRCUITS.
2. REFER TO DETAILS ON SHEET #E5.01 FOR CONDUIT MOUNTING REQUIREMENTS.

ROOM LEGEND	
#	ROOM NAME
A-1	MULTI-USE
A-2	PLATFORM
A-3	KITCHEN
A-4	LOUNGE

ROOM LEGEND	
#	ROOM NAME
C-1	CLASSROOM
C-2	CLASSROOM
C-3	CLASSROOM
C-4	WORKROOM
C-5	CLASSROOM
C-6	CLASSROOM

EXHIBIT 3-27

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REGISTERED PROFESSIONAL ENGINEER
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Exp. 6/30/25
ELECTRICAL
STATE OF CALIFORNIA

Owner:

BAKERSFIELD CITY SCHOOL DISTRICT
1300 BAKER STREET
BAKERSFIELD, CA 93309

Project Name:

CENTRAL PLANT REPLACEMENT

Project Address:

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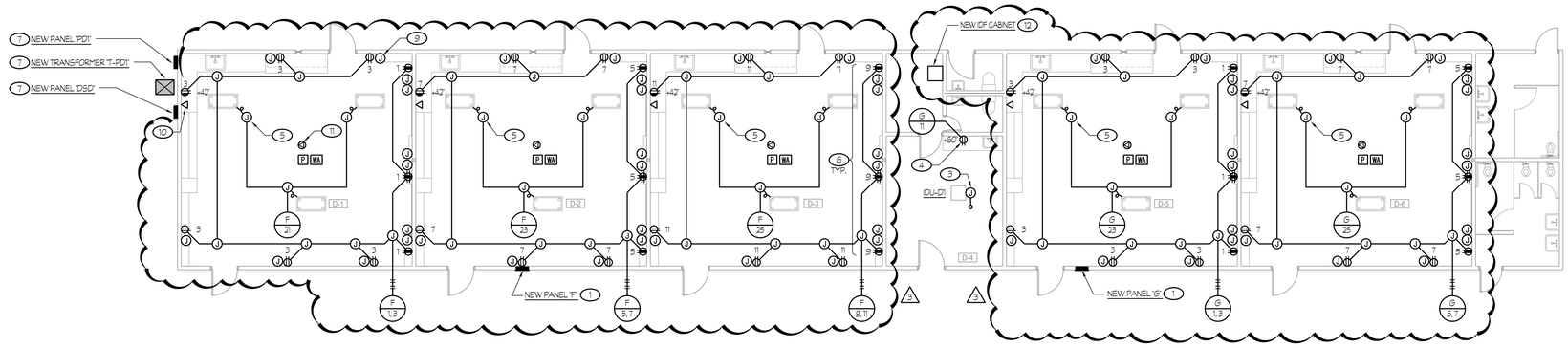
NEW POWER PLANS BUILDINGS "A &C"

Job No.: **5524**

Sheet No.: E2.10

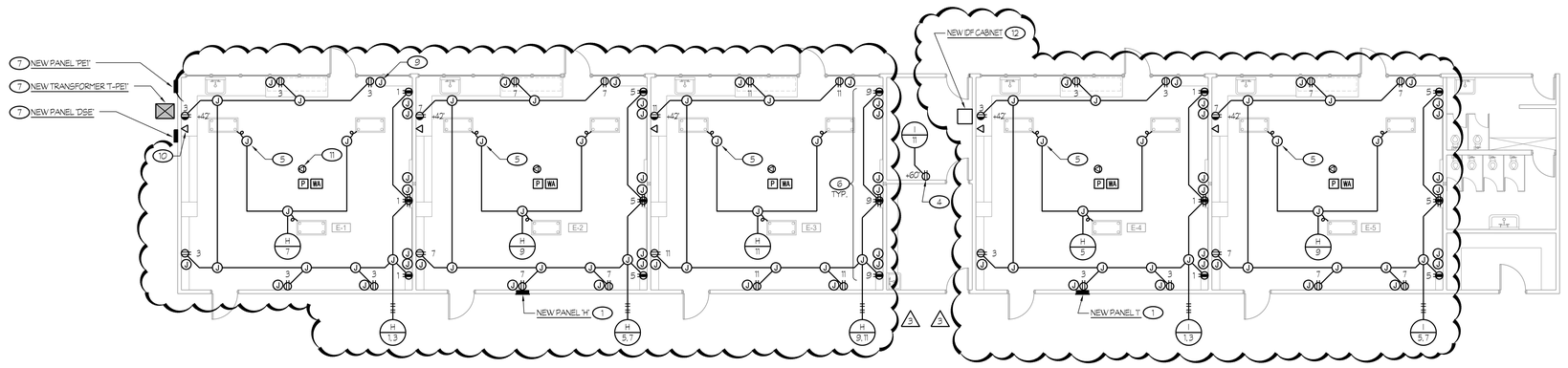
Release: ADDENDUM #3 (3) Issue Date: 01-17-2024



