Cleveland State University

Division of Hospitality and Facility Services
Office of Capital Planning

A/E DESIGN STANDARDS

Established: 02/2015
Updated: 04/08/2025

OWNER'S STANDARDS OF DESIGN

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The specifications contained herein are in addition to the ORC/OFCC guidelines and State of Ohio documents that must be followed for every CSU construction project - refer to http://ofcc.ohio.gov/About.aspx "Documents".

END OF SECTION

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DIVISION 00 – PROCUREMENT AND CONTRACTING

00 10 00 SOLICITATION

001000.1 CSU document – Limited Scope (projects between $50-200K)

001000.2 State of Ohio document – OFCC/ORC 153 (projects $200K+)

00 21 00 BIDDING

002100.1 Architect/Engineer (A/E) shall modify and prepare the Solicitation/ Notice to Bidders (NTB) and advertisement from the Ohio Facilities Construction Commission (OFCC) template documents. A/E shall coordinate advertising and bid dates with CSU Project Manager to insure compliance with Ohio Revised Code (ORC) and OFCC requirements. Dates for the first advertisement must coincide with the date documents are ready to be electronically posted.

002100.2 The NTB and advertisement must contain the date, time, and place of the pre-bid meeting. This meeting will be chaired by the A/E, who will produce minutes of the meeting and issue them as Addendum #1 within 3 working days of the pre-bid meeting. Questions, answers, and a copy of the sign-in sheet from the meeting shall be included in the addendum.

002100.3 Bidding shall be electronic and utilize Bid Express. Electronic document distribution for base bid and addendums will be on Bid Express.

002100.4 A/E shall review the number of conformed drawings that will be provided without cost to each of the prime contracts with CSU PM. These quantities shall be documented in the owner's requirements section of the specifications.

002100.5 A/E shall review all addenda with CSU PM before release to bidders. Addenda shall be distributed electronically on Bid Express.

002100.6 A/E must consult with CSU PM regarding the issue of last-minute addenda. CSU PM reserves the right to determine if the bid date will be delayed or to assess and assume the risk of not issuing the addenda. A bid extension is mandatory per OFCC requirements if an addendum is issued within 72 hours of the bid time (excluding Saturdays, Sundays, and legal holidays). Bid extension is required to be a minimum of 7 days.

002100.7 All bids shall be received electronically via Bid Express.

00 21 13 INSTRUCTIONS TO BIDDERS

002113.1 CSU document – Limited Scope (projects between $50-250K)

002113.2 State of Ohio document – OFCC/ORC 153 (projects $250K+)

00 31 43 PERMIT APPLICATION

003143.1 A/E shall prepare a draft of the application for plan approval and statement of special inspections and review the information with CSU PM before submitting the drawings and specifications for plan approval.

003143.2 A/E shall make the electronic submittal and pay all plan review fees, to be charged to OCP as a reimbursable.

003143.3 A/E shall schedule the submittal for plan approval so that partial plan approval is completed prior to releasing the project documents to bidders.

00 41 00 BID FORM

004100.1 CSU document – Limited Scope (projects between $50-250K)

004100.2 State of Ohio document – OFCC/ORC 153 (projects $250K+)

004100.3 A/E shall modify the bid form and coordinate it with other contract documents to insure that all contract work is included in the bids, and that the scope of work for each contract is clear and nothing is duplicated or omitted.

004100.4 A/E shall include allowances on the bid form by contract so that those amounts can be added to the total bid amount.

004100.5 A/E shall include alternates on the bid form by contract so that those amounts can be added to the total bid amount if selected and approved by the University.

004100.6 A/E shall include unit prices on the bid form by contract and shall include the estimated quantities so that the unit prices can be extended and those amounts can be added to the total bid amount.

00 43 21 ALLOWANCES

004321.1 The general provisions of the contract apply to all work specified under allowances.

004321.2 The net cost, including applicable taxes, of all materials and equipment delivered and unloaded at the project site shall be included in the allowance.

004321.3 The contractor's handling costs on the site, labor, installation, overhead, profit, and other expenses contemplated for the allowance shall be included in the contract sum, not the allowance.

00 43 22 UNIT PRICES

004322.1 The general provisions of the contract apply to all work specified under Unit Prices.

004322.2 Unit prices shall be employed when exact quantities cannot be determined from the drawings due to existing or hidden conditions, where appropriate for phased work, or as directed by CSU PM.

004322.3 A/E must provide estimated quantities for all unit prices so that the unit prices can be extended and included in the total cost of the bid, and to insure that funds are set aside for the work.

