

**Request for Pre-Qualification No. 902232
County of Alameda, General Services Agency
Countywide Cabling Services**

ATTACHMENT 1

CABLING REQUIREMENTS

- A.** The scope of work for each cabling request may consist of the following:
- (1) Contractor shall provide all labor and materials called for in the specifications in accordance with the conditions of the contract. This includes all incidentals such as equipment, hardware, services, hoisting, scaffolding, supports, tools, supervision, consumable items, etc., necessary to provide a complete cabling system as described herein. In no case shall Contractor use County tools or equipment.
 - (2) It is the intent of these specifications to provide a complete workable structured communications cabling system ready for the County's use. Nevertheless, the Contractor shall be responsible for all items normally required to deliver a complete cabling system despite not being explicitly depicted in the specifications.
 - (3) Installations shall be as indicated in the applicable sections of these specifications and shall be in compliance with all applicable industry standards. Requirements and details stated in the specifications shall govern if they differ from submitted plans and shop drawings.
 - (4) Contractor shall be responsible for the delivery of any and all requests for information, plans, shop drawings, submittals, samples, and/or any other required deliverables through the County or its representative. The cost of these items shall be included in price quotes submitted to the County.
 - (5) Contractor shall furnish all labor, materials, parts, equipment, and incidentals necessary to provide miscellaneous on-call, as-needed, urgent, and/or routine cabling services. The cabling services shall be performed at various County of Alameda facilities. The contractor must be able to work at all facilities located within the County borders.
 - (6) Authorized County staff will request bids from the pre-qualified Contractor(s) including the location, nature, and extent of the work to be done.
 - (7) Each cabling request will specify the location, nature, start and end dates and extent of the work to be done. This notification shall be the complete instruction and authorization for the proposed work and the Contractor shall fully comply with all particulars thereof. The County will pay only for work requested by the authorized County staff. In no case shall the Contractor accept service requests directly from tenants, lessees, or other Contractors.
 - (8) For each individual cabling request, the Contractor shall:
 - (a) Contact customer within five business days of job request to arrange an on-site survey.

Request for Pre-Qualification No. 902232
County of Alameda, General Services Agency
Countywide Cabling Services

- (b) Provide a written quote within five business days of an on-site survey, using Exhibit D: Cabling Request Form.
 - (c) Fill out appropriate forms such as the Supplemental Questionnaire and Cabling Request Form and follow cabling procedures, See sample on Exhibit B.
 - (d) Order materials.
 - (e) Schedule the work.
 - (f) Perform the work.
 - (g) Inspect the work performed and provide test results.
 - (h) Apply for cable warranty (Note: Cabling request is not considered complete until a registration for warranty has been completed and test results provided).
 - (i) Sign the Sign-Off form in proper sequence.
 - (j) Provide a monthly status report spreadsheet to County for all jobs assigned.
- (9) For each cabling request, the Contractor shall:
- (a) Determine which cabling requests require certification by a Registered Professional Engineer and secure that certification.
 - (b) Provide all cable repair and installation services as needed for the County of Alameda, including but not limited to, unshielded twisted pair (UTP) cabling, single and multimode fiber, and any older cable that has been modified for voice and data use.
 - (c) The Prime Contractor shall provide a local Registered Communications Distribution Designer (RCDD) who will ultimately be responsible for the design and the management of the cabling request. The RCDD must have sufficient experience in cabling projects to be able to lend adequate technical support to the field forces during the installation, warranty period, and during any extended warranty period or maintenance contracts. The RCDD must be available within 24 hours of any County request. At a minimum, the RCDD must be SYSTIMAX certified since about ninety percent (90%) of the County's existing cable is of that particular manufacturer.
 - (d) Provide the services of a Field Supervisor as an employee of the Contractor or approved and qualified subcontractors located within the County of Alameda to schedule the cabling request and to oversee each job.
 - (e) Provide resumes of the RCDDs and Field Supervisor (if known), copies of applicable certifications and the date of RCDD award.

Request for Pre-Qualification No. 902232
County of Alameda, General Services Agency
Countywide Cabling Services

- (f) Provide emergency cable repair service that may require a same day or next day response, at the discretion of the County.
- (g) Provide non-emergency cable repair on a time and materials (T&M) basis.
- (h) Provide all security measures deemed necessary to adequately protect unoccupied job sites from thefts, vandalism, etc. Expenses incurred by Contractor negligence in failing to provide security shall be borne by the Contractor.
- (i) Provide labor during regular County work hours from 7:00 A.M. to 5:00 P.M. unless overtime or weekend work is specified by the County. Contractor shall have a local or toll-free number and be available for emergencies 24 hours a day, 7 days a week.
- (j) Technicians shall be trained to work in confined areas and in the identification of hazardous material while performing services as required under this contract.
- (k) Access to sources of cable materials and related products.

B. Staffing Requirements:

- (1) The Contractor shall designate in writing to the County a full-time local Project Manager (PM)/Project Manager Alternate (PMA) as the contacts for design, job coordination, additions, changes, etc., who shall be reachable at all times, 24 hours a day, 7 days a week, during the performance of the work.
- (2) The PM/PMA shall have full responsibility for all coordination of all work regardless of the number of cabling jobs being performed at any one time.
- (3) The Contractor's PM/PMA shall have full authority to represent the Contractor in making decisions and executing the work. Such PM/PMA shall be interviewed for approval by the County and will be replaced at the County's discretion.
- (4) The Contractor shall provide a supervisory work force sufficient to maintain the efficient and timely (according to schedule) performance of the Contractor's work.
- (5) The Contractor shall be responsible for the actions of all workers under its employ and shall immediately and permanently remove any personnel from the job site at the written request of Alameda County.
- (6) All crafts personnel performing the work designated herein shall be fully Contractor certified and qualified and be knowledgeable of the following:
 - (a) Electronic Industries alliance (EIA)/Telecommunications Industry Association (TIA) standards and practices.
 - (b) Bonding and grounding of armored or shielded cables, equipment racks, ladder racks and other telecommunications devices and hardware.

Request for Pre-Qualification No. 902232
County of Alameda, General Services Agency
Countywide Cabling Services

- (c) Testing conductors for electrical continuity and compliance with specifications set forth in this document.
 - (d) Installation and termination of cables on specified outlets, patching, and cross connect hardware according to SYSTIMAX specifications.
 - (e) Installation, termination, and testing of both singlemode and multimode optical fiber cables.
- (7) Contractor shall be responsible for ensuring all installers possess or are provided with the required tools to perform each activity. Installers shall be adequately trained in the use of all tools prior to beginning work. Tools must be maintained in good working order. The County reserves the right to review the tool lists and tool maintenance procedure of the Contractor. Tools deemed unserviceable by the County shall be replaced immediately. Under no circumstances are County tools or equipment to be used.

C. Description of Work:

- (1) The Contractor shall furnish all labor, materials, parts, and equipment necessary to perform cabling services as requested by the County.
- (2) Organization of Work:
 - (a) The Contractor shall provide the level of staff necessary to meet all installation schedules.
 - (b) The Contractor shall maintain a complete file of shop drawings, plans and specifications and other submissions on the job site at all times. The shop drawings, plans, and specifications shall be kept in a neat and orderly fashion and shall be used to red line any changes made during construction. The shop drawings, plans, and specifications shall be used in the preparation of the required "as-built" documents. These shop drawings and submissions shall be made available to the County upon request.
 - (c) All work shall remain accessible so as to permit the County to observe the work during the course of construction.
 - (d) As required, and when directed in writing by the County, the Contractor shall, without extra charge, prior to installation, make reasonable modifications in the layout as needed to prevent conflict with work of other trades or for proper compliance with the design intent, or to meet local codes.
- (3) Cabling Request Management:
 - (a) Recommendations to the County concerning communication room layout, cable system design, support structure requirements, and products will be requested of and procurement of materials and products shall be required by the Contractor. Wherever possible, old station and riser cables shall be removed and disposed of as part of the new cable installation.

**Request for Pre-Qualification No. 902232
County of Alameda, General Services Agency
Countywide Cabling Services**

- (b) The successful bidder shall serve as a Prime Contractor, managing all County cable installations by performing work directly or by assigning cabling requests to qualified subcontractors that have been approved by the County.
- (4) Coordination of Work:
 - (a) The Contractor shall be responsible for coordinating any and all work with other trades either through scheduled meetings or through Alameda County. When possible, coordination with other trades shall take place prior to, and be indicated on, shop drawing submittals.
 - (b) Contractor shall transmit to other trades in a timely manner all information required for work to be provided under their respective sections. Where such needs are known in advance, Contractor shall transmit data no more than 15 days prior to the time it is needed for installation or fabrication.
 - (c) Wherever work interconnects with work of other trades, Contractor shall coordinate with other trades to ensure that all trades have the information necessary so they may properly install all the necessary connections and equipment.
 - (d) Depending on the type of installation, a fixed sequence of operations may be required to properly install the complete systems. Contractor shall coordinate and schedule work with the County in accordance with the overall construction, furniture, telephone, and data equipment installation schedule.
 - (e) The Contractor shall be expected to maintain the cabling request schedule unless permitted in writing from the County to deviate from the schedule. Consistent failure on the part of the Contractor to keep within the cabling request schedule can and will be considered a breach of contract.
 - (f) The Contractor, the PM/PMA, or the Field Supervisor shall be expected to attend all construction meetings as requested by the County.
- (5) Inspection, Tests, and Guarantees:
 - (a) After an installation is complete, in addition to any other required testing, and at such times as the County directs, the Contractor shall be present while the County conducts operational tests of the transport electronics connected to the cabling system. The installation shall be demonstrated to be in accordance with the requirements of these specifications.
 - (b) The Contractor shall be notified in writing of any defective items and must repair or replace such items within 24 hours of written notice, without cost to Alameda County.
 - (c) Contractor shall provide a SYSTIMAX Performance Warranty (“SYSTIMAX structural cabling systems 20 year extended product warranty and application assurance”) which guarantees all work against faulty and improper material and workmanship for a minimum period of 20 years from

Request for Pre-Qualification No. 902232
County of Alameda, General Services Agency
Countywide Cabling Services

date of final written acceptance by the County. Within 24 hours of written notice, Contractor shall correct any deficiencies which occur during the guarantee period at no additional cost to the County, all to the satisfaction of Alameda County.

(6) Quality Assurance:

- (a) The Contractor shall be responsible for ensuring all materials being provided are new and unused and bear the Underwriters' Laboratory, Inc. label. If the label is not available, the Contractor shall receive approval from the County to use the specific product.
- (b) The County may choose to reuse existing cable where feasible. Reuse of existing cable will only be done at the direction of the County.
- (c) When existing cable is reused, Contractor will re-terminate, and retest based on County standards for new cable and provide post install test results to the County with the same test results required for newly installed cable.
- (d) The Contractor shall be responsible for ensuring all materials are clean, free of defects and corrosion, and comply with the specifications as set forth herein.

(7) Components:

- (a) Contractor shall be responsible for providing all equipment and cable types as indicated in the specifications unless otherwise noted.
- (b) Part numbers and product codes in these specifications are correct as of the time of writing. Manufacturers may, however, change part numbers and product codes on short notice. In cases where part numbers or product codes differ from technical specifications for a particular product, Contractor shall provide products meeting the minimum technical specifications of the products in the specifications. Contractor shall notify the County of any product code and or part number changes on the material list submittal.
- (c) Product Consistency: Any given item of equipment or material shall be the product of one manufacturer per each cabling request. Multiple manufacturers of any one item will not be permitted, unless specifically noted otherwise and approved by the County. In particular, the glass used in the construction of the fiber optic cables, pigtails and patch cords shall be made by the same manufacturer.

(8) Installation:

- (a) Contractor shall follow manufacturer's instructions for installing, connecting, and adjusting all equipment and cabling furnished under this work. Contractor shall maintain a copy of such instructions at the equipment location during installation and any subsequent work on the equipment.

Request for Pre-Qualification No. 902232
County of Alameda, General Services Agency
Countywide Cabling Services

- (b) Contractor shall thoroughly examine the manufacturer's specifications and report any discrepancies between them to the County. Contractor shall obtain from the County written instructions for changes necessary in the work. The Contractor may be held responsible for any discrepancies unreported at the time of pricing at the discretion of the County.
 - (c) Contractor shall install and coordinate the cabling work in cooperation with other trades installing interrelated work. All repairs or changes required in the work of the Contractor, caused by Contractor's neglect (i.e., improper review of drawings/plans, storage of tools/materials, poor workmanship according to generally accepted industry standards, etc.) shall be made by the Contractor at no cost to the County.
 - (d) The locations of equipment and hardware as shown on drawings indicate the design intent of the cabling request and are understood to be subject to such revision as may be found necessary or desirable in response to site conditions, etc., at the time the work is installed.
- (9) Protection of Work, Property, and People:
- (a) The Contractor shall be responsible for the protection of all new and existing equipment and hardware from damage due to neglect or mishandling. The Contractor shall remain responsible for damages until such time as the County relinquishes the Contractor of any responsibility in writing.
 - (b) The Contractor shall be responsible for the receipt, safe storage, and delivery of materials and equipment to the job site. Materials and equipment subject to damage by natural elements shall be stored in a weather tight enclosure coordinated with Alameda County.
 - (c) The Contractor shall not store or place material on floors in excess of the designed load limits as specified by the County structural engineer. The Contractor is responsible for obtaining such specifications before beginning any work.
 - (d) Active equipment shall not be installed in the communications entrance facility room or the communications distribution rooms until such time as other trades have completed their work in those areas.
 - (e) The Contractor shall assume full responsibility for any damage or defacement caused to the finished work of other trades and shall remedy any such damage or defacement by its forces at its own expense, as required, and as soon as possible.
 - (f) The Contractor shall perform daily clean-up of its own debris in its work area. All debris shall be placed in the containers and/or locations as directed by the County. Contractor shall leave County facilities room clean.
 - (g) The Contractor shall maintain unobstructed paths of egress out of the work area.