1 NEW POWER PLAN - BUILDING "D"

CENTRAL PLANT REPLACEMENT

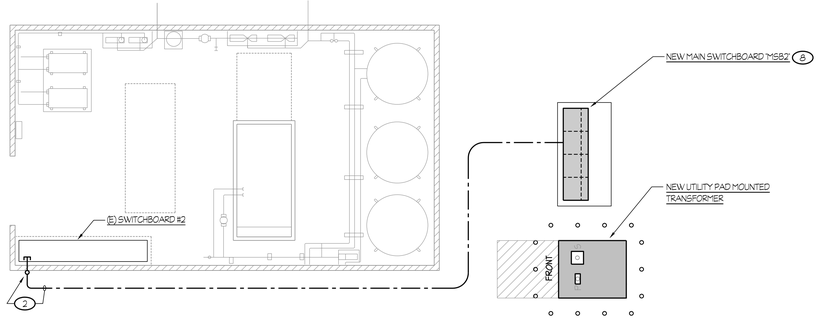
SCALE: 1/8" = 1'-0"



2 NEW POWER PLAN - BUILDING "E"

CENTRAL PLANT REPLACEMENT

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



3 NEW POWER PLAN - MECHANICAL ENCLOSURE

CENTRAL PLANT REPLACEMENT

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

NOTES (THIS SHEET ONLY):

1. REPLACE EXISTING PANEL WITH NEW PANEL PER ONE-LINE DIAGRAM. EXISTING CIRCUIT SHALL BE RECONNECTED, WALL SHALL BE PATCHED AND REPAIRED AS REQUIRED. REFER TO DETAIL #6/E5.00 FOR MOUNTING REQUIREMENTS.
2. PROVIDE TEMPORARY FEED TO EXISTING SWITCHBOARD FOR OPERATION DURING CONSTRUCTION ACTIVITIES. REFER TO ONE LINE DIAGRAM, SHEET #E4.01.
3. PROVIDE 3/4"C - 2 #12 + 1 #12 TO ROOF TOP UNIT FOR POWER CONNECTION AS REQUIRED. REFER TO DETAIL #2/E5.01.
4. COORDINATE EXACT LOCATION OF RECEPTACLE WITH MECHANICAL CONTROLLER AS REQUIRED.
5. RECONNECT EXISTING MECHANICAL EQUIPMENT. EXTEND EXISTING CIRCUIT AS REQUIRED. TYPICAL.
6. REFER TO DETAIL #2/E0.01 FOR TYPICAL TEACHER WALL ELEVATION.
7. REFER TO ONE-LINE DIAGRAM, SHEET #E4.01 AND DETAIL #9 / E5.00 FOR ADDITIONAL INFORMATION.
8. REFER TO DETAIL #7/E5.00 FOR MOUNTING REQUIREMENTS.
9. PROVIDE 3/4" CONDUIT TO ACCESSIBLE CEILING SPACE.
10. PROVIDE 3/4" CONDUIT, (2) PORT DATA OUTLETS, AND (2) CAT6 CABLES TO IDF CABINET.
11. PROVIDE (4) CAT6 DATA CABLES WITH RJ-45 TERMINATION ABOVE THE CEILING WITH 30' OF SPARE LENGTH.
12. REPLACE EXISTING CABINET WITH NEW IDF CABINET. REFER TO DETAIL #3/E5.01 FOR MOUNTING REQUIREMENTS. RECONNECT EXISTING FIBER OPTIC CABLES IN NEW FIBER PATCH PANEL. PROVIDE NEW PATCH PANEL FOR COPPER CONNECTIONS AS REQUIRED.

3

GENERAL NOTES

1. EXISTING RECEPTACLES SHALL REMAIN INCLUDING RESPECTIVE CIRCUITS.
2. REFER TO DETAILS ON SHEET #E5.01 FOR CONDUIT MOUNTING REQUIREMENTS.