004322.4 Unit prices will be for both added and deducted quantities. Multiple levels of a unit prices should be included to allow for quantity based pricing if large variations in the total quantity, phasing, or change of scope are anticipated.

00 43 23 ALTERNATES

004323.1 A limited number of alternates may be used to insure that the base bid will be within the construction cost estimate and to fully utilize project funds.

004323.2 Deduct alternates are prohibited unless special project conditions exist, and must be approved by CSU PM.

00 45 13 BIDDER'S QUALIFICATIONS

004513.1 State of Ohio document.

004513.2 Bidder to provide OAKS vendor number if registered to do business in the State's OAKS system.

00 45 39 EDGE AFFIDAVIT

004539.1 State of Ohio document.

00 51 00 BID AWARD

005100.1 A pre-award scope-review meeting will be scheduled by CSU PM. A/E and CSU PM will meet with apparent low bidders' representatives to validate that the bid includes all of the contract work. Procedures for bid evaluation and award, as delineated in the NTB, shall be followed. A/E shall be responsible for conducting the technical scope review with the apparent low bidder, CSU PM shall be responsible for conducting contractual and University policy compliance review.

005100.2 When successful bidders have been selected, A/E shall immediately produce a letter of recommendation for bid award, addressed and delivered to CSU PM.

00 52 13 AGREEMENT FORM

005213.1 CSU document – Limited Scope (projects between $50-250K)

005213.2 State of Ohio document – OFCC/ORC 153 (projects $250K+)

END OF SECTION

DIVISION 01 – GENERAL REQUIREMENTS

01 00 00 PERFORMANCE

010000.1 All work is subject to the General Conditions and Specifications as published by the State of Ohio and "Owner's Requirements" as written by the A/E and approved by OUA. A/E's office standards do not justify deviation from the performance required by this Outline Specification Guide. A/E may submit requests to OUA for deviation from standards. Any deviations must be approved in writing by the OUA PM.

01 10 00 SUMMARY OF THE WORK

011000.1 A specification section entitled "Summary of the Work" shall be included in the project manual which provides a general description of all work, including exterior work, is required for each trade. Although brief, this description must be complete enough to indicate the full scope of work for each contract. The proposed use for the building should be explained. Concurrent occupancy of adjacent buildings, or parts of a renovated building should be noted. Specific details and requirements for the project should be noted here. The overall construction schedule and milestone dates should be specified here. Individual specifications' work scope must be coordinated with this overall summary.

011000.2 The "Summary of the Work" verbiage shall be forwarded to the OUA PM and OUA webmaster, along with a sketch, rendering, photograph, and/or floor plan for use on the OUA website.

011000.3 University furnished items and any related work required of the prime contractors must be identified. Items to be salvaged or removed from existing structures by the Owner, and items to be salvaged by the Contractor then turned over to the Owner must be identified on the drawings. OUA will advise A/E regarding how/where contractor is to deliver salvaged materials.

011000.4 Project conditions such as occupation of buildings, limited scheduling for utility connections, and special events of the University must be defined.

011000.5 If additional work outside the scope of the prime contracts will be performed concurrently with the project, by other contractors or the Owner, advise the contractors that coordination and cooperation with this work will be required.

01 31 00 PROJECT COORDINATION

013100.1 A pre-construction meeting will be scheduled by OUA after the award of contract. Successful bidder and the A/E will attend. A/E will record the meeting and distribute minutes within 3 working days of the meeting.

013100.2 Weekly progress meetings will be scheduled by A/E and OUA with the General Contractor (GC) and major subcontractors. The time and day of the meeting will be established by A/E and OUA in cooperation with the GC. A/E will record the meetings and distribute minutes within 3 working days of the meeting. The frequency of this meeting may be decreased or increased as project conditions warrant. Contractor's authorized representatives are required to attend these meetings. If the project is Construction Manager at Risk (CMR) then the scheduling of the meetings and all meeting minutes may be the responsibility of the CMR depending on the scope of services as defined in the A/E's and/or CMR's contract scope of services.

013100.3 Weekly coordination meetings will be scheduled by the GC with major subcontractors. The time and day of the meeting will be established by the GC/CMR. The GC/CMR will record the meetings and distribute minutes within 3 working days of the meeting.