Request for Pre-Qualification No. 902232
County of Alameda, General Services Agency
Countywide Cabling Services

- (h) Contractor shall be responsible for its staff maintaining safe, appropriate, and courteous behavior when dealing with other trades, County staff, and the public when on County premises. The County will determine what behavior is appropriate and/or courteous.
- (10) Special Tools:
 - (a) All special tools and small equipment items needed for proper operation, adjustment, and maintenance of cabling and equipment installed under any contract to be entered into shall be provided by the Contractor.
 - (b) The terms "special tools" and "small equipment items" is meant to include such items as punch down tools, power/hand tools, connector assembly tools, etc.
- (11) General Installation Standards and Procedures:
 - (a) The work of this section shall include, as required, but is not limited to, the following:
 - (i) 4-inch conduit installation and related coring, boring and/or trenching between buildings, entrance facilities, and communications rooms as needed.
 - (ii) Cable trays and distribution rings within communications rooms.
 - (iii) J-hooks as required outside of the communications rooms.
 - (iv) Inner duct for fiber optic cable between distribution rooms and wherever fiber optic cable is run in open spaces or environments.
 - (v) Cable management devices and associated hardware.
 - (vi) Communications equipment racks and/or cabinets complete with all necessary installation hardware and seismic support.
 - (vii) Copper distribution frames, whether patch panels, 110-blocks, or 66-blocks as appropriate for each job.
 - (viii) Fiber optic distribution frames, whether shelves, patch panels, or wall-boxes as appropriate for each job.
 - (b) Standards:
 - (i) Except as modified by governing codes and by the contract documents, comply with the applicable provisions and recommendations of Construction Specifications Institute (CSI) Division 16, section 16740, low-voltage electrical specifications.
 - (c) Cable Runways:
 - (i) 4-inch conduit stubs and coring between riser IDFs

Request for Pre-Qualification No. 902232
County of Alameda, General Services Agency
Countywide Cabling Services

- (ii) 4-inch conduit stubs going across firewalls in the core of the building
- (iii) Trenching/boring and placement of 4-inch conduits between buildings, as needed
- (iv) Cable runways in the main communications equipment room, the communications entrance room and the communications distribution rooms shall consist of metallic cable runways with a protective coating.
- (v) Cable Runway Sizes: All cable runways shall be a minimum of 1½" in depth regardless of width. The widths of the runway shall generally be 12", unless otherwise specified. Should the Contractor choose to propose other sizes for ease of routing or space limitations, a proposal must be submitted for approval by the County.
- (vi) Cable Runway Fittings: All cable runway fittings shall be of the same manufacturer as the tray. Strut and threaded rod for support may be of a different manufacturer; however, they must be indicated through the submittal process.
- (vii) All clamps, splices, mounting brackets, and associated hardware shall be fastened together using no less than 3/8" nuts and bolts as indicated in manufacturer's literature.
 - i. Straight splice hardware shall be used on all corners, "Ts," intersections and all overhead room applications.
 - ii. Bonding clamps shall be provided for each individual length of runway. The runway shall be grounded with #6 AWG green-insulated copper wire back to the nearest Telecommunications Grounding Busbar (TGB).
 - iii. "L" brackets shall be used for support in combination with strut and threaded rod and for side wall mounting above distribution frames.
 - iv. Stanchion support clamps and "L" brackets shall be used for support under all raised floors. All other support devices shall be incorporated into submittals and shop drawings for approval prior to installation as required.
- (d) Distribution rings shall be constructed of hard plastic and no larger than 4" in diameter. Distribution rings shall be used on the type 110 distribution frames for cross-connect wire only.
- (e) Vertical Cable Trough for Equipment Racks: Cable troughs for equipment racks shall be bolted to either side of the equipment rack and shall be sized in coordination with the racks required.

Request for Pre-Qualification No. 902232
County of Alameda, General Services Agency
Countywide Cabling Services

(f) Fiber Optic Innerduct

- (i) The fiber optic innerduct in conduits and above the ceiling shall consist of 1¼" poly vinyl chloride (PVC) construction as required. Smooth wall is preferred but not required. However, Contractor shall use plenum-rated material where required.
- (ii) The fiber optic innerduct below raised floor systems shall consist of plenum rated construction.
- (iii) The Contractor shall provide properly sized and fitted couplings at all PVC to plenum-rated innerduct transitions.
- (iv) Inner duct that is run in cable trays shall be identified with clearly visible fiber optic warning tags. Tags shall be placed at the point that innerduct exits a conduit into cable tray and at 10-foot intervals in an exposed area.
- (v) The fiber optic inner duct shall be marked with the manufacturer's name, the product name, dimension, material designation, and UL designation.
- (vi) The innerduct shall route through the conduits, cable trays, or ceiling spaces as required.
- (vii) In the communications rooms the innerduct shall be brought to the fiber optic termination/splice enclosure via the cable tray.
- (viii) The innerduct shall be secured to the cable tray every four feet along all cable tray installations.

(g) Riser Cable Support Grips

- (i) Riser cable supports shall be provided on all floors throughout the riser system. The Contractor shall submit sample cable support clamps.
- (ii) All vertical backbone cable runs will be via the approved riser cable clamps and the vertical wire management on the plywood backboards.

(h) Cable Support

- (i) Contractor shall provide appropriate seismic bracing for all cabling support mechanisms installed. J-hooks, cable trays, and other support mechanisms shall be structurally designed to accommodate their anticipated cable loads and should comply with Exhibit A: Alameda County Infrastructure Cabling Specifications. In general, Contractor shall provide support only from floor slabs, beams, columns, or structural walls (such as shear walls). Contractor shall coordinate seismic design with

Request for Pre-Qualification No. 902232
County of Alameda, General Services Agency
Countywide Cabling Services

architectural, structural, mechanical, electrical, plumbing, fire protection, and other trades.

- (ii) J-hooks, cabling slings, and other support mechanisms shall be appropriately designed for the type of cabling being installed.
 - (iii) All cabling support mechanisms should be installed according to the manufacturer's specifications and dedicated for the use of the communications cabling. Cabling will not be supported by drop-ceiling support wires, building plumbing, electrical conduit, or any other trade material.
 - (iv) J-hooks for all cable runs are to be installed either parallel or perpendicular to building column lines. Deviations from this policy are permitted for short distances at the end of a cable run or where necessary to avoid obstruction.
 - (v) All J-hooks will be installed on no more than six-foot centers, to avoid cable sags.
 - (vi) Coordinate location of J-hooks with other trades to avoid conflicts and preserve accessibility.
- (i) Equipment Racks/Cabinets
- (i) 19 inch Equipment Racks: 7' X 19" bolt-down EIA-standard equipment rack, with 1¼" X ½" front and rear flange hole pattern, 12 24 threaded holes, brushed aluminum finish, and self-support base.
 - (ii) The Contractor shall be responsible for coordinating any power strip requirements for the equipment racks with the County. Each equipment rack will generally require one-20 amp, 3-wire dedicated circuit which will be provided under the Electrical work.
 - (iii) Vertical cable management shall be placed on either side of each installed rack. The cable management shall be double sided with finger-duct front and swing gate rear cable restraints.
 - (iv) Equipment cabinets shall be provided by the Contractor where applicable and shall be coordinated with the County for approval prior to installation.
 - (v) The cabinets shall require 16 AWG metallic construction, square-punched adjustable mounting rails, removable side panels, quick release doors with key locks, be capable of fan and/or vent mounting and have power strips installed.
 - (vi) Bolt racks and cabinets to slab (through access floor, where applicable). Provide and install seismic bracing for racks and cabinets as required by local building code.

Request for Pre-Qualification No. 902232
County of Alameda, General Services Agency
Countywide Cabling Services

- (vii) Bond all equipment racks and cabinets to nearest TGB using #6 AWG green insulated wire.
- (j) Copper Distribution Frames
 - (i) All copper distribution frames shall be 110 type.
 - (ii) The frame shall consist of 100, pair verticals and include distribution rings as required.
 - (iii) Each communications room shall have of a copper feeder from the wall-mounted distribution frame to a 24 or 48 port patch panel on an equipment rack, terminated 1-pair per port.
- (k) Fiber Optic Distribution Frames: The fiber optic distribution frames shall consist of maximum 72-port rack mounted enclosures with the following feature
 - (i) 16 AWG all steel construction.
 - (ii) Locking, smoked plexiglass hinged front door.
 - (iii) Appropriate number of splice trays for safe and secure storage of all splices and spare cable.
 - (iv) LC modules/bulkheads.
 - (v) Dual grounding and ample strain relief lugs.
 - (vi) Appropriate size cut-outs for cable and or innerduct entry.
 - (vii) Install enclosure in the top of the fiber optic distribution cabinet or equipment rack as required. Indicate type and location on all shop drawings.
 - (viii) Install an enclosure in the top of the equipment rack of each telecom distribution room including the telecom entrance room. Indicate type and location on all shop drawings.
 - (ix) Bond the fiber optic enclosure to the equipment rack or cabinet.
 - (x) Install innerduct all the way to all enclosures.
- (l) Quantities and Locations of Items
 - (i) The Contractor is responsible for providing the correct quantities of all materials necessary to accommodate the volume of cable described in these specifications.
 - (ii) The location and placement of equipment racks/cabinets and distribution frames shall be as indicated on the approved shop drawings or defined in these specifications unless notified in writing by the County.

Request for Pre-Qualification No. 902232
County of Alameda, General Services Agency
Countywide Cabling Services

- (m) Acceptance: Contractor shall not install cabling until after the cable management device installations have been accepted by the County.
- (12) Copper Cabling Specifications:
 - (a) This section of the specifications addresses the copper backbone cables, station cables and interconnect cables required under the cabling contract. The Contractor shall be responsible for the labor, tools, equipment, and services necessary for a complete communications cabling infrastructure, as required.
 - (b) The work of this section shall include but is not limited to the following:
 - (i) A complete UTP Structured Cabling System with cables, termination hardware, outlets and necessary installation and supporting hardware as required.
 - (c) Standards: Except as modified by governing codes and by the Contract Documents, Contractor shall comply with the applicable provisions and recommendations in the TIA/EIA568-C standard.
 - (d) Backbone Cable Specifications
 - (i) Twisted Pair Backbone Cable (Indoor): The cables consist of 24 AWG thermoplastic insulated conductors formed into binder groups of 25 pairs.
 - i. Contractor shall develop backbone (riser) diagram for required pair counts where applicable.
 - ii. Minimum performance specifications: Cables shall meet the requirements of ANSI/EIA/TIA-568-C for 100-ohm category 3 UTP Multi-pair Backbone Cable.
 - iii. Cable construction specifications: Core wrap - Polypropylene Film.
 - iv. Cable jacket marking: Must be legible and shall contain the following information: Manufacturer's name, Copper Conductor Gauge, Pair Count, UL and CSA listing, and Manufacturer's Trademark.
 - v. Cable jacket shall be gray with black lettering.
 - (ii) UTP Backbone Outside Plant Filled Cable: The cables consist of 24 AWG insulated conductors formed into binder groups of 25 pairs.
 - i. The Contractor shall be responsible for the design, pair counts and pair count locations of all outside plant cable systems via the scope of work and shop drawing process.

Request for Pre-Qualification No. 902232
County of Alameda, General Services Agency
Countywide Cabling Services

- ii. Minimum performance specifications: The cables shall meet the DC resistance, mutual capacitance, impedance and attenuation requirements of TIA/EIA-568-C for 100-ohm category 3 UTP Multi-pair Backbone Cable.
 - iii. Cable construction specifications: Conductor Insulation – DEPIC, Filler - Flexgel non-petroleum based, Core wrap - Polypropylene Film, Jacket - High Density Polyethylene (HDPE).
 - iv. Cable jacket marking: Must be legible and shall contain the following information: Cable construction , PIC Filled, Conductor Insulation, DEPIC, Conductor Gauge, 24, Sheath Designation, ASP, Pair Count, Outer Protection, UM, Manufacturer's name, Manufacture Date
 - v. Cable jacket shall be black with white lettering.
- (iii) UTP Station Cable for voice and data: Four unshielded twisted pairs of 22 AWG solid copper conductors. Individually insulated conductors under a common sheath. Cable must be plenum rated (CMP).
- i. Contractor shall develop communications floor plans for required quantities and locations.
 - ii. Minimum performance specifications: Must meet requirements for Category 6 of TIA/EIA-568-C.
 - iii. Cable jacket marking: Must be legible and shall contain the following information: Manufacturer's name, Copper Conductor Gauge, UL and CSA listing, Manufacturer's Trademark, Category rating, and Sequential foot markings
 - iv. Station cable jacket color shall have black lettering and the color shall be approved by the County prior to installation.
- (iv) Cross-Connect Wire: One pair, 24-AWG solid copper conductors. Individual conductors PVC jacketed. Each conductor provided with unique color code. Must be UL listed for use as cross-connect wire.
- i. The first two-pair of the "A" (voice) cable shall be cross-connected to the riser cable in sequential order according to their station identification number as required.
 - ii. Minimum performance specifications: Cross-connect wire must meet the impedance, attenuation, and NEXT requirements for Category 3 Horizontal Cable of TIA/EIA-568-C.