ROOM LEGEND	
#	ROOM NAME
D-1	CLASSROOM
D-2	CLASSROOM
D-3	CLASSROOM
D-4	LOUNGE
D-5	CLASSROOM
D-6	CLASSROOM

ROOM LEGEND	
#	ROOM NAME
E-1	CLASSROOM
E-2	CLASSROOM
E-3	CLASSROOM
E-4	CLASSROOM
E-5	CLASSROOM

EXHIBIT 3-28

Rose Sing Eastham & Associates
Electrical Consultants
131 S. Dunworth - (559)733-2671
Visalia, California 93292-6705

REGISTERED PROFESSIONAL ENGINEER ROBERT K. EASTHAM No. E-18786 Exp. 6/30/25 ELECTRICAL STATE OF CALIFORNIA

Owner:

BAKERSFIELD CITY SCHOOL DISTRICT
1300 BAKER STREET
BAKERSFIELD, CA 93309

Project Name:

CENTRAL PLANT REPLACEMENT

Project Address:

MUNSEY ELEMENTARY SCHOOL
3801 BRAVE AVENUE
BAKERSFIELD, CA 93309

integrated designs
by SOMAM, Inc.

**ARCHITECTURE
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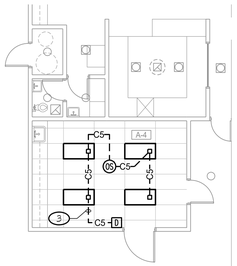
Sheet Title:

NEW POWER PLANS - BLDG. "D, E & ME"

Job No.: **5524**

Sheet No.: E2.11

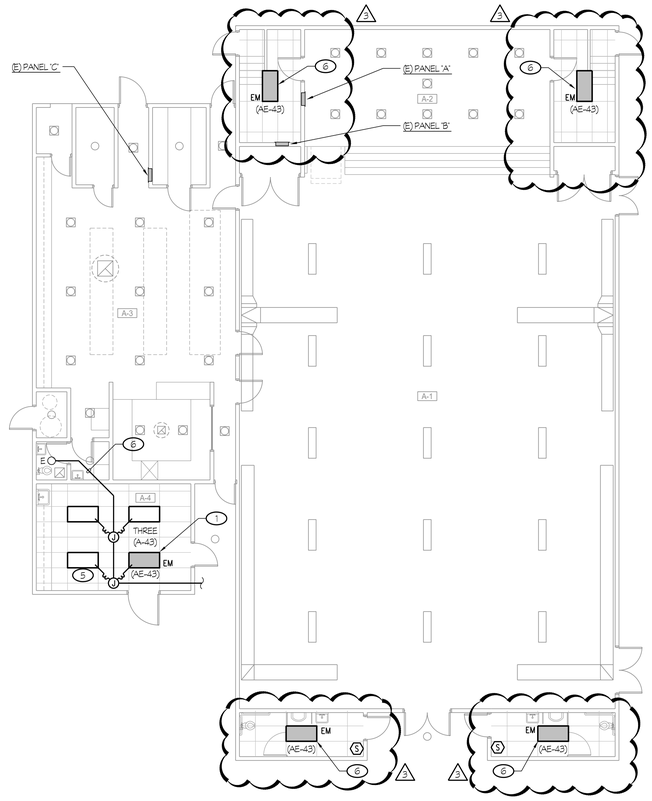
Release: ADDENDUM #3 3 Issue Date: 01-17-2024



2 NEW LIGHTING CONTROLS PLAN - BUILDING "A"

CENTRAL PLANT REPLACEMENT

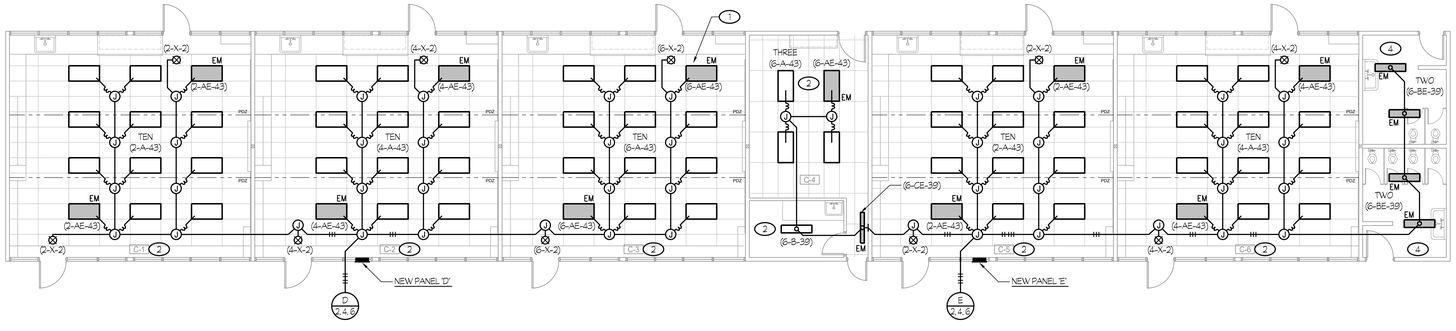
SCALE: 1/8" = 1'-0"