01 31 70 SPECIAL PROJECT CONDITIONS

013170.1 Wage Rate Requirements:

A. The Contractor shall pay the prevailing wage rates of the Project locality, as issued by the Ohio Department of Commerce, Wage and Hour Bureau to laborers and mechanics performing work on the Project. The prevailing wage rates are available at the Ohio Department of Commerce's web site: http://com.state.oh.us/
B. The Contractor shall comply with the provisions, duties, obligations, and is subject to the remedies and penalties of Ohio Revised Code ("ORC") Chapter 4115.
C. The Contractor shall submit all payroll reports in compliance with the requirements of ORC Chapter 4115 for all of the employees of the Contractor and of the Contractor's Subcontractors.
D. By executing a Contract, the Contractor certifies that it based its Bid upon the prevailing rates of wages as ascertained by the Ohio Department of Commerce, Wage and Hour Bureau for the Project as provided in ORC Sections 4115.03 through 4115.14.
E. A/E shall be responsible for obtaining the wage rates along with any updates from the Ohio Department of Commerce, Wage and Hour Bureau's website at: http://198.234.41.198/w3/webwh.nsf/wrlogin/?openform Registration and login may be required. A/E shall obtain wage rates for all classifications for Cuyahoga County and they shall be included in the specifications.
F. Any payment requests (pay apps) submitted without the required Prevailing Wage documentation will be rejected.

013170.2 Building / Room Access: Contractors working on site and requiring building, freight elevator or room access shall be required to submit a "Keybox Access Request Form" (see Appendix F). The form must be submitted a minimum of five (5) days prior to the start of any work activity requiring access to any of the above areas. Refer to Appendix E "Keybox Access Rules & Regulations".

013170.3 Parking:

A. All CSU and City of Cleveland parking requirements and restrictions must be followed during the duration of the project. Visit http://www.csuohio.edu/parking for more information.
B. Onsite staging/storage of materials and dumpster parking is limited and locations must be approved by the OUA Project Manager and CSU Parking.
C. All vehicles parked on campus must display a valid CSU Parking hangtag unless parked at a meter. Parking Services offers the following options for contractors and construction workers:
    1. Purchase a contractor hangtag. This hangtag will have an expiration date based on the needs of the patron. At the time of this printing, hangtags cost $50 per week and are accepted in any CSU parking facility except at meters or in Lot 22, Prospect Garage, or South Garage.
    2. Purchase a one-day visitor permit at the current visitor rate.
D. Contractor hangtags must be purchased from the office of Parking & Transportation Services located in Euclid Commons at the corner of East 24th and Euclid. The office is open Monday through Friday 8 AM to 5 PM.
E. Contractors who must park in a prohibited location in order to discharge their duties while on campus may request an official dashboard pass when registering for the parking hangtag. The request must be accompanied by details regarding the specific nature of their duties. Dashboard passes must be displayed in tandem with a prepaid hangtag and are intended for **short-term use** related to the defined duties – **not for all day parking**.

F. Loading and unloading is exactly as stated. Thirty (30) minutes is the maximum time allowed for loading and unloading. Special requests regarding loading/unloading must be authorized by Parking & Transportation Services. Failure to comply may result in a citation, boot and/or towing.

013170.4 Rules of the Workplace:

A. The Contractor shall be responsible for cleaning and removal of all construction and packaging material and debris.
B. Use of CSU dumpsters is not allowed.
C. The Contractor is responsible for all construction materials, tools, equipment, vehicles, and personal items. CSU is not responsible for any of these items if lost, stolen, or damaged.
D. At a minimum, the Contractor is responsible for the professional behavior of its personnel and must adhere to the following rules. No eating, drinking, or storing food or beverage in any work area unless so designated. No radios or other unnecessary noise on the premises.

013170.5 Cleveland State University has a TOBACCO FREE CAMPUS policy.

A. Policy Statement:
    1. Cleveland state university has a vital interest in maintaining a safe, healthy and respectful learning and working environment for members of the university community. The university seeks to set a model for a tobacco free workplace and promotion of healthy lifestyles now and in the future. Research findings show that use of tobacco products in general constitutes a significant health hazard.
    2. Tobacco use, including the sale, advertising, sampling and distribution of tobacco products and tobacco related merchandise is prohibited in all university facilities, on all university grounds, whether leased or owned, and at university-sponsored events, regardless of the venue.
    3. Tobacco industry and related company sponsorship of athletic events and athletes is prohibited.
B. Definitions:
    1. "Tobacco " - Tobacco is defined as all tobacco-derived or containing products, including, but not limited to, cigarettes, (clove, bidis, kreteks), e-cigarettes, cigars and cigarillos, hookah-smoked products, and oral tobacco (spit and spitless, smokeless, chew, snuff, snus).
    2. "University facilities" - University facilities are defined as any facility or property that is owned, leased, used or occupied by the university, including but not limited to: classrooms, restrooms, auditoriums, offices, lounges, dining areas, recreational facilities, parking lots, parking garages, rooftops, storage areas, service shops, garages, walkways, enclosed bridges, thoroughfares, facilities operations areas, athletic facilities, extension locations, all university vehicles (owned or leased), and personally owned or rented vehicles when used to transport university faculty, staff or students on any school-related business, academic or student life activities.
    3. “Members of the university community" are defined as anyone on campus including but not limited to faculty, staff, students, visitors, consultants, vendors, volunteers and contractor employees.
C. Exceptions and Limitations:
    1. Tobacco use may be permitted for controlled research with prior approval of the provost, and in the case of smoking, the review and recommendation of the department of environmental safety and health.
    2. Tobacco use may be permitted for educational, clinical, or religious ceremonial purposes with prior approval of the Provost and in the case of smoking, the review and recommendation of the department of environmental safety and health.