Request for Pre-Qualification No. 902232
County of Alameda, General Services Agency
Countywide Cabling Services

- (v) Data Equipment Inter-Connect Cables: The data equipment inter-connect cable must meet the impedance, attenuation, and NEXT requirements for Category 6 Horizontal Cable of TIA/EIA-568-C. The Contractor shall be responsible for coordinating all data equipment interconnects with the County prior to installation.
 - i. NOTE: The Data Equipment Inter-connect Cables for under floor applications require a plenum rating.

(e) Modular Patch Panels

- (i) All RJ45 modular patch panels shall be of an approved manufacturer and shall consist of no more than 48, Category 6 ports with TIA/EIA568B pin-out.
- (ii) Minimum performance specifications: Must meet requirements for Category 6 of TIA/EIA 568-C.
- (iii) Jacks shall be 110/factory PC board constructed or field terminated, direct connection jacks.
- (iv) Patch panels shall be furnished with field installable labels and or icons and all field installed jacks shall be color coded as required.
- (v) Patch panels shall be installable on standard 19-inch equipment racks or cabinets as required.
- (vi) Should wall mounting be required, fully opening swing racks with all associated cable management shall be required.
- (vii) All hardware shall be UL listed and CSA certified.

(f) Modular Voice/Data Outlets

- (i) NOTE: All 8-position modular jack inserts for voice and data locations are to be pinned as per TIA/EIA 568B.
- (ii) For all outlets (voice and data): Outlets shall be of the approved manufacturer and shall consist of 8-pin terminations for two jacks, unless otherwise noted.
 - i. Minimum performance specifications: Must meet requirements for Category 6 of TIA/EIA 568-C.
 - ii. Modular jacks shall be color-coded for identification.
 - iii. All components shall be UL listed and CSA certified.
- (iii) Wall Mounted outlets/faceplates: In locations with one 4-inch square box and a single gang plaster ring: two, four-pair station cables shall be terminated as follows. Color to be specified by County per cabling request.

Request for Pre-Qualification No. 902232
County of Alameda, General Services Agency
Countywide Cabling Services

- i. A flush single gang, two port faceplates.
 - ii. Two Category 6, 110 type, EIA/TIA T568B termination jacks.
 - iii. Black on white self-adhesive, computerized labels. Pre-approved by County.
- (iv) Systems furniture outlets/faceplates: In locations with system furniture mounted outlets: two, four-pair station cables shall be terminated as follows.
- i. Two port systems furniture outlets complete with all required adapters/bezels and mounting hardware. Must fit in furniture access points.
 - ii. Two Category 6 - 110 type, EIA/TIA T568B termination jacks.
 - iii. Black on white self-adhesive, computerized labels. Pre-approved by County.
- (v) Wall phone outlets:
- i. Face plates shall be stainless steel or plastic (to be specified by County per cabling request) with two wall-phone hanging studs.
 - ii. Face plate shall have a single 8-pin RJ-45 jack.
- (g) Splice Case
- (i) Fire retardant splice cases shall meet the following specifications:
 - i. Splice cases shall be Avaya 2000FR series splice closures, and 3M K&B vault closures.
 - ii. End caps with hole configurations shall meet cable sheath diameters without fillers. All unused end-cap holes shall be plugged.
 - iii. Bonding brackets or L Bracket Bonding Kit. Used for grounding in fiber optic splice cases.
 - iv. Sealant for flooded and filled cables to eliminate the leakage of the flooding/filling compound.
 - (ii) Contractor shall provide proposed splice cases and connectivity arrangement via the scope of work and shop drawing process.
- (h) Elevator Phone Connectors

Request for Pre-Qualification No. 902232
County of Alameda, General Services Agency
Countywide Cabling Services

- (i) For elevator phone connections in elevator machine rooms, 60-inch cable whip shall be coiled at 4-inch square box with blank cover plate.

(13) Copper Cabling Installation:

(a) General

- (i) The Contractor shall install all backbone and station cabling in accordance with these specifications and required via County approved scope of work and/or shop drawings as required.
- (ii) The Contractor shall install each cable as an uninterrupted conductor between the designated termination points, unless otherwise directed by the cable installation specifications. There shall be no splices installed between the cable points of origin and termination.
- (iii) Unless otherwise noted, all cables shall be routed through the building cable tray/conduit/floor duct system. Contractor to
- (iv) coordinate all pathway requirements with the appropriate disciplines.
- (v) Cable tags shall be placed as per these specifications. Tags containing a unique cable ID designator shall be placed on both ends of all cables, six inches from the connector and/or terminal block. Also label all backbone cables passing through communications rooms.
- (vi) Common cable runs shall be tie wrapped to supporting devices, except in the above ceiling cable tray system.
- (vii) At the same time cable is pulled into a conduit or floor duct a pull rope shall also be installed to facilitate future cable pulls along those pathways.
- (viii) Contractor shall coordinate also with the Systems Furniture Contractor to schedule installation of communications cables and outlets as required.
- (ix) Contractor shall provide mounting plates and/or face plates for use in floor monuments and flush floor boxes. Coordinate with the Electrical Contractor regarding the exact type to use.

(b) Multi-Pair Riser Cable

- (i) All riser cables shall run from the locations through the dedicated pathways and spaces identified in the Contractors scope of work and shop drawings and into their respective communications rooms. All riser cables shall be "punched down" on terminating

**Request for Pre-Qualification No. 902232
County of Alameda, General Services Agency
Countywide Cabling Services**

blocks. All riser cables running on cable tray within any communications room shall be neatly placed and lashed to the horizontal and vertical tray with cable ties at intervals not to exceed every two feet (2') on horizontal runs and every foot (1') on vertical runs plus all locations where the cable changes direction.

(c) Multi-Pair Outside-Plant Cable

- (i) Filled outside plant cables shall run as required for each individual building, through the dedicated conduits and manholes. All filled outside plant cables shall be "spliced" on 25-pair splice modules at both ends of the filled cable. Cables running on ladder racking within the building entrance facilities shall be neatly placed and lashed to the horizontal and vertical ladder racking with approved straps at intervals not to exceed every third rung plus all locations where the cable changes direction.

(d) Station Cable

- (i) From the appropriate communications room, Contractor shall provide to each workstation outlet, the types and quantities of station cables as described in this section. Cables shall leave the communications room via cable tray, conduit, or sleeve. Where an overhead cable leaves the cable tray, County approved J-hooks shall be installed on centers not exceeding six feet (6') to support the cables to their respective "stub ups" above the finished ceiling or appropriate access point.
- (ii) At no point shall any station cables be tie-wrapped to the cable tray. After cables have exited the cable tray, they shall be tie wrapped with plenum rated tie wraps (where applicable) to the J-hooks. The tie wraps shall be cinched snug around the cable bundle enough to keep them uniform and in the hooks, but not so tight as to damage the construction or geometry of the cables themselves.
- (iii) System Furniture Workstation Cable:
 - i. The installation of the workstation cables shall be coordinated with the system furniture contractor. Prior to the system furniture installation, the workstation cables shall be pulled to the access point and left coiled with enough slack to reach the eventual outlet location. After the systems furniture is installed and walls/floors are finished, the Contractor shall pull cables to the outlet locations and complete the cable installation.

**Request for Pre-Qualification No. 902232
County of Alameda, General Services Agency
Countywide Cabling Services**

ii. Where system furniture is used, cables shall be routed from wall and floor access points as coordinated by the Contractor. The Contractor shall provide appropriate size spiral wrap or split duct for any cables exposed between the system furniture and the telecommunications cable access point. Tie wraps or flexible conduit shall not be accepted. Contractor to submit sample of spiral wrap or split duct in the color which is intended for installation.

(iv) All station cables shall be installed per the TIA/EIA 568-C standards for Category 6 cables and hardware.

(e) Splice Connector/Case

(i) Contractor will install multi-pair splice connectors per manufacturer's instructions and follow all industry best practices documentation.

(ii) Contractor will label all 25-pair splice connectors with beginning and ending pair count as well as the Binder Group number.

(f) Cable Terminations

(i) Conductors are to be splayed and terminated in a neat and uniform fashion. Maintain sheath integrity by removing only as much as is practical to accomplish termination (generally less than 1/2").

(ii) Cable pair twists shall be maintained to the point of termination for all station cabling. At no time shall cable pairs be untwisted or otherwise altered prior to termination.

(iii) Contractor shall not bend station cables to a radius of less than eight times the cable diameter. Kinked cables shall be corrected and tested. If they do not pass tests they shall be replaced. Cables which have had their sheath cut during installation shall be replaced. Taped cables shall not be accepted.

(g) Patch Cords

(i) The Contractor will perform all necessary patch cord installation. Use the shortest necessary patch cord lengths. After completion of work, dress patch cords and in cable management apparatus. Do not tie wrap patch cords into bundles.

(h) Cable Identification

(i) Contractor shall provide pre-printed labels for each installed cable with the appropriate jack number or termination location as indicated. Handwritten cable labels are not acceptable.

Request for Pre-Qualification No. 902232
County of Alameda, General Services Agency
Countywide Cabling Services

- (ii) All cable tags shall be easily accessible, both physically and visually, upon completion of the job.
- (i) Quantities and Placement of Items
 - (i) Location and placement of termination blocks, splice boxes, patch panels and other distribution hardware shall be as shown on the drawings or identified, in writing, by the County.
 - (ii) Unless otherwise noted, quantities of blocks, racks, splice boxes and patch panels, etc. shown on the drawings are illustrative only and are meant to indicate the general configuration of the work. The Contractor is responsible for providing the correct quantities of blocks, racks, patch panels, connectors, etc. necessary to terminate, cross connect, and patch the volume of cable required for each individual request and in accordance with these specifications. Where less than all of the capacity of a terminal block, patch panel, etc. is used to terminate cables, the Contractor shall provide the County with the number of connecting blocks, coupling panels, modules, etc. to completely fit out the installed equipment.
- (j) Copper Cable Testing
 - (i) At a minimum, the Contractor shall test, as described below, all copper and optical fiber cables installed under these specifications. Contractor shall also perform those system specific tests required by the individual system specification sections.
 - (ii) Pre installation testing:
 - i. Visually inspect all cables, cable reels, and shipping cartons to detect cable damage incurred during shipping and transport. Return visibly damaged items to the manufacturer.
 - ii. Do not install any cable with less than the manufacturer's guaranteed number of serviceable conductors or fibers.
 - (iii) Post-installation testing:
 - i. Conduct cable testing as described below upon completion of installation. Test fully completed systems only. Piecemeal testing is not acceptable.
 - ii. Remove all defective cables from pathways system. Do not abandon cables in place.
 - (iv) The County reserves the right to observe the conduct of any or all portions of the testing process.

Request for Pre-Qualification No. 902232
County of Alameda, General Services Agency
Countywide Cabling Services

- (v) The County further reserves the right to conduct, a random re-test of up to 10% of the cable plant to confirm documented test results.
 - (vi) All test results and corrective procedures are to be documented and submitted to the County within ten working days of test completion.
 - i. Each test report form shall contain the following general information: date of preparation, date of test, cabling request name, Contractor's name, media type, make, model, and serial Number of test equipment used, and date of last calibration.
 - ii. Backbone and workstation copper cable test reports: as a minimum, shall also provide cable number, cable type, pair or conductor count, individual pair or conductor numbers, results of each test for each pair or conductor.
 - iii. Multi conductor backbone cable: After terminating and splicing the cables, Contractor will test all cable pairs for continuity, ground fault, proper cross-connection, shorts and crossed pairs.
 - iv. For multi-pair cables: For 50 pair or smaller, Contractor will replace entire cable if bad pair or conductor is found. For larger pair count cables, replace if more than 2% of pairs are bad.
 - v. Workstation cables: After terminating both ends of all UTP cables, but before any patch cords are installed, Contractor will test all UTP copper station cables for Category 6 compliance in accordance with TIA/EIA-568-C requirements for Level 2 bi-directional testing.
- (14) Fiber Optic Cabling and Termination:
- (a) This section of the specifications addresses the fiber optic backbone cables, interconnect cables, and any fiber station cabling required under the contract. The Contractor shall be responsible for the labor, tools, equipment, and services necessary for a complete fiber optic cable plant as specified herein.
 - (b) The work of this section shall include but is not limited to the following:
 - (i) A complete fiber optic cabling system with cables, termination hardware, splices and necessary installation hardware as required in the specifications and per each cable request scope of work.

Request for Pre-Qualification No. 902232
County of Alameda, General Services Agency
Countywide Cabling Services

- (ii) Providing a complete fiber optic backbone distribution and riser diagram and scope of work for County approval prior to commencement of work.

(c) Standards

- (i) Except as modified by governing codes and by the Contract Documents, Contractor will comply with the applicable provisions and recommendations.
- (ii) TIA/EIA-568-C, "Commercial Building Telecommunications Wiring Standard, ANSI/TIA/EIA 606 Administration Standard for the Telecommunications Infrastructure of Commercial Buildings.

(d) Fiber Optic Cable Specifications

(i) Multimode Fiber Optic Riser Cable Requirements:

i. Fiber Optics specifications:

Fiber Type – OM4 Multimode.

Fiber material - SYSTIMAX 50/125.

Buffer - 900 um, mechanically strippable PVC.

Fiber strength - 100 kpsi minimum.

Color code - EIA/TIA - 598, color coding for fiber optic cables.

ii. Cable construction specifications:

Core - Buffered fibers shall be supported in Aramid yarn matrix.

Armor – None.

Jacket - UV and Sunlight resistant PVC.