1 NEW LIGHTING PLAN - BUILDING "A"

CENTRAL PLANT REPLACEMENT

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



3 NEW LIGHTING PLAN - BUILDING "C"

CENTRAL PLANT REPLACEMENT

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

NOTES (THIS SHEET ONLY):

1. SYMBOL EM DENOTES LIGHT FIXTURE EQUIPPED WITH AN EMERGENCY BATTERY PACK. CONNECT PER DETAIL #3/E5.00.
2. REFER TO TYPICAL LIGHTING CONTROL PLAN, #1/E2.22 FOR ADDITIONAL WORK.
3. C5 DENOTES CAT. 5e CABLE. ELECTRICAL CONTRACTOR MAY USE PRETERMINATED CAT. 5e CABLING OR PROVIDE CAT. 5e CABLING, MODULAR JACKS ON EACH END AND TERMINATE THE MODULAR JACKS USING THE TIA/EIA-568-B.2 PIN-PAIR SPECIFICATION. ELECTRICAL CONTRACTOR SHALL PROVIDE CONDUIT AND OUTLET BOXES IN WALLS FOR ROUTING OF CABLING. CABLE MAY BE ROUTED IN FREE-AIR, WHEN LOCATED IN ACCESSIBLE ATTIC SPACE ABOVE T-BAR CEILINGS. AT GYPBOARD CEILINGS, PROVIDE A DOUBLE-GANG LOW VOLTAGE MOUNTING PLATE BRACKET, CADDY #MPLS2 OR EQUAL, AT THE RJ-45 JACKS (EMBEDDED CONTROLS) OF THE SURFACE MOUNTED LIGHT FIXTURES FOR PASSAGE OF CAT. 5e CABLING.
4. REFER TO TYPICAL LIGHTING CONTROL PLAN, #2/E2.22 FOR ADDITIONAL WORK.
5. REFER TO NEW LIGHTING CONTROLS PLAN - BUILDING 'A', #2/E2.22 FOR ADDITIONAL WORK.
6. CONNECT NEW LIGHTING TO EXISTING CIRCUIT AS REQUIRED.

GENERAL NOTES

1. REFER TO DETAILS ON SHEET #E5.01 FOR CONDUIT MOUNTING REQUIREMENTS.

ROOM LEGEND	
#	ROOM NAME
A-1	MULTI-USE
A-2	PLATFORM
A-3	KITCHEN
A-4	LOUNGE

ROOM LEGEND	
#	ROOM NAME
C-1	CLASSROOM
C-2	CLASSROOM
C-3	CLASSROOM
C-4	WORKROOM
C-5	CLASSROOM
C-6	CLASSROOM

EXHIBIT 3-29

Rose Sing Eastham & Associates
Electrical Consultants
131 S. Dunworth - (559)733-2671
Visalia, California 93292-6705

REGISTERED PROFESSIONAL ENGINEER — ROSE SING KING EASTHAM — No. E-18786 Exp. 6/30/25 — ELECTRICAL — STATE OF CALIFORNIA

Owner:

BAKERSFIELD CITY SCHOOL DISTRICT
1300 BAKER STREET
BAKERSFIELD, CA 93309

Project Name:

CENTRAL PLANT REPLACEMENT

Project Address:

MUNSEY ELEMENTARY SCHOOL
3801 BRAVE AVENUE
BAKERSFIELD, CA 93309

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Sheet Title:

NEW LIGHTING PLANS BUILDINGS "A &C"

Job No.: **5524**

Sheet No.: E2.20

Release: ADDENDUM #3 — Issue Date: 01-17-2024

EXISTING PANEL "A"

120/208V, 3 PH, 4 W — 225 A. BUSSING — 225 A. MAIN BKR. — 42 CIRCUIT — 10K BREAKER A.I.C. — 5 3/4" MAX. ENCL. DEPTH — FLUSH MOUNTING

CKT	BKR	LOAD: V.A. A	B	C	DESCRIPTION	DESCRIPTION	LOAD: V.A. C	B	A	BKR	CKT
1	15/1	500			(E) LOAD	(E) LOAD			500	15/1	2
3	15/1		500		(E) LOAD	(E) LOAD		500		15/1	4
5	15/1			500	(E) LOAD	(E) LOAD	500			15/1	6
7	15/1	500			(E) LOAD	(E) LOAD			500	15/1	8
9	15/1		500		(E) LOAD	(E) LOAD		500		15/1	10
11	15/1			500	(E) LOAD	(E) LOAD	500			15/1	12
13	15/1	500			(E) LOAD	(E) LOAD			500	15/1	14
15	15/1		500		(E) LOAD	(E) LOAD		500		15/1	16
17	15/1			500	(E) LOAD	(E) LOAD	500			15/1	18
19	15/1	500			(E) LOAD	(E) LOAD			500	15/1	20
21	15/1		500		(E) LOAD	(E) LOAD		500		15/1	22
23	15/1			500	(E) LOAD	(E) LOAD	500			15/1	24
25	15/1	500			(E) LOAD	(E) LOAD			500	15/1	26
27	15/1		500		(E) LOAD	(E) LOAD		500		15/1	28
29	15/1			500	(E) LOAD	(E) LOAD	500			15/1	30
31	15/1	500			(E) LOAD	(E) LOAD			500	15/1	32
33	20/1		1000		(E) LOAD	(E) LOAD		1000		20/1	34
(B) 35	**25/2**			**1664**	**ODU A-1**	FIRE ALARM "P.E.P."	500			20/1	36 (A)
37		**1664**				SPACE					38
39					SPACE	SPACE					40
41					SPACE	SPACE					42