3. Tobacco use is permitted on primary public traffic and pedestrian thoroughfares.
4. Tobacco use may be permitted on properties the university owns, but leases or otherwise conveys an interest (e.g. an easement) to a non-university party for non-university purposes, according to the provisions of the applicable lease or agreement.
5. Tobacco use in facilities that are not owned, leased, or controlled by the university, are subject to the non-tobacco policies applicable to those particular facilities, and are exempt from this regulation.

D. Compliance and Enforcement:
   1. The responsibility for the enforcement and communication of this policy depends on the thoughtfulness, consideration and cooperation of all members of the university community.
   2. University administration will develop administrative guidelines and procedures as necessary to implement this policy by the beginning of the fall semester 2013, including provisions for notification, communications, training, signage, complaint procedures, disciplinary consequences, and enforcement.

E. Tobacco Usage Cessation: The University shall make available to faculty, staff and students comprehensive tobacco usage cessation programs including no cost or low cost counseling and medication based solutions

013170.6 Protection of Property: The Contractor shall be responsible for maintaining every reasonable level of care to assure that the University premises and property shall be protected from any damage, accident or otherwise, while the contractor is entrusted with such property or on such premises. Contractor access to University property for any project activity is subject to prior University approval.

A. At minimum the Contractor shall:
   1. Not disengage or dismantle anything permanently attached to any part of the building or grounds without prior written consent of the University as conveyed by the PM.
   2. Not disconnect or connect any utilities unless otherwise directed by the Scope of Work or the PM. Notification of disruption must be given in writing to the PM 48 hours prior to work.
   3. Remove or discard any piece of existing equipment without prior written consent of the University as conveyed by the PM.
   4. Use protective material to protect areas not affected by the work from damage.

B. If due to any act on the part of the Contractor, its agents or employees, any property that is owned or controlled by Cleveland State University is lost or damaged during the performance of these requirements, the Contractor shall be responsible to the University for such loss or damage. The University, at its option, may in lieu of payment therefore, require the Contractor to repair/replace at the Contractor's expense, all property lost or damaged.

013170.7 Security: The Contractor shall take all reasonable precautions necessary to insure CSU Property is secured daily. The Contractor shall institute procedures to minimize the risk of loss, damage, theft, or any other condition detrimental to University property while work is under way. All interior and exterior doors that are designated as secure or restricted access areas shall remain locked at all times. Contractors are not to prop open any doors. Contractors who fail to comply may be removed from campus.

013170.8 Safety: Refer to Section 01 35 23 Owner Safety Requirements.

010370.9 Nuisance Calls: Contractors will be charged $500 for setting off any fire-related alarm, and an additional $1,000 for every alarm thereafter on the same project. A fire-rated alarm includes smoke detectors, heat detectors, duct detectors, sprinkler activation, and anything else that causes an alarm to sound, the building to be evacuated, and/or the CFD to respond. These charges will be deducted from the contractor's fee via change order.

01 33 00 SUBMITTALS

013300.1 Construction progress schedule is the ultimate responsibility of the GC/CMR. The schedule must be prepared according to the specifications regarding content, software, format, project milestones, phases, and completion/occupancy dates. A preliminary schedule will be presented to the other prime contractors for their input. The GC/CMR will adjust his schedule and present it at a following meeting. After approval by A/E, the schedule will be submitted to OUA for approval.