Cable listing - UL OFNR, CSA FT-4.

iii. Cable jacket marking: Must be legible and shall contain the following information:

Manufacturer's name.

Fiber size, 50/125.

UL and CSA listing (MUST be suitable for the application).

Manufacturer's Trademark.

Sequential foot markings.

Request for Pre-Qualification No. 902232
County of Alameda, General Services Agency
Countywide Cabling Services

- iv. Cable jacket shall be aqua with black lettering.
- v. Minimum performance specifications as follows:
 - Maximum attenuation: 3.2 dB/km @ 850 nm, 0.9 dB/km @ 1300 nm
 - Minimum bandwidth: 200 MHz-km @ 850 nm, 600 MHz-km @ 1300 nm

(ii) Multimode Fiber Optic Outside Plant Cable Requirements:

- i. Fiber Optics specifications:
 - Fiber Type - OM4 Multimode
 - Fiber material - SYSTIMAX 50/125
 - Coating - 50 um, acrylate
 - Fiber strength - 110 kpsi minimum
 - Color code - EIA/TIA - 598, color coding for fiber optic cables
- ii. Cable construction specifications:
 - Core - Flooded core.
 - Buffer tubes - Gel filled.
 - Aarmor - None, full dielectric construction.
 - Jacket - UV and Sunlight resistant MDPE.
 - Cable listing - UL OFN.
- iii. Cable jacket marking: Must be legible, and shall contain the following information:
 - Manufactures name
 - Fiber size, 50/125
 - UL and CSA listing (MUST be suitable for the application)
 - Manufactures Trademark
 - Sequential foot markings
- iv. Cable jacket shall be Black with White lettering.
- v. Minimum performance specifications as follows:
 - Maximum attenuation: 3.2 dB/km @ 850 nm, 0.9 dB/km @ 1300 nm

Request for Pre-Qualification No. 902232
County of Alameda, General Services Agency
Countywide Cabling Services

Minimum bandwidth: 200 MHz-km @ 850 nm, 600 MHz-km @ 1300 nm

(iii) Single Mode Fiber Optic Outside Plant Cable Requirements:

i. Fiber Optics specifications:

Fiber Type - Single Mode

Fiber material - SYSTIMAX 8/125

Coating - 250 um, acrylate

Fiber strength - 110 kpsi minimum

Color code - EIA/TIA - 598, color coding for fiber optic cables

ii. Cable construction specifications:

Core - Flooded core

Buffer tubes - Gel filled

Armor - None, full dielectric construction

Jacket - UV and Sunlight resistant MDPE

Cable listing - UL OFN

iii. Cable jacket marking must be legible and shall contain the following information:

Manufactures name

Fiber size, 8/125

Fiber Grade

UL and CSA listing (MUST be suitable for the application)

Manufacturer's Trademark

Sequential foot markings

iv. Cable jacket shall be Black with White lettering

v. Minimum performance specifications as follows: Maximum attenuation: 0.5 dB/km @ 1310 and 0.4 dB/km 1550

(e) Connectors and Adapters

- (i) Optical Fiber, Multimode: Ceramic tipped, LC connectors. Suitable for use with specified multimode optical fiber. Maximum insertion loss across mated pair: less than 0.1 dB. Suitable for field installation.

Request for Pre-Qualification No. 902232
County of Alameda, General Services Agency
Countywide Cabling Services

- (ii) Optical Fiber, Singlemode: Ceramic tipped, LC connectors.
Suitable for fusion splicing specified singlemode optical fiber.
Maximum insertion loss across mated pair: less than 0.1 dB

(f) Patch Cords

- (i) Multimode and singlemode Fiber Optic Patch Cords should be of a type and quality to match the installed fiber cabling:
 - i. Cable construction specifications:

Duplex Zip cord - Buffered fibers shall be supported in
Aramid yarn matrix

Cable listing - UL OFN

(g) Splices

- (i) Multimode and singlemode fiber optic cable splicing shall be fusion splicing.
- (ii) Multimode and singlemode flooded fiber optic cables shall be spliced to riser rated dry fiber optic cables at the building entrance points.
 - i. Splice cases shall be CommScope
 - ii. Provide end caps with hole configurations to meet cable sheath diameters without fillers.
 - iii. Provide plugs for all unused end cap holes.
 - iv. Provide sealant for flooded and filled cables to eliminate the leakage of the flooding/filling compound.
 - v. Metal trays shall be used to hold all fusion splices.
 - vi. Fiber optic cables shall be labeled at the Fusion splice tray.
- (iii) Singlemode pre-terminated fiber optic pigtails shall be spliced to riser rated and or flooded outside plant fiber optic cables as required.
 - i. Rack mounted splice tray enclosures shall be by the same manufacturer as the fiber optic connector panels.
 - ii. Provide sealant for flooded and filled cables to eliminate the leakage of the flooding/filling compound.
 - iii. Metal trays shall be used to hold all fusion splices.
 - iv. Fiber optic cables shall be labeled at the Fusion splice tray.

(h) Fiber Optic Distribution Frames

**Request for Pre-Qualification No. 902232
County of Alameda, General Services Agency
Countywide Cabling Services**

- (i) Optical Fiber Main Distribution Frame shall be free standing, 19-inch bay, 84 inches in height, containing 72-port connector termination modules, splicing modules and patch cable storage modules. Building entrance fiber optic cables shall be segregated from building distribution fiber optic cables.
- (i) Fiber Optic Patch Panels
 - (i) Optical Fiber Patch Panels shall be:
 - i. Fully enclosed cable management tray type patch panel.
 - ii. Rack mountable in 19-inch relay racks as shown on drawings.
 - iii. Front and rear access (front access only for wall mounted).
 - iv. Complete with all necessary cable clamps, couplings, and connector bulkheads.
 - (ii) Fiber optic cables shall be terminated in cable management trays.
 - (iii) Fiber optic patch panels shall accept a variety of interchangeable bulkheads including ST, SC, LC, as well as attenuators.
 - (iv) Fiber optic patch panels shall provide a splice tray option.
- (j) Fiber Optic Cable Installation
 - (i) Backbone Cables:
 - i. Install between the optical fiber Main Distribution Frame (MDF) and the communications distribution rooms as required via the scope of work and shop drawing approval process
 - (ii) Connector Panels
 - i. Optical fiber cables shall enter the fiber optic connector panels from the top rear side of the panel enclosure.
 - ii. The fiber optic connector panels shall be mounted in the 19-inch equipment racks. The top of the panels shall start at 72 inches above the finished floor.
 - (iii) Connector Installation:
 - i. After dressing the cable to its final destination, sheath shall be removed to a point that allows the conductors to be splayed and terminated in a neat and uniform fashion. At this point all fibers shall be terminated in strict compliance with the manufacturer's submitted instructions. Terminate

**Request for Pre-Qualification No. 902232
County of Alameda, General Services Agency
Countywide Cabling Services**

both ends of each optical fiber with an LC connector, as per manufacturer's recommendations. After termination, mount all connectors in patch panels.

(iv) Cable Identification:

- i. Identify all optical fiber cables in accordance with the Contractors approved submittal.

(v) Cable Testing

- i. Pre-installation testing: Optical fiber cables: Contractor will perform visible light continuity check on each fiber. If one end is not accessible, perform OTDR test to assure fiber continuity.

- ii. Post-installation testing:

After installation of connectors, Contractor will visually inspect each fiber end face at 10X magnification. Refinish fibers with visible defects and/or striations in the core area.

Contractor will perform end to end, bidirectional attenuation (loss) test for each fiber strand at 850nm and 1300nm wavelengths. Conduct tests in accordance with TIA/EIA-568-C, Method B and with test instrument manufacturer's printed instructions.

Contractor will demonstrate that measured link loss does not exceed the "worst case" allowable loss which is defined as the sum of: the connector losses (based on the number of mated connector pairs at the TIA/EIA-568-C maximum allowable loss of 0.75 dB per mated pair) and the optical fiber loss (based on length and the TIA/EIA-568-C maximum allowable loss (3.75 dB/km @ 850 nm and 1.5 dB/km @ 1300 nm).

Strands whose measured attenuation fall outside the acceptable range shall be subject to further inspection and testing to determine the nature of the fault. At a minimum, an OTDR shall be used to: determine the true loss for each connector pair, the exact length of the fiber and to identify the presence of any core damage.

Faults related to connectorization shall be corrected, and the fiber retested as stated in paragraph 3.08.B.2 above, until acceptable attenuation measurements are recorded.

Where defects are found to be inherent in the fiber itself: replace any cable having fewer than the manufacturer's guaranteed number of serviceable fibers.

Request for Pre-Qualification No. 902232
County of Alameda, General Services Agency
Countywide Cabling Services

- iii. In addition to the information required by Specification Section 16740, Contractor will submit the following information regarding the optical fiber cable testing:

Cable number, fiber count, individual fiber numbers, connector types, number of connectors/patches, calculated maximum link loss, length of run, measured link loss for each fiber.

(vi) Acceptance

- i. Once the testing has been completed and the County is satisfied that all work is in accordance with the Contract Documents, the County shall notify the Contractor in writing via the sign-off sheet.

(vii) Record Drawings

- i. The cable request record drawings shall show the types, locations and counts of installed: Cables, Splices

Patch panels

(15) Telecommunications Grounding and Bonding:

- (a) The work covered by this section of the Specifications includes all labor materials and equipment necessary or used to perform and complete such construction.
- (b) The work of this section shall include, but is not limited to, the following:
 - (i) Bond all cable tray segments, cabinets, and equipment racks to the ground bar in each communication room as required.
 - (ii) Provide a connection between the ground bar and the building electrical ground, if necessary.
 - (iii) Properly secure the ground straps for all installed power strips to the cabinet or equipment rack ground, as required.
 - (iv) Bond all armored cable sheaths to the ground bar in each communication room as required.
- (c) Grounding Conductors
 - (i) Cable jacket marking: Must be legible and shall contain the following information:
 - i. Manufactures name
 - ii. Copper Conductor Gauge
 - iii. UL listing

**Request for Pre-Qualification No. 902232
County of Alameda, General Services Agency
Countywide Cabling Services**

(ii) Cable jacket shall be green with black lettering.

(d) Cable Connectors (Lugs)

- (i) Connectors for conductors #6 AWG and smaller shall be standard barrel, single hole, compression type lug.
- (ii) Connectors for conductors larger than #6 AWG shall be long barrel, dual hole, and compression type lug.

(e) Cable and Wire Installation

- (i) General: Follow ANSI/TIA/EIA-607 standards.
- (ii) The Contractor shall provide a #6 AWG ground wire from each telecommunications equipment rack/cabinet to the nearest length of ladder rack as required. The Contractor shall be responsible for the associated grounding kits for the equipment racks/cabinets. Run ground wire on the Contractor provided cable management and pathways.
- (iii) The Contractor shall provide one-#6 AWG grounding wire from the Contractor provided cable tray to the telecommunications ground bus located in the respective telecommunications room as required.
- (iv) The Contractor shall provide a #6 AWG grounding jumper or 6" braided jumper at each cable tray junction to provide a continuous ground path from the ladder rack to the telecommunications ground bus. The jumpers shall be bolted through the cable tray side rail. On painted cable tray the paint shall be scraped off at the point of jumper connection to insure a clean contact between the jumper and the cable tray. There shall be no splices or mechanical couplers installed between the wire points of origin and termination.

(f) Connector Installation

- (i) The Contractor shall furnish and install all ground wire connectors as indicated herein, as required.
- (ii) Connectors shall be crimped on to ground cables.

(g) Cable Testing

- (i) As a minimum, the Contractor shall test for continuity between the object that is being bonded to and the ground bar in the telecommunication's room, on all Ground Cables.

(h) Record Drawings

Request for Pre-Qualification No. 902232
County of Alameda, General Services Agency
Countywide Cabling Services

- (i) Cabling request record drawings shall show the types and locations of installed grounding busbars.

(16) Fire Stops

- (a) The work covered by this section of the Specifications includes the labor, materials, and equipment necessary to perform and complete such construction. The work of this section shall include, but is not limited to, the following:

- (i) Fire stopping of communication conduits penetrating or passing through fire rated walls and/or floors.
- (ii) Fire stopping of communication sleeves penetrating rated walls or floors.
- (iii) Fire stopping of communication cable trays penetrating rated walls.

(b) Standards

- (i) The fire stopping methods used for the cabling request shall fully comply with their associated Underwriters' Laboratory Inc. fire stop system. The Contractor shall submit complete fire stop systems documentation for each type of fire stop system intended for this project.

(c) Fire Stop Installation General

- (i) Contractor shall provide fire resistant materials of a type and composition necessary to restore fire ratings to all wall, floor, or ceiling penetrations. All materials shall be UL classified and meet NEC and local codes.
- (ii) All penetrations through fire rated floors and walls shall be sealed to prevent the passage of smoke, fire, toxic gas, or water through the penetration either before, during or after a fire. The fire rating of the penetration seal shall be at least that of the floor or wall into which it is installed, so that the original fire rating of the floor or wall is maintained as required by Article 300 21 of the National Electric Code. Also install fire stops at any other locations indicated in the Specifications or Drawings.

(d) Fire Stop – Penetration Sealant – Conduits & Sleeves

- (i) No flammable material may be used to line the chase or hole in which the fire stops material is to be installed.
- (ii) When damming materials are to be left in place after the seal is complete, all such materials shall be nonflammable.