LOAD SUMMARY	A	B	C	
CONNECTED LOAD (VA) :	7664	7000	7164	TOTAL CALCULATED
25% LCL/LML (VA) :	0	0	0	LOAD FOR PANEL:
TOTAL LOAD (VA) :	7664	7000	7164	21828 VA
TOTAL LOAD (AMPS) :	63.9	58.3	59.7	

PANEL "D" (1)

120/208V, 3 PH, 4 W — 100 A. BUSSING MAIN LUG ONLY — 30 CIRCUIT — 10K BREAKER A.I.C. — 5 3/4" MAX. ENCL. DEPTH — FLUSH MOUNTING PER #6/E5.00

CKT	BKR	LOAD: V.A. A	B	C	DESCRIPTION	DESCRIPTION	LOAD: V.A. C	B	A	BKR	CKT
1	20/1	720			RECEPT - TEACHER WALL	LIGHTS			516	20/1	2
3	20/1		1080		RECEPT - CLASSRM #C-1	LIGHTS		516		20/1	4
5	20/1			720	RECEPT - TEACHER WALL	LIGHTS	516			20/1	6
7	20/1	1080			RECEPT - CLASSRM #C-2	SPARE				20/1	8
9	20/1		720		RECEPT - TEACHER WALL	SPARE				20/1	10
11	20/1			1080	RECEPT - CLASSRM #C-3	SPARE				20/1	12
3 13	15/1	1000			RECEPT -	RECEPT -			1000	15/1	14
15	15/1		1000		RECEPT -	RECEPT -		1000		15/1	16
17	15/1			1000	RECEPT-	RECEPT -	1000			15/1	18
3 19	15/1	1000			RECEPT -				1500	20/3	20
21	15/1		600		AIR PURIFIER	EXISTING - EQUIP.		1500			22
23	15/1			600	AIR PURIFIER		1500				24
25	15/1	600			AIR PURIFIER	SPACE					26
27	15/2		800		EXISTING - EQUIP.	EXISTING PANEL				40/2	28
29				800							30

LOAD SUMMARY	A	B	C	
CONNECTED LOAD (VA) :	7416	7216	7216	TOTAL CALCULATED
25% LCL/LML (VA) :	129	129	129	LOAD FOR PANEL:
TOTAL LOAD (VA) :	7545	7345	7345	22235 VA
TOTAL LOAD (AMPS) :	62.9	61.2	61.2	

PANEL "E" (1)

120/208V, 3 PH, 4 W — 100 A. BUSSING MAIN LUG ONLY — 30 CIRCUIT — 10K BREAKER A.I.C. — 5 3/4" MAX. ENCL. DEPTH — FLUSH MOUNTING PER #6/E5.00

CKT	BKR	LOAD: V.A. A	B	C	DESCRIPTION	DESCRIPTION	LOAD: V.A. C	B	A	BKR	CKT
1	20/1	720			RECEPT - TEACHER WALL	LIGHTS			516	20/1	2
3	20/1		1080		RECEPT - CLASSRM #C-5	LIGHTS		516		20/1	4
5	20/1			720	RECEPT - TEACHER WALL	LIGHTS	406			20/1	6
7	20/1	1080			RECEPT - CLASSRM #C-6	SPARE				20/1	8
3 9	20/1				SPARE	SPARE				20/1	10
11	20/1			500	MECHANICAL CONTROLS	RECEPT - WP ON ROOF	1080			20/1	12
13	15/1	1000			RECEPT -	RECEPT -			1000	15/1	14
15	15/1		1000		RECEPT -	RECEPT -		1000		15/1	16
17	15/1			1000	RECEPT -	RECEPT -	1000			15/1	18
19	15/1	1000			RECEPT -				1500	20/3	20
(A) 21	20/1		200		FIRE ALARM "P.E.P.-2"	EXISTING - EQUIP.		1500			22
23	20/1			600	AIR PURIFIER		1500				24
25	20/1	600			AIR PURIFIER	SPACE					26
3 27	15/2				EXISTING - EQUIP.	- ODU C-1		1664		25/2	28
29								1664			30