013300.2 Project inspection reports shall be performed in the OAKS system on all capitally funded projects and as otherwise directed. A/E shall prepare this report and submit to OUA twice monthly. The reports shall be submitted no later than the 14th and 28th days of each month. If these dates fall on weekends or holidays, the report shall be submitted on the first working day thereafter. Each project inspection report shall include:

A. Contractor reports with the percentage of work complete and a short description (i.e. "3rd floor concrete placed", "building under roof", etc.).
B. Total project report including percentage of completion for the total project, scheduled completion date, and weeks ahead or behind schedule. Briefly describe the reasons for variation in the schedule. If the project is behind schedule, describe the methods which will be used to put the project back on schedule.

013300.3 Shop Drawings and Submittals:

A. During production of final specifications, A/E shall develop a list of required submittals and review with OUA for approval. Following contract award, A/E shall provide this list to contractors. Shop drawings and samples shall be submitted to A/E as soon as possible after award of contract. All submittals requiring OUA selection or approval must be coordinated. Actual finish and color samples must be provided for review. OUA will not make selections based off of electronic color charts.
B. GC/CMR shall submit a schedule to A/E indicating dates that shop drawings and other requirements will be submitted. Dates scheduled shall not impede the progress of the work. A/E shall approve the submittal schedule.
C. GC/CMR shall forward all submittals to A/E by electronic files in PDF format.
D. A/E shall forward all approved submittals to GC/CMR by electronic files in PDF format.
E. A/E shall forward all approved submittals to OUA by electronic files in PDF format at time of approval and not held until the end of the project.
F. Specifications for ornamental work which requires models or patterns will stipulate that the models or patterns become the property of the University after the work has been installed.

013300.4 Layouts for structure coordinates, site improvements, utilities, elevations, etc. shall be performed by a licensed engineer or surveyor employed by the contractor performing the work. This information shall be verified periodically by A/E as the work progresses.

013300.5 GC/CMR will establish all grade lines, levels, and benchmarks.

A. Sturdy batter boards at all corners of the building will be maintained by GC/CMR.
B. Benchmarks at each level will be established by GC/CMR

C. Exact partition locations on floors will be established by GC/CMR as guides to other trades.

01 35 23 OWNER SAFETY REQUIREMENTS

013523.1 All contractors, subcontractors, and personnel that will be working on the jobsite are required to obtain a photo ID badge to be worn at all times while working on campus. Refer to Appendix C "Contractor Onboarding Procedure".

013523.2 All contractors are required to abide by Appendix B "Contractor Orientation Information" (previously referred to as the Contractor Safety Guide).

013523.3 All contractors shall:

A. Verify proper access to buildings with PM and request access through Access Control & Fire Prevention (AC&FP). Refer to Appendix F "Keybox Access Rules & Regulations" and Appendix G "Keybox Access Request Form". AC&FP will not escort or open doors for contractors.
B. Correspond all questions, RFIs, and shutdowns through Project Manager. AC&FP will not provide information directly to the Contractor.
C. Provide advanced notice for shutting down sprinkler lines and fire pumps.
D. Restore all systems to their best function status at the end of each work day and notify AC&FP to provide verification. Contact CSU Police Department dispatch at 687-2020 if after 4pm M-F and 24/7 Saturday and Sunday.
E. Coordinate pre-testing for fire alarm systems with PM. AC&FP will not schedule directly with contractor. All pre-testing is performed in early AM before building opens to general public.
F. Arrange for proper equipment to be on site for testing, pre-test, and final test.
G. Have their current state license in possession at time of visit by State inspectors.
H. Ensure the State approved/ stamped drawings are on the job site at all times, including the attendance sheet the State inspectors use to sign in for an inspection/ site visit.

013523.4 A/E and PM shall:

A. Be aware that plan review and/or modification to the fire alarm system (adding, deleting, or changing locations of devices) will incur programming changes.
B. Provide advanced notice for programming changes due to system software at multiple sites (Campus Safety, Plant Services, and associates node(s)). The CSU Fire Alarm Network is affected campus-wide when programming changes are downloaded. Downloads shall be scheduled for the early part of the week, in the AM.
C. Provide/ post advanced notice of programming and testing with building SACC, occupants, FAST and CSU Police Department.

01 40 00 QUALITY CONTROL

014000.1 Each contractor will be required to include the cost of services by certain specialists in the bid. A/E shall observe the performance of these services, review the reports, document results in the project administration records, and furnish copies of the reports to OUA.

014000.2 Each respective specification section will contain the details of the type of service required, methods and frequency of investigations, number and type of reports required, and the method of payment for the specialist's services.

014000.3 The following services and other required by the application for plan approval will be performed by qualified independent testing agencies, who will be contracted by OUA or A/E as specified in A/E's contract.