**Request for Pre-Qualification No. 902232
County of Alameda, General Services Agency
Countywide Cabling Services**

- (iii) The sealant shall be applied to the opening as per the manufacturer's printed instructions. No cables may be left touching each other, thereby allowing voids to form in the fire stop, unless explicitly allowed by the fire stop material manufacturer and the applicable UL fire stop system.
- (iv) The sealant shall remain resilient and pliable to allow for the removal and/or addition of cable without the necessity of drilling holes. It shall adhere to itself perfectly to allow any and all repairs to be made with the same material. It shall allow for vibration, expansion, and/or contraction of anything passing through the penetration without affecting the seal, or cracking, crumbling, and spalling.
- (v) When sealant is injected into a penetration, the material shall completely surround all the items within the penetration and maintain pressure against the walls of the penetration as well as the pass-through items. The material shall cure within five minutes and be fire resistant at that time. No heat shall be required to further expand the material to prevent the passage of fire and smoke or water.

(e) Fire Stop – Penetration Sealant – Framed Partition Openings

- (i) Contractor shall install fire stop materials in the framed openings through fire rated partitions per approved submitted drawings.
- (ii) Contractor shall install the fire stop system in accordance with the manufacturer's instructions and local codes.

D. Sequence of Work:

- (1) Each County department will assign a primary point of contact for each cabling request. The point of contact will contact the Contractor, schedule a site survey and provide a description of cabling request; Contractor will submit a proposal for work discussed
- (2) The County assigned point of contact shall:
 - (a) Submit a purchase requisition, attach the Cabling Request Form with the properly filled out supplementary questionnaire for the necessary work and have it approved, as required, by the:
 - (i) Department Manager;
 - (ii) GSA-Building Maintenance Department (BMD);
 - (iii) GSA-Technical Services Department (TSD) Environmental Engineering Manager;
 - (iv) Information Technology Department (ITD); and

Request for Pre-Qualification No. 902232
County of Alameda, General Services Agency
Countywide Cabling Services

- (v) Auditor's Office; the Auditor Controller Agency shall:
 - i. Verify authorized department approval signature on scope of work.
 - ii. Match signed off scope of work with corresponding requisition number.
 - iii. Sign the scope of work.
 - iv. Assign a purchase order number to the scope of work.
 - v. Transmit purchase order number electronically to Contractor as notice to proceed.
 - vi. Maintain a status log from the date scope of work is received through purchase order issuance.
- (vi) The Contractor will provide the email addresses of at least two of its/their employees who will receive all emailed purchase orders.
- (vii) Contractor shall respond to all phone and electronic messages from County personnel within 24 working hours of receipt..
- (3) Contractor shall accept scope of work/notice to proceed only from the Auditor Controller Agency, except for emergency repair work or T&M repair work requested by ITD. In addition to Auditor Controller Agency, authorized ITD management and the County assigned point of contact can give the Contractor work/notice to proceed for emergency repair work. The County assigned point of contact will provide the Contractor with a list of names of managers who can authorize emergency work.
- (4) Contractor shall immediately place all scope of work/notices to proceed into a scheduling queue. Rush orders will be noted on scope of work/notice to proceed and shall be scheduled for work to begin immediately, within three workdays of receipt. All other work shall be scheduled to begin within ten workdays unless another date is specified.
- (5) Contractor shall submit a written scope of work for all change orders with labor and material costs itemized in advance of changes. Contractor shall not be entitled to compensation for any changes or additions unless change or additions have been authorized in writing by the County. Such changes or additions shall be handled in the same manner as original orders.
- (6) The Contractor shall coordinate the work so as to keep interruptions to department operations at a minimum.
- (7) Upon completion of a cabling request that involves regulated life and safety issues or impacts building integrity, the Contractor shall notify the County assigned point of contact who will make arrangements for an inspection in the

Request for Pre-Qualification No. 902232
County of Alameda, General Services Agency
Countywide Cabling Services

presence of the Contractor for the purpose of determining acceptability of the completed cabling request.

- (8) Contractor shall invoice the County monthly for completed cabling requests per the original scope of work and change orders. No other charges shall be accepted unless specifically agreed to by the County at the time the job is quoted.
- (9) Invoices shall reference specific County purchase order numbers and the corresponding scope of work number issued for each cabling request.
- (10) Emergency cable repair work and T&M cable repair work may be invoiced on a County Purchase Order (PO). No work can be charged against any County PO without written authorization from the department's County assigned point of contact.
- (11) Labor and materials provided shall be itemized separately on each invoice.
- (12) Contractor shall provide a monthly status report of all cabling jobs in process to the County Information Technology Department. See sample format on Exhibit E.
- (13) Contractor must participate in periodic meetings with County personnel regarding status of all cabling requests.

END OF DOCUMENT

EXHIBIT A: ALAMEDA COUNTY INFRASTRUCTURE CABLING SPECIFICATIONS

VERSION 2020.1

CONTENTS

- 1 Overview2
- 2 Communication Rooms.....3
 - Typical MDF Layout4
 - Typical IDF Layout.....6
 - Approved Rack Equipment8
- 3 Building Pathways.....8
- 4 Backbone Cabling.....10
- 5 Horizontal Cabling.....11
 - Approved Cable Materials12
- 6 Administration and Testing.....13
- 7 Appendix.....15

1.1 Introduction

This document is intended to provide a guideline for uniform communications infrastructure design across County buildings (owned and leased), one that will ease maintenance and simplify the integration of new technologies. A structured cabling system is one whose parts are matched and designed to work together; thus, according to these Specifications, installed systems will: be of a certain cable type, have a restricted topology, use defined hardware, and be thoroughly tested prior to acceptance. It is the intent of these Specifications to set a baseline of operational functionality and product performance that all installations must meet. This document includes product specifications, general design considerations, and installation guidelines; however, it is not intended to be complete and exhaustive. Contractors must provide the necessary equipment and/or accessories for a fully functional installation that meets the intended design, whether expressly specified herein. Quantities of outlets, backbone routing, and installation details will be in separate construction documents. Systems will be considered operational only upon the County's acceptance of a properly completed installation, per this document.

1.2 Installing Contractor

The cabling contractor must be a certified installer of a County-approved structured cabling system (Systimax or PanGen) or be able to obtain a County site license from the structured cabling vendor. They are responsible for workmanship and installation practices in full accordance with these Specifications as well as the requirements of the manufacturer's program. A project manager will be assigned by the contractor throughout the duration of the installation. This person will coordinate the logistics of the installation and recommend any material or schedule changes that may be required. The contractor must also have an RCDD-certified individual available to insure adherence with industry best-practices. A walk-through of the job site by that RCDD, prior to quoting on any project, will be considered essential.

1.3 Topology

Alameda County intends for any communications cabling installation to provide a single logical transport for all information systems within the facility. Beyond just desktop voice and data, all endpoints that could potentially utilize the same physical medium should be accounted for: cameras, wireless access points, building management systems, and any other IP-based device. Additionally, traditional analog connections need to be included as well: fax machines, security alarms, fire alarms, elevator phones, intercoms, door buzzers, and any paging interface.

The overall cabling topology for County facilities should provide a central consolidation point within any building (MDF) or campus, with connectivity radiating out along logical pathways.

1.4 Codes and Standards

The latest editions and addendums of the following industry references and their subsections will be adhered to in any installation of cabling systems within the County of Alameda. This document,

state and local regulations, and all manufacturers' instructions are included by inference. In the event of non-regulatory conflicts, the County standard (this document) will take precedence, followed by the more stringent applicable standard.

- ANSI - TIA/EIA 568C, Commercial Building Telecommunications Cabling Standard
- ANSI - TIA/EIA 569A, Commercial Building Standard for Telecommunications Pathways and Spaces
- ANSI - TIA/EIA 607, Commercial Building Grounding and Bonding Requirements for Telecommunications
- ANSI - TIA/EIA 758, Customer Owned Outside Plant Telecommunications Cabling Standard
- NFPA 70 - Article 645, National Electrical Code, Information Technology Equipment
- NFPA 70 - Article 800, National Electrical Code, Communications Circuits
- NECA/BICSI 568-2006, Installing Commercial Building Telecommunications Cabling
- TDMM – BICSI, Telecommunications Distribution Methods Manual

2 COMMUNICATION ROOMS

2.1 Entrance Facility / MPOE

All County buildings must have an appropriate space to house service provider termination equipment and serve as a splice point for incoming cables. This space should be as close as practicable to the point at which cables cross the physical boundary of the structure, which is often a load-bearing exterior wall in the basement. This space should provide adequate overhead clearance for conduit stub-outs and cable routing; in practice, it is often most efficient to consolidate this MPOE within the larger MDF room. If the MPOE is an entirely independent space, then it should be sized similarly to an IDF. In all but the smallest of buildings, the MPOE should be fed by three 4" conduits connecting the service provider to the building. All conduits must be run so that they slope away from the building, to prevent water intrusion.

All incoming copper cable (whether provider or campus) must be routed through an entrance cable protector panel, which must be connected with a green-jacketed AWG #6 copper bonding conductor between the protector ground lug and the main TGB.

2.2 MDF

This area houses communication and control systems, adjuncts, and any battery backup (UPS).

2.2.1 Location

The following considerations must be given to the placement of the MDF:

- Centrally located within any building

- Contiguous with IDF rooms for unimpeded backbone cabling
- Not traversed by wet pipes, subject to humidity or steam infiltration
- Not below the local water table, or subject to water intrusion
- With a door opening onto a major hallway
- Not adjacent to mechanical, electrical, pumping, or generator closets to avoid EMF interference and fire-risks.

2.2.2 Access

The MDF must be a dedicated room with 24/7/365 availability. It should have both a card lock and a keyed entry (for access during power failures), and a minimum 38" unimpeded width and 90" clearance through the doorway. If this is a different room than the MPOE, it should be fed by multiple 4" conduits between the two.

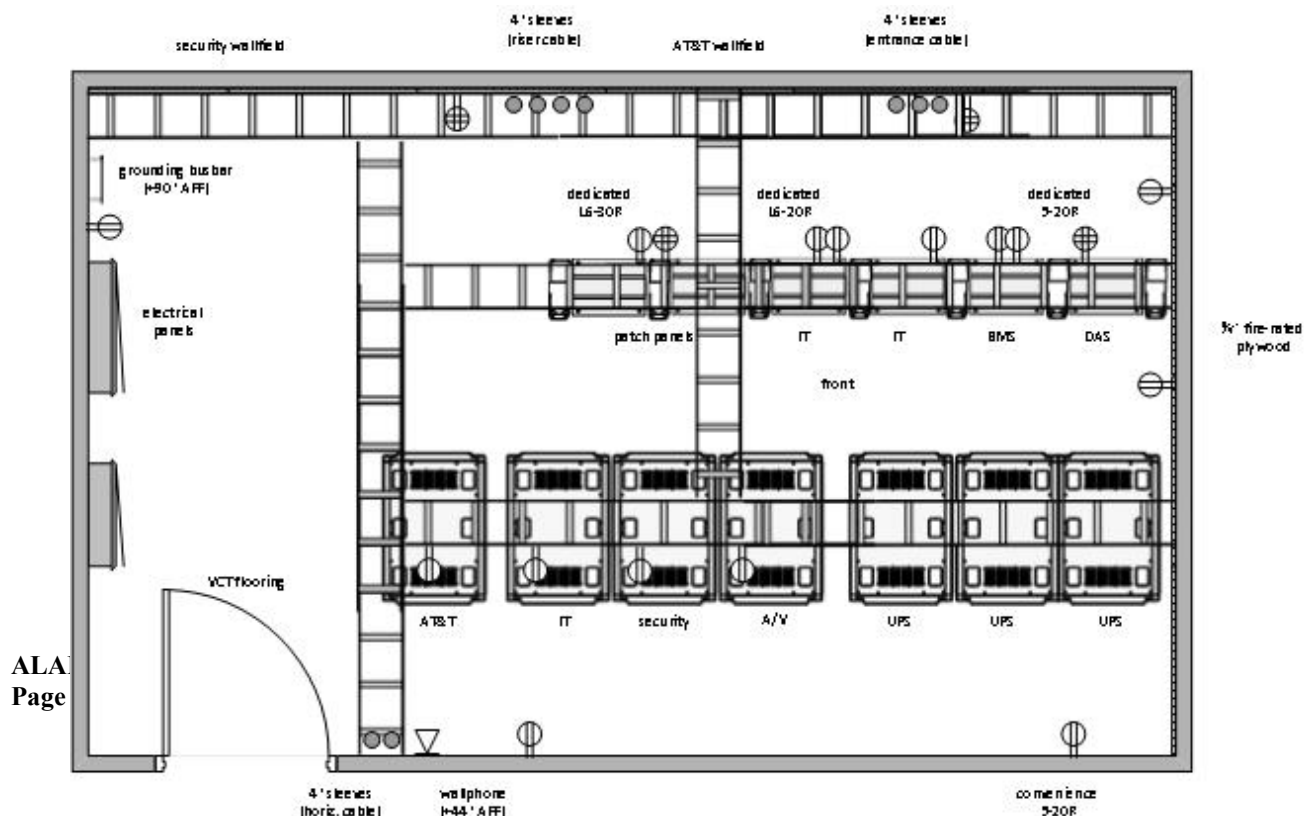
2.2.3 Construction

The MDF in all but the smallest facilities (<5,000 sq ft) must be a rectangular room capable of containing two parallel rows of equipment racks with adequate space front and rear for technicians to maneuver. It should have minimum 1-hour fire-rated, full-height walls, an open ceiling (no suspended tiles), and unimpeded access to one long wall for mounting equipment. The minimum recommendation is:

For the smallest facilities, a 10' by 8' (80 sq ft) room

For approximately 100 outlets, a 15' by 12' (180 sq ft) room

For larger facilities, a 23' by 14' (320 sq ft) room



The floor will be asbestos-free, non-conducting VCT (vinyl composition tile), designed to minimize dust, and light in color to enhance illumination. It will support a static loading of 200 lbs/sq ft. The County does not specify a raised floor.