LOAD SUMMARY	A	B	C	
CONNECTED LOAD (VA) :	7416	6960	8470	TOTAL CALCULATED
25% LCL/LML (VA) :	129	129	102	LOAD FOR PANEL:
TOTAL LOAD (VA) :	7545	7089	8572	23206 VA
TOTAL LOAD (AMPS) :	62.9	59.1	71.4	

PANEL "F" (1)

120/208V, 3 PH, 4 W — 100 A. BUSSING MAIN LUG ONLY — 30 CIRCUIT — 10K BREAKER A.I.C. — 5 3/4" MAX. ENCL. DEPTH — FLUSH MOUNTING PER #6/E5.00

CKT	BKR	LOAD: V.A. A	B	C	DESCRIPTION	DESCRIPTION	LOAD: V.A. C	B	A	BKR	CKT
1	20/1	720			RECEPT -TEACHER WALL	LIGHTS			516	20/1	2
3	20/1		1080		RECEPT -CLASSRM #D-1	LIGHTS				20/1	4
5	20/1			720	RECEPT -TEACHER WALL	LIGHTS	516			20/1	6
7	20/1	1080			RECEPT- CLASSRM #D-2	SPARE				20/1	8
9	20/1		720		RECEPT -TEACHER WALL	SPARE		1080		20/1	10
3 11	20/1			1080	RECEPT - CLASSRM #D-3	SPARE	1080			20/1	12
13	15/1				RECEPT -	RECEPT -			1000	15/1	14
15	15/1				RECEPT -	RECEPT -		1000		15/1	16
17	15/1				RECEPT -	RECEPT -	1000			15/1	18
3 19	15/1				RECEPT -				1500	20/3	20
21	15/1		600		AIR PURIFIER	EXISTING - EQUIP.		1500			22
23	15/1			600	AIR PURIFIER		1500				24
25	15/1	600			AIR PURIFIER	SPACE					26
27	15/2	E	800		EXISTING - EQUIP.	SPACE					28
29				800		SPACE					30

LOAD SUMMARY	A	B	C	
CONNECTED LOAD (VA) :	6496	7296	7296	TOTAL CALCULATED
25% LCL/LML (VA) :	129	129	129	LOAD FOR PANEL:
TOTAL LOAD (VA) :	6625	7425	7425	21475 VA
TOTAL LOAD (AMPS) :	55.2	61.9	61.9	

PANEL "G" (1)

120/208V, 3 PH, 4 W — 100 A. BUSSING MAIN LUG ONLY — 30 CIRCUIT — 10K BREAKER A.I.C. — 5 3/4" MAX. ENCL. DEPTH — FLUSH MOUNTING PER #6/E5.00

CKT	BKR	LOAD: V.A. A	B	C	DESCRIPTION	DESCRIPTION	LOAD: V.A. C	B	A	BKR	CKT
1	20/1	720			RECEPT - TEACHER WALL	LIGHTS			516	20/1	2
3	20/1		1080		RECEPT - CLASSRM #D-5	LIGHTS		516		20/1	4
5	20/1			720	RECEPT - TEACHER WALL	LIGHTS	406			20/1	6
7	20/1	1080			RECEPT - CLASSRM #D-6	SPARE			1080	20/1	8
3 9	20/1				SPARE	SPARE		1080		20/1	10
11	20/1			500	MECHANICAL CONTROLS	RECEPT - WP ON ROOF	1080			20/1	12
13	15/1				RECEPT -	RECEPT -			1000	15/1	14
15	15/1				RECEPT -	RECEPT -		1000		15/1	16
17	15/1				RECEPT -	RECEPT -	1000			15/1	18
19	15/1				RECEPT -				1500	20/3	20
21	20/1				SPARE	EXISTING - EQUIP.		1500			22
23	20/1			600	AIR PURIFIER		1500				24
25	20/1	600			AIR PURIFIER	SPACE					26
3 27	15/2				EXISTING - EQUIP.	- ODU D-1		1664		25/2	28
29								1664			30

LOAD SUMMARY	A	B	C	
CONNECTED LOAD (VA) :	6496	6840	7470	TOTAL CALCULATED
25% LCL/LML (VA) :	129	129	102	LOAD FOR PANEL:
TOTAL LOAD (VA) :	6625	6969	7572	21166 VA
TOTAL LOAD (AMPS) :	55.2	58.1	63.1	

PANEL "H" (1)