A. General Contract
    1. Soil compaction
    2. Piling and caisson inspection and tests
    3. Concrete sampling and tests
    4. Sound transmission tests
    5. Radiation tests
B. Plumbing Contract
    1. Supervision of gas piping purging
    2. Water piping sterilization
    3. Sound control tests
C. HVAC Contract
    1. Air and water systems balancing
    2. Soil corrosion analysis for cathodic protection
    3. Sound control tests
D. Electrical Contract
    1. Communication systems tests
    2. Signaling systems tests
    3. Sound control tests

01 50 00 TEMPORARY FACILITIES

015000.1 Utility Connections:

A. The University will permit contractors to connect to existing utilities when they are available and shall not charge for electricity, water, natural gas, or steam used (if steam is used as a temporary utility, all condensate shall be returned to the system). The University reserves the right to charge if excessive consumption usage occurs. When utilities are not available, the contractor responsible for the temporary utility shall arrange with the local utility company for installation of temporary utility service and shall pay all costs involved.
B. Connections to University utilities shall be arranged by A/E through Facilities Management (FM). A/E shall obtain drawings for existing utilities and include information concerning connections in the contract documents.
C. Utility company installation of temporary services shall be reviewed with OUA.

015000.2 Temporary utilities will be provided as follows. Any utility connection must be coordinated with FM.

A. HVAC: Contractor shall provide heating required by the work or trade as needed, until weather-tight enclosure of the building. Contractor shall provide temporary heating, ventilation, and dehumidification after weather-tight enclosure of the building.
B. Temporary Drainage: GC/CMR shall provide temporary drainage for the building excavation including trenches, sumps, pumps, or other items as required to provide satisfactory working conditions for the execution, completion, and protection of all work. Water shall be directed or pumped to existing sewage systems and shall not be permitted to run across the surface of the ground. Upon completion of basement slab, first level floor, and foundation backfill, temporary sanitary sewer shall be provided by the contractor.
C. Temporary drainage for trenches shall be provided by the respective contractor.
D. Water Service: provided by the University.
E. Sanitary Sewer: provided by the University.
F. Electrical Service: provided by the University.
G. Internet Service: Where available, the University will provide guest access to internet services via the university's wireless system for contractor's use during construction. Where not available, contractors are required to provide for their own service via outside providers or by

cellular/broadband series at their expense. A/E shall coordinate availability with OUA and indicate the status in the contract documents.

015000.3 Hoisting facilities for the project shall be provided by the contractor requiring it.

A. New elevators may not be utilized for transportation of workers and materials.
B. Existing elevators may not be used for construction unless approved by FM.

015000.4 Noise and dust control shall be provided by GC/CMR. Specific materials and methods shall be specified by A/E. Other means of dust and noise control shall be required as construction operations dictate. Work within occupied buildings shall require the contractor to perform daily cleaning of adjacent areas that may be impacted by construction activities. If contractors fail to perform cleaning to the satisfaction of FM and/or OUA, the University reserves the right to back charge contractor for any cleaning costs that may be incurred.

015000.5 Site Access:

A. Entrances and exits for the public must be maintained during periods of joint occupancy.
B. A secure 6 foot high construction fence, chain link with vision slats or tarps with top and bottom rails, hinged gates, and OSHA approved "No Trespassing" signs shall be erected at the perimeter of the project. The fence location shall be approved by OUA and shall be shown on the site plan. Barbed wire is prohibited. Gates shall be double locked with contractor padlock and CSU furnished padlock to allow emergency access off hours. The site shall be secured by contractor after working hours.
C. Keys or key cards may be provided to GC/CMR by Access Control for renovation projects. GC shall be responsible for coordination of access by all trades and shall return keys upon project completion.
D. Vehicular access to the site shall be provided and maintained by GC/CMR. Permits must be obtained from Parking Services.
E. Delivery and loading areas will be limited to the building site when space permits. Any delivery to an existing building must be coordinated with FM. All construction deliveries are the responsibility of the contractor. University personnel will not accept or be responsible for any construction related deliveries.
F. Traffic flow shall be maintained at all times. If traffic flow must be interrupted, the contractor will notify A/E and OUA a minimum of two (2) weeks prior to the work. Contractor is required to post the construction area with warning signs which comply with the State Highway Signage Manual. Contractor is responsible for obtaining street and sidewalk closures per City of Cleveland's requirements. All temporary signs shall be removed after the pavement is fully restored.
G. Street debris including mud and spillage caused by the work shall be removed immediately. Failure to clean public and University rights of way may result in the University performing the work and back charging the contractor.
H. Repair of damaged streets, roads, or other facilities shall be the responsibility of the contractor causing the damage, at no expense to the University. Work shall be performed to the satisfaction of OUA, FM and/or City of Cleveland.
I. Protection of trees and existing landscaping is paramount. OUA will make arrangements for repair and remedial treatments for damage caused by the contractor, who shall bear the cost of these services.
J. Washout of concrete equipment or contamination by any construction products anywhere on University property is strictly prohibited.