The backboard will be 3/4" fire-rated plywood, with the "C" (knot) side facing the wall. If painted, it should be white and must not cover any fire-rating stamps. This plywood will be affixed to at least the two walls nearest the equipment racks, and mounted from 12" off the floor to 9' high (4x8 panels). It should cover all of the space behind anticipated racks and cable runway mounting points to provide an effective surface for installation. All plywood will be fastened securely to the wall substrate, with appropriate fasteners mounted flush to the surface.

2.2.4 Environmental

The lighting will consist of fixtures mounted to the ceiling, above the height of any cable runway, which illuminate the equipment uniformly (front and rear). Exact fixture locations should be coordinated with the equipment layout, to avoid interference. Control of the lights should not be on a timer or motion-sensitive switch. Select fixtures should be designated as emergency lighting.

There will be a dedicated (independent of the "base-building"), 24/7/365 cooling unit serving the MDF, with the sensors and controls for this equipment located within the room. This unit must report to the BMS and County IT department when alarm thresholds are exceeded. The recommended operating range for the room is:

- 68 to 79° F ambient room temperature
- 40 to 59% relative humidity

The operating range must take into account the heat load of all equipment expected to be installed, plus a reasonable margin for growth. Note that any water and drainpipes within the room must be fitted with drip pans to avoid equipment damage.

2.2.5 Electrical

The telephone and data equipment must be powered from dedicated circuits, clearly identified by label, and separate from the feed for any lights, convenience outlets, or HVAC. These circuits will generally consist of UPS-protected L6-30 (208v, 30a twist-lock), L6-20 (208v, 20a twist-lock), and 5-20 (120v, 20a straight) receptacles mounted onto the cable runway above the equipment racks. One dedicated 120v, 20a quad circuit must be located convenient to the security wall field, and there should also be a minimum of one 120v duplex convenience outlet per wall.

An electrical subpanel for the MDF should be within the room, and -- if fed by UPS -- clearly labeled as such. A single UPS large enough to support voice and data communication equipment throughout the building should be considered for any installation. Power backup systems will be designed to supply adequate AC power to connected equipment for a period of at least one hour (less is acceptable if further backed by generator). Any UPS designed to provide 208/240v output to equipment must be supplied with a manual bypass switch, distinct from the UPS itself, and any UPS larger than 6kva

must have its output hardwired to a standard electrical distribution panel.

The grounding and bonding recommendations of TIA/EIA 607 (see Appendix for diagram) will be adhered to in all County buildings. All communications equipment, racks, and runways will be grounded to a busbar (TGB) in each equipment room. Every TGB will be mounted to the wall at approximately 90" high with insulators and stand-off brackets, and then connected to building structural steel. The main TGB in the MPOE is also designated for outside cable protection and must safely carry lightning and power fail currents. It should be 1/4"D x 4"H x 18"L, and wired between the cable protectors and the approved building ground.

2.2.6 Fire Protection

The MDF should be provided with a dry-standpipe system to ensure against inadvertent water damage to electronic equipment while still providing fire protection. However, at a minimum, the MDF must be provided with a pre-action sprinkler valve and heads designed to operate at 212° F or higher as basic enhancements. An FM-200 (or similar) auxiliary suppression system should be considered for larger MDFs, and those serving critical facilities.

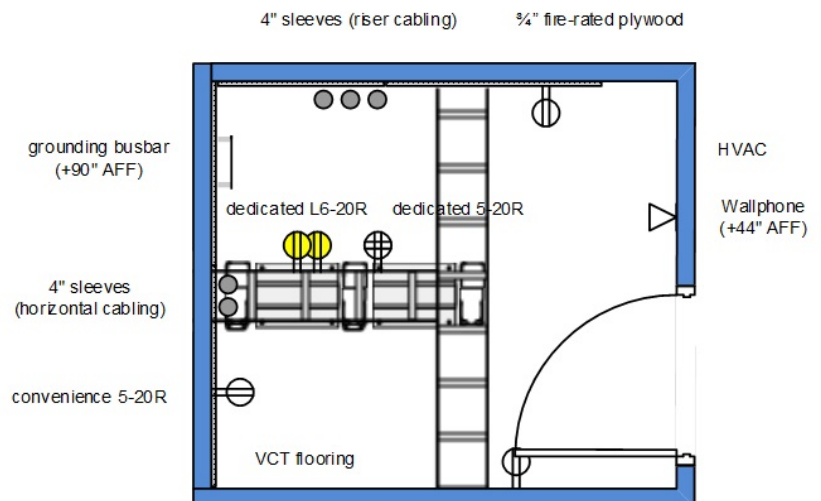
2.3 IDF

These rooms are intended to connect horizontal station cabling with the building backbone.

2.3.1 Location

The following considerations must be given to the placement of any IDF:

- A minimum of one per floor (more if >10,000 sq ft)
- Must be on the same floor as the terminations which it feeds
- No further than 220 feet from most distant wall
- Vertically stacked as feasible to limit backbone complexity
- Not traversed by wet pipes, subject to humidity or steam infiltration
- With a door opening onto major hallway
- Removed from mechanical and electrical closets, to avoid EMF
- Not for radio frequency (RF) distribution equipment



2.3.2 Access

Any IDF should have a lockable door that is 36” wide.

2.3.3 Construction

The design of any IDF will vary due to available space, but the minimum requirement is for a 9’ by 8’ rectangular room – sufficient for complete access to two equipment racks. Odd or “L-shaped” rooms are unacceptable unless the clear rectangular area is equivalent to a minimum 68 sq ft.

The floor, wall, and ceiling will be as in the MDF, with the note that any exposed brick, concrete and gypsum board will be painted or sealed to minimize dust.

2.3.4 Environmental

The lighting will be as in the MDF.

There need not be a dedicated air handling unit for an IDF, as long as the ambient temperature range with anticipated operational equipment is consistent with the surrounding office space. To that end, the room should have a louvered door. It is recommended that a temperature-controlled exhaust fan be supplied, set at 85° F.

2.3.5 Electrical

There must be a dedicated 208v, 20a twist-lock outlet in the room; it should be located on the overhead cable tray. There should also be a minimum of two 120v duplex convenience outlets, located at 6’ intervals around the room.

The room will have an appropriate TGB connected to the grounding backbone (TBB).

2.4 Racks

Equipment racks are used to house voice and data electronics, and route cable for the proper functioning of cross-connect products (see Appendix for diagram). The following must be observed in installations:

- Racks must be UL listed, aluminum, 19” by 84”
- Run in a row parallel to a long wall
- Mounted 51” from centerline to rear wall (for clearance when loaded)
- Properly bolted to the flooring and cable runway
- Spaced for proper installation of vertical managers

Any co-located network cabinets must retain at least 30” of unobstructed passageway behind – even if that requires their face not be flush with the racks.

Vertical and horizontal cable managers may differ in manufacturer from the rack or one another. The vertical managers must be 6” wide, with black finger-duct (and a cover door) on the front and distribution rings on the rear. They must be bolted to the racks on either side (unless at the end of a row). The horizontal managers should use black metal distribution rings, not plastic finger duct, and be front-sided only.

The cable runway should be at least 12” wide and run the length of the room, in-line with the racks. A runway segment should be installed perpendicular to the racks, and – in larger facilities – also along the entrance facility wall field. Any runway must be level to a tolerance of within ¼” over an 8’ span. This provides efficient cabling access to all equipment, properly supports the cables (as, under no circumstances, should they be draped across the floor), and braces racks against earthquake damage. All fittings must be of the same manufacturer as the runway itself, and a ground strap must be installed between sections of runway.

2.5 Approved Rack Equipment

Panduit R2P 19” equipment rack, black	R2P
Panduit PatchRunner2 vertical cable manager, black	PR2VD10
Panduit PatchRunner2 horizontal cable manager, black	PR2HF3

3 BUILDING PATHWAYS

3.1 Outside Plant

Interbuilding (OSP) cabling should be installed such that it can continue to effectively serve the campus decades into the future, even as individual buildings are modified or razed.

- Feed buildings via maintenance vaults, not structure pass-through
- Splicing must be done in maintenance vaults only
- Separate from other utilities by 3” in concrete, 4” in masonry, 12” in earth
- Install cables opposite traffic flow when using utility poles
- Route along roadway where possible, not bisecting undeveloped space

When installed in the ground, backbone cable must be run in conduit (no direct-buried installations) with sweeping bends instead of sharp turns for pathways. Provision at least one additional conduit for future use, and all conduit, whether used or not, should contain a nylon pull-rope. All buried conduit must be marked appropriately for future detection.

3.2 In-Building

Ensure the integrity of any signal that will be carried across the structured cabling system by observing practices that protect cabling from possible sources of interference or degradation:

- Cross electrical conduits at right angles only
- No splicing or intermediate patch panels are allowed
- No affixing to other utilities (gas, plumbing, etc)
- Route 18” from EMF-generating devices such as light ballasts (4’ from motors)
- Velcro wrap all bundles below ceiling grid (no staples)
- Completely replace cable if the sheath is damaged
- Observe minimum bend radius and pulling tension standards
- Unprotected cable must not be run alongside unfinished exterior walls

Also of particular concern in open-ceiling environments is that structured cabling be run along defined pathways. The cabling should be run in level (horizontal) paths, normalized with the lines of the building, as defined by its columns and beams; diagonal cable runs must be avoided.

3.3 Conduit

Backbone cable must be run in conduit and the conduit itself must be labeled at each end with the destination. For vertical runs use a minimum of two 4” conduits, plus one additional conduit for every three floors. Horizontal conduit runs should be considered for interconnecting multiple IDFs on a single floor of multi-story buildings. The maximum bend radius for any conduit is 10x the inside diameter. All conduit, whether used or not, should contain a nylon pull-rope. Do not mix copper and fiber cabling in the same conduit.

Any conduit used to feed station cables must be sized not to exceed 40% fill, with a minimum ¾” diameter. Other than in equipment rooms, conduit must be concealed with any stub-outs having minimal (<4”) protrusion from the finished walls. All stub-outs must be reamed or finished with insulated bushings to protect cable sheath. In open-ceiling environments the conduit end should be coordinated with the location of cable support devices. There will be a dedicated conduit per outlet box; daisy-chaining outlet boxes is prohibited unless specifically noted in the construction documents.

3.4 Penetrations

Any cable penetrations of walls or floors are to be sleeved with metallic conduit and bushings, sized to not exceed 40% fill. The ends must be finished appropriately to eliminate possible cable sheath damage. Penetrations of walls or floors designed as fire barriers are also to be caulked outside and packed inside with suitable fire stop material, in compliance with state and local fire codes.

In County-owned buildings, a penetration through the roof from the upper-most IDF must be provided for potential use by satellite, microwave, or other communication mediums. This penetration must be a minimum 2-1/2” conduit, with appropriate weather-head.

3.5 Cable Support

Support devices must be used for station cable runs of any length. Whether cable tray, “J-hooks”, or cable slings, they must be cat6 compliant and anchored approximately 4’ apart (to insure minimal sag). They will provide at least 3” of clearance from the ceiling (for access), and will hang securely from wire hangers dedicated to only the cable support devices. The cable will not be attached to ceiling grid supports or other structures, and at no point should cables rest on acoustic ceiling panels. Whatever support device is used, it should be sized not to exceed 40% fill.

3.6 Raceway

It is preferred that all cabling be concealed inside walls or plenum wherever possible; however, any exposed run must be enclosed in raceway. The raceway must provide separation of power and communication cabling, as well as bend-radius protection. Note that the use of utility columns (“tele/power poles”) is to be avoided in County facilities.

3.7 Outlet Rough-in

Outlets boxes should be flush-mounted, and sized to allow the station cable to have a 6” service loop. Each outlet should consist of two cables per workstation, unless otherwise specified, though multiple workstations may be fed from a single outlet. They should be located where they will not be blocked by furniture; ideally, where a standard 7’ patch cord will reach the desk phone.

The County specifically disallows the use of pedestal floor outlets (“monuments”). For modular furniture, outlets should be located close to the anticipated communication base feed (alongside the electrical whip).

3.8 Distributed Antenna System

Provision of a network of antenna nodes for public safety radio and cellular wireless transmission throughout the facility should be considered. Pathway should be designed for RG-6 horizontal distribution cable from each IDF sufficient to provide full-building coverage. If necessary, appropriate space and UPS-protected power for head-end equipment in the MDF must be provided.

4 BACKBONE CABLING

4.1 Quantities

Vertical backbone installations should consist of riser-rated, minimum 25-pair copper cable and laser-optimized, 50-micron OM4 multimode fiber and/or singlemode fiber, run simultaneously to each IDF. The fiber should be at least 12-strand, but 24-strand is strongly recommended for all but the smallest facilities. Campus backbone distances greater than 1500’ in length require 24-strand singlemode fiber be run alongside any copper cable.

4.2 Copper Method

Backbone copper cabling should terminate onto 110-block wall fields at both ends; all wall fields must

be supplied with cable troughs and D-rings for proper routing of cross-connect wire. Voice and data station cabling will terminate onto patch panels mounted in equipment racks. Unless otherwise noted, a feeder cable must be installed between the wall field and patch panels in the MDF and each IDF to support any legacy digital phones and/or analog devices. This feeder will be a minimum 25-pair cable, split out -- one pair per jack on pins 4 and 5 – to a dedicated patch panel.