120/208V, 3 PH, 4 W — 100 A. BUSSING MAIN LUG ONLY — 30 CIRCUIT — 10K BREAKER A.I.C. — 5 3/4" MAX. ENCL. DEPTH — FLUSH MOUNTING PER #6/E5.00

CKT	BKR	LOAD: V.A. A	B	C	DESCRIPTION	DESCRIPTION	LOAD: V.A. C	B	A	BKR	CKT
1	20/1	720			RECEPT - TEACHER WALL	LIGHTS			516	20/1	2
3	20/1		1080		RECEPT - CLASSRM #E-1	LIGHTS		516		20/1	4
5	20/1			720	RECEPT - TEACHER WALL	LIGHTS	516			20/1	6
7	20/1	1080			RECEPT - CLASSRM #E-2	SPARE				20/1	8
9	20/1		720		RECEPT - TEACHER WALL	SPARE				20/1	10
3 11	20/1			1080	RECEPT - CLASSRM #E-3	SPARE				20/1	12
13	15/1				SPARE	RECEPT -			1000	15/1	14
15	15/1				SPARE	RECEPT -		1000		15/1	16
17	15/1				SPARE	RECEPT -	1000			15/1	18
3 19	15/1	1000			SPARE				1500	20/3	20
21	15/1		600		AIR PURIFIER	EXISTING - EQUIP.		1500			22
23	15/1			600	AIR PURIFIER		1500				24
25	15/1	600			AIR PURIFIER	SPACE					26
27	15/2		800		EXISTING - EQUIP.	SPACE					28
29				800		SPACE					30

LOAD SUMMARY	A	B	C	
CONNECTED LOAD (VA) :	6416	6216	6216	TOTAL CALCULATED
25% LCL/LML (VA) :	129	129	129	LOAD FOR PANEL:
TOTAL LOAD (VA) :	6545	6345	6345	19235 VA
TOTAL LOAD (AMPS) :	54.5	52.9	52.9	

PANEL "I" (1)

120/208V, 3 PH, 4 W — 100 A. BUSSING MAIN LUG ONLY — 30 CIRCUIT — 10K BREAKER A.I.C. — 5 3/4" MAX. ENCL. DEPTH — FLUSH MOUNTING PER #6/E5.00

CKT	BKR	LOAD: V.A. A	B	C	DESCRIPTION	DESCRIPTION	LOAD: V.A. C	B	A	BKR	CKT
1	20/1	720			RECEPT - TEACHER WALL	LIGHTS			516	20/1	2
3	20/1		1080		RECEPT - CLASSRM #E-4	LIGHTS		516		20/1	4
5	20/1			720	RECEPT - TEACHER WALL	LIGHTS	406			20/1	6
7	20/1	1080			RECEPT - CLASSRM #E-5	SPARE				20/1	8
9	20/1				SPARE	SPARE				20/1	10
3 11	20/1			500	MECHANICAL CONTROLS	RECEPT - WP ON ROOF	1080			20/1	12
13	15/1				SPARE	RECEPT -			1000	15/1	14
15	15/1				SPARE	RECEPT -		1000		15/1	16
17	15/1				SPARE	RECEPT -	1000			15/1	18
19	15/1				SPARE				1500	20/3	20
21	20/1				SPARE	EXISTING - EQUIP.		1500			22
23	20/1			600	AIR PURIFIER		1500				24
25	20/1	600			AIR PURIFIER	SPACE					26
3 27	15/2				EXISTING - EQUIP.	SPACE					28
29						SPACE					30

LOAD SUMMARY	A	B	C	
CONNECTED LOAD (VA) :	5416	4096	5806	TOTAL CALCULATED
25% LCL/LML (VA) :	129	129	102	LOAD FOR PANEL:
TOTAL LOAD (VA) :	5545	4225	5908	15678 VA
TOTAL LOAD (AMPS) :	46.2	35.2	49.2	

TYPICAL PANEL SCHEDULE NOTES:

(A) PROVIDE A LOCK-ON DEVICE AT THIS CIRCUIT BREAKER, 'RED IN COLOR', SPACEAGE #LOCK-FA OR EQUAL. PROVIDE AN ENGRAVED NAMEPLATE: 'FIRE ALARM CIRCUIT', WHITE LETTERS ON A RED BACKGROUND. MOUNT NAMEPLATE ONTO INTERIOR TRIM AND ADJACENT TO CIRCUIT BREAKER.

(B) PROVIDE NEW CIRCUIT BREAKER MATCHING EXISTING PANEL IN STYLE, TYPE, AND AIC RATING.

NOTES (THIS SHEET ONLY):

(1) FIELD VERIFY EXISTING BRANCH BREAKERS FOR EACH PANEL AND MATCH EXISTING IN QUANTITY AND SIZE.