015000.6 Project identification sign requirements of the GC/CMR may be waived by OUA for small projects or renovations. Otherwise, contractor will provide the sign including shop drawing submittal for

approval.

A. The location of the project sign, if required, will be approved by the University and will be shown on the site plan.
B. The sign format shall be approved by OUA and provided by the GC/CMR as illustrated on the drawings.

015000.7 Field Office:

A. GC/CMR's representative shall be present in the job office or on the building site, or otherwise readily available by phone at all times during the work.
B. A/E shall consult with OUA to determine whether the GC/CMR is required to furnish a job office trailer with sufficient conference space for all prime contractors' representatives, OUA representatives, and A/E's field representative to hold project meetings.
C. The securable office trailer facilities shall include:
    1. Office space for GC/CMR's superintendent and staff.
    2. File storage space and layout space for use of working drawings, specifications, and shop drawings.
    3. Internet connections, a copy machine, and fax equipment.
    4. A separate office space shall be provided for A/E's filed representative which shall include a desk, plan rack, plan table, and 5-drawer file cabinet. Space for the A/E representative shall be at least 80 sq. ft.
    5. A/E representative shall be provided with free use and access of the internet connections, copy machine, and fax equipment.
    6. A/E shall be entitled to use the conference space to meet with contractors and other parties to the work.
D. GC/CMR shall provide a private office space for each of the major prime contractors on the project, and shall be permitted to back charge the cost of the office space and utility costs pro-rated on a SF basis. Each contractor may provide its own field office trailer if site area permits.
E. Offices within the building may be established if the project size warrants, provided that this use does not adversely affect progress. OUA/Space Manager must approve use of the building for temporary office use by the contractors.

015000.8 Materials and Equipment:

A. The University will not sign for, pay for, or otherwise accept materials for contractors. All shipments are to be addressed and delivered to the project site. Deliveries which arrive at the University supply center will be returned to the sender.
B. Transportation and handling is the responsibility of the contractors. A/E, in concert with the GC/CMR, shall by visual observation and checking of the contractor's estimate for partial payment, control deliveries to the site to avoid congestion of storage and work areas with materials which cannot be installed in a reasonable time.
C. Storage and protection of building materials and equipment is required of each contractor and will include weather-tight sheds of sufficient size to store all materials which might be damaged by the weather. All outdoor storage (when permitted by the specification) must be limited to the area within the construction fence. Small sheds shall be painted with one coat of paint in color as selected by OUA. Small identification signs are permitted. Large banners or company advertisement of any kind are not allowed on University property unless specifically approved by OUA.
D. Storage of materials within the building shall not obstruct any of the work or entrances and exits of the building. Material storage within the building must be agreeable to all contractors. Storage locations may require review by the University Fire Inspector and/or OUA.
E. Storage of University equipment or furnishings may be required shortly before substantial completion. GC/CMR shall make available large rooms at or near grade level for this use.

F. Protection of University equipment stored on site is required of all contractors, similar to the protection afforded other contractor's materials and equipment.

01 60 00 PRODUCTS

016000.1 Three manufacturers for each product should be specified (with the exception of standard products or systems as directed by OUA). Any deviation must receive written approval from OUA.

016000.2 Specified manufacturers must be provided unless a substitution of equivalent value and performance is approved by A/E in writing and issued by addendum prior to receipt of bids.

016000.3 Single manufacturers, when specified, are products or systems with the University maintains with its existing parts inventory or uses exclusively due to contract or service agreements.