4.3 Fiber Method

Optical cable must be run in 1-1/4” innerduct tubing and have a nylon pull-rope installed. When not also run inside conduit, both fiber and innerduct must be UL-rated for plenum use and secured every 5’ to the cable supports. Inter-building (campus) fiber must have a dry water-blocking system (100% gel-free) cable construction designed for both indoor and outdoor (buried conduit) use without a transition splice at the building entrance; it must also have a 20’ service loop at the building entrance. All fiber is to be installed with LC duplex connectors inserted into fully-enclosed termination shelves, unless otherwise requested.

4.4 Other Wiring

Vendors supplying and installing cabling for other building equipment, including but not limited to: A/V, CCTV, cable television, fire control, HVAC, overhead paging, and security systems should run their cable in such a manner as to minimize potential confusion with, or degradation of, communication service. When feasible, they should use their own cable supports and different colored wire. Under no circumstances should in-building radio distribution cable be run directly adjacent to communications cabling.

5 HORIZONTAL CABLING

5.1 Description

Station cabling throughout the County will consist of two cables to each outlet, unless otherwise specified. All station cable must be 4-pair UTP, UL listed for plenum use. Cat5e or Cat6 cable should not be used in new construction. The maximum acceptable total length for any individual station cable run is 275’ (thus leaving enough distance remaining to account for patch cords).

- Category 6A multimedia use, yellow and white

5.2 Method

All cables are to be home run to the appropriate IDF and terminated on patch panels. All work should be done professionally, with due diligence given to aesthetic concerns. Any unspecified materials necessary for the completion of work should be of a type and quality consistent with those identified in this document. Modifications or remodels within an existing building must conform to the products already in use at that location. Accessible portions of extant cabling not being reused, or terminated and tagged for future use, must be completely removed during any remodel – not

abandoned in place. Similarly, abandoned communication outlets will be covered with a blank faceplate, and not retain disconnected jacks.

In-wall station outlets are to be dual-position, single gang wall plates of a color that matches the electrical (typically ivory). Modular jacks will be of the proper performance grade to match station cable, and connections will be terminated as to maintain proper wire twist and sheathing. All jacks are to be wired with full 4-pair continuity, RJ-45, in a 568B configuration, and should be terminated with an orange modular connector (both voice and data, unless otherwise noted). Blank inserts must be installed in any unused jack locations.

Modular furniture must be wired using the baseboard raceway feed and proper faceplate adaptors for the system type, as the County does not allow the use of surface-mount (“biscuit” box) outlets in workspace locations. When there is exposed cable length between a modular furniture feed and the wall it is suggested to dress cables using corrugated plastic tubing.

5.3 Wireless Access Points

Outlets for wireless access points in office environments should be provided approximately every 25 sq ft. throughout any facility. These outlets must consist of three cables terminated in a single “biscuit” box with a 10’ service loop. In a suspended ceiling area, this outlet should be mounted above the ceiling grid on its own support wire, and not permanently mounted to any surface. Outlets for wireless access points in hard-ceiling environments should be three cables terminated inside a recessed equipment box. Alameda County ITD will provide the configured wireless access points to the cabling contractor to install as part of the cabling scope of work for each project.

5.4 Rack Installation

Patch panels will be of the proper performance grade to match station cable. The County disallows use of high-density patch panels (defined as more than 24 ports in a 1-U frame, or 48 ports in a 2-U frame). Connections will be terminated carefully to maintain proper wire twist and sheathing, and then dressed for a neat appearance. Copper patch cords will be “snagless”, of the same manufacturer as the patch panels, and equivalent (or better) grade than the station cable. Patch cords and cross-connect wires are not to be tied into bundles.

Any fiber connection shelves must be mounted at the top of the rack closest to the wall, to avoid accidental damage. Multimode fiber connector panels will use aqua phosphor-bronze sleeves, and singlemode fiber connector panels will use blue ceramic split sleeves. Fiber patch cords, pigtails, and cable must all be of the same grade of glass, providing the same bandwidth.

5.5 Approved Cable Materials

5.5.1 CommScope (SYSTIMAX GigaSPEED X10D System Solution)

4-pr cat6A cable (yellow), 2091B, U/UTP 4/23 R1000

760105957

4-pr cat6A cable (white), 2091B, U/UTP 4/23 R1000	760105940
48-pt cat6A patch panel, 1100GS5-48	760051169
cat6A modular jack (orange), MGS600-112	760092379
360GS10E Solid Cordage 15ft Patch Cord, 360GS10E	CPCSSX2-02F015
24-strand OM4 optical fiber, R-024-DZ-5K-FSUAQ	760127407
48-strand OM4 optical fiber, R-048-DZ-5K-FMUAQ	760126540
24-strand SM optical fiber, R-024-DZ-8W-FSUYL	760127373
48-strand SM optical fiber, R-048-DZ-8W-FMUYL	760127340
G2 Panel, HD Series 96LC/RU, HD-1U	760209940
G2Adapter Pack, LC Multimode, 360DPis-24LC-LS	760216754
G2Adapter Pack, LC Singlemode, 360DPis-24LC-SM	760216762
LC-LC 10ft OM4 Duplex patch cord	FEXLCLC22-MXF10
LC-LC 10ft Singlemode Duplex patch cord	FEWLCLC22-JXF10

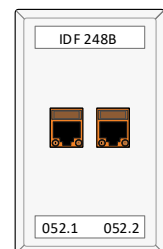
5.5.2 Panduit/General Cable (PanGen Cat6A System Solution)

4-pr cat6A plenum cable (yellow), 10MTP	7132852
4-pr cat6A plenum cable (white), 10MTP	7132850
48-pt cat6A patch panel, DP6A 10Gig	DP486X88TGY
cat6A jack (orange), Mini-ComTX6A 10Gig	CJ6X88TGOR
cat6A 15ft Patch Cord with TX6A 10Gig plugs	UTP6ASD315
24-strand OM4 optical fiber, 10G	BL0241PNU-ILPA
24-strand SM optical fiber, 10G	AP0241PNU-ILPA
48-strand SM optical fiber, 10G	AP0481PNU-ILPAS
LC-LC 3m OM4 Duplex patch cord	NKFPZ22LLLSM001
LC-LC 3m Singlemode (OS2) Duplex patch cord	NKFP92ELLSM001

6 ADMINISTRATION AND TESTING

6.1 Labeling

A labeling system will be utilized that clearly identifies each station cable. Machine-made, permanently affixed labels must be placed on each station jack and patch-panel port. They must be printed in black ink upon a white background. The labeling system should be based upon outlet, not work area, and irrelevant of the current purpose of a jack. The suggested method is for all outlets from a specific IDF to be



incrementally numbered, using three digits (including leading zeroes when necessary). The individual horizontal cables at a drop are then identified by a “dot” sequence from left to right, top to bottom; thus, the top right jack at the 52nd outlet fed from a particular IDF would be 052.2. The actual serving IDF is identified by the label “IDF [room #]” on each outlet.

6.2 Testing

Tests must be performed using industry standard test equipment that has been UL verified to level III accuracy as defined by TIA/EIA-568-B.2-1. The tester must be recalibrated according to the manufacturer’s recommended schedule, and must specifically check for guaranteed performance throughout the valid range of the cable. The equipment should use marginal pass indicators (to identify when the result is closer to a test limit than the tester’s margin of accuracy), and links which report a marginal pass should be re-terminated and tested again.

All installed cable must be permanent-link tested prior to system cut-over and activation in accordance with the appropriate field test specifications; sample tests of only some cables are not acceptable. For multi-pair copper backbone cabling no more than 2% of the total pairs may be defective. The contractor will immediately replace (remove and re-install) or repair, at no cost to the County, any copper, fiber, or backbone cable not meeting expected performance parameters and retest prior to final acceptance.

6.3 Verification

The County may, at its discretion, have its own representatives inspect and retest a sample of the installed communications links. Any individual discrepancies must be resolved, to the County’s satisfaction, by the installing contractor (and at their own cost). If more than 2% of the sample results are confirmed to differ, in terms of pass/fail, then the installation contractor must retest all of the communications cabling at their own cost.

6.4 Documentation

Test results must be provided in digital format for all installed cabling (copper, fiber, or backbone) to the Alameda County Information Technology Department, Telephony Services Division, prior to final acceptance. The information for all copper station cabling should be sorted in ascending numerical order (according to the labeling standard), and include the relevant test information for the type of cable. The information for each test will contain the worst pair value, the worst pair margin, the test frequency of that worst pair, and the test limit at that frequency. The electronic file for each test result must include the brand name, model, serial number, and software version of the tester used, as well as the cabling test category and date performed.

As-built drawings of the complete structured cabling system should be included at the same time, in digital media (preferably PDF format), at no additional cost to the County. It is the contractor’s

responsibility to ensure that the Alameda County has the necessary Microsoft Windows PC software to read all documentation.

6.5 Certification

The contractor must successfully receive certification of the installed structured cabling system from the manufacturer before the County will accept a completed installation. The certification must provide at least a 20-year warranty directly to the County on the material and workmanship of the cabling system, including connectivity components and any backbone or other subsystems installed. The warranty must cover standards adherence, transmission performance, application assurance, and repair/replacement of faulty equipment (including necessary labor). Evidence of this certification must be presented to the County with other required documentation.

6.6 Exceptions

Any exceptions to these Specifications must be approved in writing, in advance, by the Alameda County ITD, Telephony Services Division. Trade names, brand names, model numbers, etc used in this specification are for the purpose of providing a performance and quality reference and are not intended to be exhaustive. Alternative parts must meet or exceed all performance references listed herein, the relevant industry guidelines, and comply fully with the chosen structured cabling system manufacturer's warranty program. It is the installing contractor's responsibility to demonstrate such equivalency.

7 APPENDIX

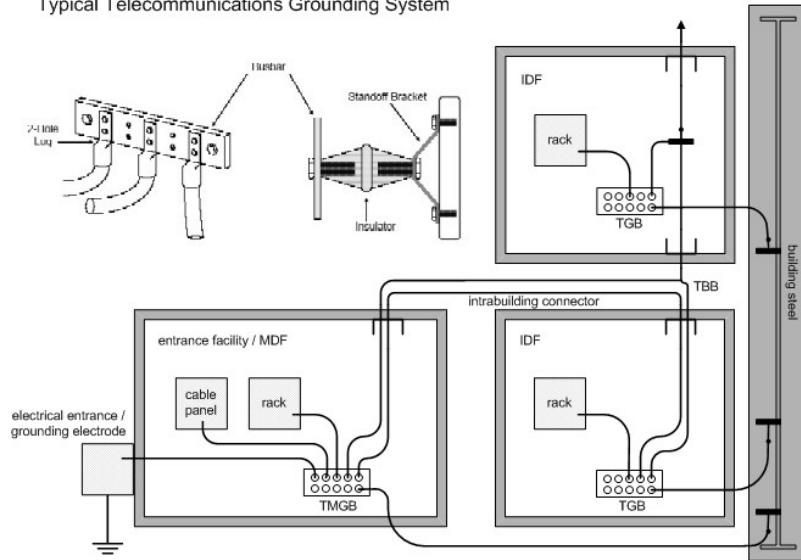
7.1 Glossary

<i>As-Built</i>	Documentation that reflects actual cable routing installed upon job completion.
<i>Backbone</i>	Copper and fiber cable that interconnects the MPOE, MDF and IDF's within a building, as well as any outside plant facilities between buildings on a campus.
<i>Cable Tray</i>	Welded steel-wire cable "basket" conveyance with field-formable bends.
<i>D-Ring</i>	Metal cable management ring used for routing cable on a plywood backboard.
<i>EMF</i>	Electromagnetic Fields, energy generated by electronic equipment that can cause interference with voice and data transmissions.
<i>Fill</i>	The carrying capacity (in quantity of cable) of a particular cable conveyance.
<i>HVAC</i>	Environmental air handling units and their control assemblies.

<i>IDF</i>	Intermediate Distribution Frame, an enclosed integration point on a floor for serving data and telephony to nearby stations, also referred to as a riser closet, distribution closet, telecom room, or hub room.
<i>Jack</i>	Modular telecom receptacle for termination of station cable in a work area.
<i>MDF</i>	Main Distribution Frame, centralized location for primary electronic equipment within a building, and the termination point for backbone cabling, also referred to as the phone room, computer room, or equipment room.
<i>MPOE</i>	Minimum Point of Entry, building entrance for public and private network service cables.
<i>Outlet</i>	The collocated group of modular jacks where station cables are terminated, also referred to as the wall faceplate or a cable drop.
<i>Port</i>	Receptacle on the IDF end of a station cable.
<i>Raceway</i>	Any enclosed conveyance or channel designed for routing cables.
<i>RCDD</i>	Registered Communications Distribution Designer certification from BICSI, a technical organization for low-voltage cabling design and installation.
<i>Runway</i>	Cable conveyance shaped like a ladder and used primarily in MDF and IDFs, also referred to as ladder rack.
<i>Station</i>	An individual end-user communications or network device.
<i>Station Cable</i>	Horizontal cabling that connects a patch panel in the IDF to the work area outlet.
<i>TBB</i>	Telecommunications Bonding Backbone, a conductor between the main TGB (in the MPOE) and the TGBs in IDFs throughout the building.
<i>TGB</i>	Telecommunications Grounding Busbar, a solid copper plate pre-drilled with holes for bonding electronic equipment to building ground.
<i>UPS</i>	Uninterruptible Power Supply, back-up battery power source for electronic systems.
<i>UTP</i>	Unshielded Twisted Pair, standard premises cable containing pairs of twisted copper wire without metallic shielding.