PANEL SCHEDULES (1)

CENTRAL PLANT REPLACEMENT

NTS

EXHIBIT 3-30

Rose Sing Eastham & Associates
Electrical Consultants
131 S. Dunworth – (559)733-2671
Visalia, California 93292-6705

ELECTRICAL PROFESSIONAL ENGINEER — CHRISTOPHER KIRK EASTHAM — No. E-18786 Exp. 6/30/25 — ELECTRICAL — STATE OF CALIFORNIA

Owner:
BAKERSFIELD CITY SCHOOL DISTRICT
1300 BAKER STREET
BAKERSFIELD, CA 93309

Project Name:
CENTRAL PLANT REPLACEMENT

Project Address:
MUNSEY ELEMENTARY SCHOOL
3801 BRAVE AVENUE
BAKERSFIELD, CA 93309

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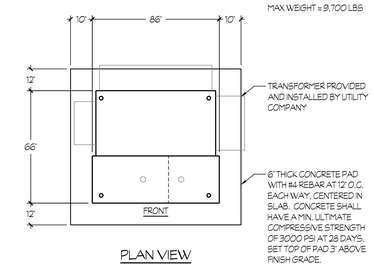
Sheet Title:
PANEL SCHEDULES

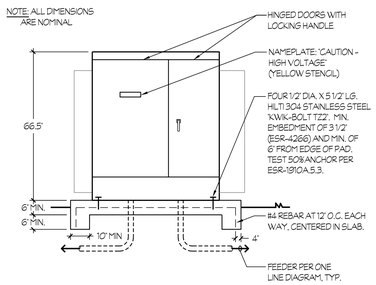
Job No.: **5524**

Sheet No.: E4.02

Release: ADDENDUM #3 (3) Issue Date: 01-17-2024

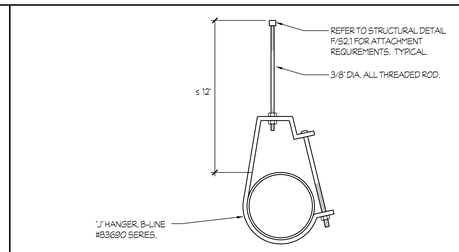


PLAN VIEW

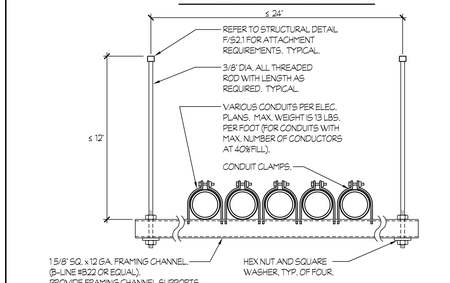


2 UTILITY TRANSFORMER PAD DETAIL

NTS



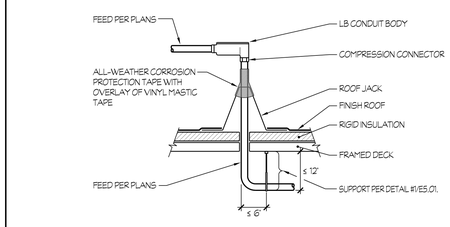
SINGLE CONDUIT BRACING



CONDUIT SUPPORT RACK

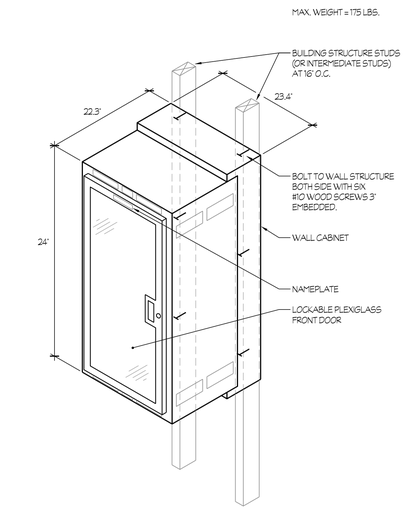
1 CONDUIT BRACING DETAILS

NTS



8 ROOF JACK AT ROOF

NTS



2

3 HC/IDF CABINET WALL RACK MOUNTING

NTS

EXHIBIT 3-31

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Electrical Consultants
131 S. Dunworth - (559)733-2671
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REGISTERED PROFESSIONAL ENGINEER KYLE EASTHAM No. E-18786 Exp. 6/30/25 ELECTRICAL STATE OF CALIFORNIA

Owner:

BCSD BAKERSFIELD CITY SCHOOL DISTRICT

BAKERSFIELD CITY SCHOOL DISTRICT
1300 BAKER STREET
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Project Name:

CENTRAL PLANT REPLACEMENT

Project Address:

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DETAILS

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