7.2 Grounding

Typical Telecommunications Grounding System



7.3 Typical IDF Elevation

Typical IDF Rack Design

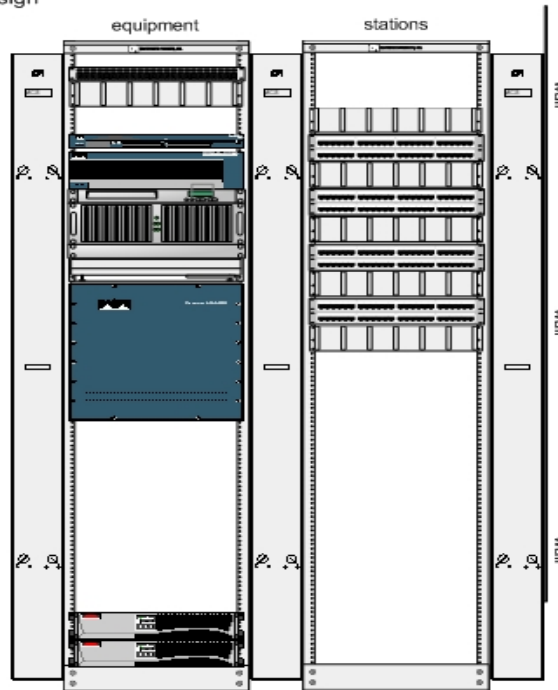




Exhibit B: Sample Supplemental Questionnaire

Supplemental Questionnaire

CABLING REQUEST NUMBER: _____

(Enter street address where work will be done here: include city name)

INSTRUCTIONS: This questionnaire is to be completed by Vendor (subcontractor if Vendor is subcontracting the work out) and submitted with Vendor's quotation.

YES NO Is scope of work limited to equipment change out (no cable)?

YES NO Are new cable pulls required? If yes, is the proposed routing through:

___ Existing conduit?

___ Other established pathways?

Describe routing: _____

If proposed routing is through overhead areas, will cable be:

___ Bundled and suspended with cable ties?

___ Laid directly on ceiling grid/surface?

___ Other? (Identify & describe)

YES NO Is above ceiling access required?

YES NO Are wall penetrations required?

YES NO Are firewall penetrations required?

YES NO Are floor penetrations required?

YES NO Will work impact asbestos-containing materials?
If yes, list the types of asbestos-containing materials that will be impacted by the proposed work?

YES NO Will work impact any other environmentally sensitive materials in the work area? (e.g., lead containing paint, mercury containing fluorescent light tubes, etc.) If yes, list below.

EXHIBIT C

COUNTY OF ALAMEDA MINIMUM INSURANCE REQUIREMENTS

Without limiting any other obligation or liability under this Agreement, the Contractor, at its sole cost and expense, shall secure and keep in force during the entire term of the Agreement or longer, as may be specified below, the following minimum insurance coverage, limits and endorsements. The County reserves the right to modify these requirements, including limits, based on the nature of the risk, prior experience, insurer, coverage, or other special circumstances. If the contractor maintains broader coverage and/or higher limits than the minimums shown below, the County requires and shall be entitled to the broader coverage and/or the higher limits maintained by the Contractor. Any available insurance proceeds in excess of the specified minimum limits of insurance and coverage shall be available to the County.

TYPE OF INSURANCE COVERAGES		MINIMUM LIMITS
A	Commercial General Liability Premises Liability; Products and Completed Operations; Contractual Liability; Personal Injury and Advertising Liability	\$1,000,000 per occurrence (CSL) Bodily Injury and Property Damage
B	Commercial or Business Automobile Liability All owned vehicles, hired or leased vehicles, non-owned, borrowed and permissive uses. Personal Automobile Liability when extended to cover your business is acceptable for individual contractors with no transportation or hauling related activities	\$1,000,000 per occurrence (CSL) Any Auto or Hired and Non-Owned Autos Bodily Injury and Property Damage
C	Workers' Compensation (WC) and Employers Liability (EL) As required by State of California	WC: Statutory Limits EL: No less than \$1,000,000 per accident for bodily injury or disease

D Endorsements and Conditions:

1. **ADDITIONAL INSURED:** County of Alameda, its Board of Supervisors, the individual members thereof, and all County officers, agents, employees, volunteers, and representatives are to be covered as additional insureds on the CGL policy with respect to liability arising out of work or operations performed by or on behalf of the Contractor including materials, parts, or equipment furnished in connection with such work or operations. General liability coverage can be provided in the form of an endorsement to the Contractor's insurance (at least as broad as ISO Form CG 20 10 11 85 or if not available, through the addition of **both** CG 20 10, CG 20 26, CG 20 33, or CG 20 38; **and** CG 20 37 if a later edition is used). Auto policy shall contain, or be endorsed to contain additional insured coverage for the County.
2. **DURATION OF COVERAGE:** All required insurance shall be maintained during the entire term of the Agreement. In addition, Insurance policies and coverage(s) written on a claims-made basis shall be maintained and evidence of insurance must be provided during the entire term of the Agreement and for at least five (5) years following the later of termination of the Agreement and acceptance of all work provided under the Agreement, with the retroactive date of said insurance (as may be applicable) concurrent with the commencement of activities pursuant to this Agreement. If coverage is cancelled or non-renewed, and not replaced with another claims-made policy form with a Retroactive Date prior to the contract effective date, the Contractor must purchase "extended reporting" coverage for a minimum of five (5) years after completion of work. Proof of workers' compensation insurance coverage is not required if contractor provides a signed Workers Compensation Written Declaration of Compliance.
3. **REDUCTION OR LIMIT OF OBLIGATION:** All insurance policies, including excess and umbrella insurance policies, shall be primary and non-contributory coverage at least as broad as ISO CG 20 10 04 13 as respects the County, its officers, officials, employees, or volunteers. Any insurance or self-insurance maintained by the County, its officers, officials, employees, or volunteers shall be excess of the Contractor' insurance and shall not contribute with it. Pursuant to the provisions of this Agreement insurance effected or procured by the Contractor shall not reduce or limit Contractor's contractual obligation to indemnify and defend the Indemnified Parties.
4. **INSURER FINANCIAL RATING:** Insurance shall be maintained through an insurer with an A.M. Best Rating of no less than A:VII or equivalent, shall be admitted to the State of California unless otherwise acceptable by Risk Management, and with deductible amounts acceptable to the County. Acceptance of Contractor's insurance by County shall not relieve or decrease the liability of Contractor hereunder. Self-insured retentions must be declared and approved. Any deductible or self-insured retention amount or other similar obligation under the policies shall be the sole responsibility of the Contractor. The policy language shall provide or be endorsed to provide, that the self -insured retention may be satisfied by either the named insured or County.
5. **SUBCONTRACTORS:** Contractor shall include all subcontractors as an insured (covered party) under its policies or shall verify that the subcontractor, under its own policies and endorsements, has complied with the insurance requirements in this Agreement, including this Exhibit.
6. **JOINT VENTURES:** If Contractor is an association, partnership or other joint business venture, required insurance shall be provided by one of the following methods:
 - Separate insurance policies issued for each individual entity, with each entity included as a "Named Insured" (covered party), or at minimum named as an "Additional Insured" on the other's policies. Coverage shall be at least as broad as in the ISO Forms named above.
 - Joint insurance program with the association, partnership or other joint business venture included as a "Named Insured".
7. **CANCELLATION OF INSURANCE:** Each insurance policy required above shall provide that coverage shall not be cancelled, except with notice of cancellation provided to the County in accordance with policy terms and conditions.
8. **CERTIFICATE OF INSURANCE:** Before commencing operations under this Agreement, Contractor shall provide Certificate(s) of insurance and applicable insurance endorsements as set forth in the provisions of this Agreement and this Exhibit C, in forms satisfactory to County, evidencing that all required insurance coverage is in effect. However, failure to obtain the required documents prior to the work beginning shall not waive the Contractor's obligation to provide them. The County reserves the right to require the Contractor to provide complete, certified copies of all required insurance policies, including endorsements required by these specifications, at any time.

Exhibit D: Cabling Request Form

VENDOR NAME

CABLING REQUEST NUMBER: _____

FOR

**ALAMEDA COUNTY
(DEPARTMENT OR AGENCY NAME)**

(VENDOR NAME) to provide the following wire proposal to **ALAMEDA COUNTY** at (street address including City name). This quote includes (succinct statement of what is being installed.) This quote includes (type of hours – regular, after hours, weekend, Sunday etc. that involve different rates.)

Example below

- A. The following is a list of work to be performed by (VENDOR NAME)
1. (VENDOR NAME) will provide and install six **(6)** new 48 port Systimax Cat 6 patch panels in the existing 2-post rack in the Data Room.
 2. (VENDOR NAME) will provide and install six **(6)** new 2U horizontal wire managers in the existing 2-post rack in the Data Room.
 3. (VENDOR NAME) will provide and install two **(2)** new Cat 6 data cables to each of **(104)** work station locations for a total of **(208)** cables.
 - a. The cable will be yellow SYSTIMAX 2071 Category 6.
 - b. The cable will be terminated using orange Systimax jacks.
 4. (VENDOR NAME) will provide and install two **(2)** new Cat 6 data cables to each of **(14)** printer/Fax locations for a total of **(28)** cables.
 - a. The cable will be yellow SYSTIMAX 2071 Category 6.
 - b. The cable will be terminated using orange Systimax jacks.
 5. (VENDOR NAME) will provide and install two **(2)** new Cat 6 data cables to each of **(8)** WAP ceiling locations for a total of **(16)** cables.
 - a. The cable will be yellow SYSTIMAX 2071 Category 6.
 - b. The cable will be terminated using orange Systimax jacks.
 6. (VENDOR NAME) will provide the labor and material to mount **(8)** customer supplied WAP's.

7. (VENDOR NAME) will provide three (3) 5' Cat 6 patch cables which will be installed with two on the station side and one on the patch panel side at each of the 8 wireless access locations for a total of (24) patch cords.
(Include assumptions for labor)
 - This quote was developed with the assumption that there will be 2 Saturday overtime shifts needed for cut overs.

B. MISCELLANEOUS

1. (VENDOR NAME) will test and label all new cabling.
 - a. Testing for all cables will include, at a minimum, continuity, shorts, crosses, and grounds.
 - b. Testing for all cables will include, at a minimum, wire map, attenuation, impedance, near-end-crosstalk (NEXT) and distance.
 - c. An industry recognized and certified (**Name and type of tester used here**) tester will be used for testing the new cables.
 - d. Test results shall be provided in soft (PDF file) copies to **ALAMEDA COUNTY**.
 - e. Labeling of all terminations will be done professionally, based on a County-approved method.
 - f. The horizontal 4-pair cable shall meet EIA/TIA Commercial Building Telecommunications Wiring Standards for horizontal wire.

C. The SYSTIMAX® SCS extended warranty will be provided with this installation.

D. The following is a list of general conditions and assumptions used in providing this project:

E. CLIENT RESPONSIBILITIES AND DELIVERABLES

1. (VENDOR NAME) will arrange access with ALAMEDA COUNTY.
 - a. ALAMEDA COUNTY will arrange for and provide a list of locations requiring scheduled access.

F. (VENDOR NAME) RESPONSIBILITIES AND DELIVERABLES

1. (VENDOR NAME) will fire seal all conduits, cores and sleeves utilized after placing the new cable.
2. (VENDOR NAME) Project Manager will attend required construction meetings when necessary.

3. (VENDOR NAME) will clean up any debris left from the work that Contractor performs during the course of the project. This includes clean up at the end of each work day.
4. (VENDOR NAME) will commence wiring work 48 hours after ALAMEDA COUNTY and (VENDOR NAME) have agreed that all preliminary commitments have been met and a "Cable Project Work Start Form" has been submitted to the County Client, GSA-BMD and GSA-TSD. (VENDOR NAME) SYSTEMS shall verify lead times for delivery of materials with suppliers to insure construction schedules are met.
5. (VENDOR NAME) proposal shall be valid for 90 days.

Cabling Task Order **XXXXX** for (Street Address)

COST SUMMARY

Total Material:	
Tax:	
Total Labor:	
Total Sell:	

(Vendor Operations Mngr. Name and Title) (Phone Number) Dated: X/XX/XX

ACCEPTANCE OF TASK ORDER (TO BE SIGNED IF AWARDED PROJECT)

I hereby acknowledge the receipt of the Cabling Task Order and agree to implement the work described in accordance with the Contract Documents including, but not limited to, the Agreement and this Cabling Task Order subject to necessary approvals by the County

CLIENT ACCEPTANCE:

ALCOLINK REQ. #: _____

DEPT SIGN-OFF: _____ **DATED:** _____

PRINTED NAME: _____

LANDLORD/RPM SIGN-OFF: _____ **DATED:** _____

PRINTED NAME: _____

GSA ENVR ENGR SIGN-OFF: _____ DATED: _____

PRINTED NAME: _____

GSA/BMD SIGN-OFF: _____ DATED: _____

PRINTED NAME: _____

SAMPLE

Exhibit D: Sample Job List Status Report

RFQ	Status	DATE	WALK	QUOTED TO ALCO	PO#	PO \$	PO DATE	# OF DROPS	COST PER DROP	Work Start to BMD	WORK STARTED	SIGN OFF	Systimax Approval Request	TYPE	DEPARTMENT	ADDRESS	CITY	CONTACT	TEL #	GSA Coord	C O M M E N T S	