016000.4 The following list of certifications and other submittals is required as a minimum, in addition to guarantees, to assure quality of materials and workmanship; A/E to review all items in the specifications with OUA and add to this list as directed by OUA:

A. General Contract:
    1. Reinforcing steel – mill certificate
    2. Insulating concrete decks – manufacturer's certificate
    3. Face brick – efflorescence test results
    4. Masonry restoration – subcontractor's record of experience
    5. Steel joists – manufacturer's certificate
    6. Metal decking – manufacturer's certificate
    7. Caulking and sealants – subcontractor's record of experience
    8. Metal windows – performance reports
    9. Reflective insulating glass – performance reports
    10. Finish hardware – submit samples
    11. Fire rated ceilings – installer's certificate
    12. Resilient flooring and carpet – manufacturer's certificate
    13. Painting – manufacturer's and installer's certificates
    14. Fire resistive coatings – manufacturer's certificate
    15. Laboratory equipment – manufacturer's financial statement
    16. Radiation protection – installer's certificate
    17. Elevators – maintenance service

B. Plumbing Contract:
    1. Soil, waste, and vent piping – inspection certificate
    2. Underground services piping – test reports
    3. Interior piping – test reports
    4. Gas service and piping – recording line charts
    5. Fire protection – test reports

C. HVAC Contract:
    1. Boilers – safety and function tests
    2. Refrigerant lines – certificate of compliance with USA Standards
    3. Fans – test performance seals
    4. VFD's – start-up installation test report
    5. Air, Water, Hydronic Systems – balance reports

D. Electrical Contract:
    1. Primary cable installation – high voltage d-e proof tests
    2. Cable splicing – installer's certificate
    3. Lightning protection – UL master label

E. Data and Communications:
    1. Installed cable system – cable certification test reports

01 73 29 CUTTING AND PATCHING

017329.1 Each trade is responsible for their own cutting, patching, sealing, fire/smoke-proofing, and weatherproofing openings they make or existing openings they use for installation of their work. All work shall be performed by individuals trained and experienced in the work. The general trades contractor shall be responsible for structural reinforcement of all holes requiring structural framing indicated on the drawings by notes, schedules, or specific structural details. Structural openings that a contractor requests for his convenience that are not required or shown on the drawings shall be at that contractor's cost, but performed by a qualified general trades contractor. Any utility connection must be coordinated with FM.

01 74 19 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

017419.1 The University seeks to maximize the diversion of construction and demolition waste away from landfills and incinerators. Where possible, waste materials are to be reused on site, salvaged, or recycled, to meet or exceed the goal of a 75% construction/demolition waste diversion rate.

01 77 00 PROJECT CLOSEOUT

017700.1 Final cleanup of the project shall be assigned to the GC/CMR and shall include cleaning of all horizontal surfaces, windows (inside and outside), light fixtures, convector cabinets, exposed piping and structure, equipment, HVAC grilles, and plumbing fixtures.
A. A competent janitorial subcontractor experienced in construction site cleaning shall be employed to perform final cleanup.
B. Carpeting shall be spot cleaned and vacuum cleaned; hard surface floors shall be wet mopped (unless prohibited by the manufacturer).
C. Final cleanup shall be complete and suitable for immediate occupancy by the University.

017700.2 Equipment demonstrations shall be scheduled by the respective contractors with the A/E and OUA.
A. A/E shall attend each demonstration with the engineer responsible for the design of the system. OUA will invite interested University personnel.
B. An explanation of mechanical, electrical, and control system operations shall be composed by the engineer in layman's terminology. Multiple copies of this explanation shall be distributed to all persons at the demonstration.
C. Contractor shall forward all training videos, manuals, and demonstration sign-in sheets to OUA Project Manager.

017700.3 Final inspection procedures shall be as defined in Article 10 – Contract Completion in the General Conditions of the specifications and in the Section 01 35 00 Owner's Requirements.

017700.4 Affidavits, bonds, and guarantees are required in addition to the standard forms required by the contract documents. These documents should be included in the Operating and Maintenance (O&M) manuals which are to be submitted by each contractor. Include similar statements in the specifications as are listed with the following item:
A. Affidavits and Warranties:
    1. Resilient flooring – from manufacturer and installer
    2. Carpet – from manufacturer and installer
    3. Hazardous waste delivery – from abatement contractor

B. Bonds:
    1. Roofing – 10 year guarantee from manufacturer, 5 year guarantee from installer
    2. Steel metalwork – 5 year guarantee
    3. Membrane waterproofing – 10 year guarantee
C. Extended Guarantees:
    1. Caulking and sealants – 5 year guarantee
    2. Metal windows – 2 year guarantee for windows, 5 year guarantee for weatherstripping
    3. Wood doors – lifetime guarantee
    4. Tinted and insulating glass – 5 year guarantee
    5. Chalk and marker boards – 20 year guarantee
    6. Water chillers – 5 year guarantee
    7. Air cooled condensers – 5 year guarantee

017700.5 O&M Manuals:

A. One preliminary review manual shall be submitted to A/E for approval.
B. Upon approval by A/E, contractor shall provide (3) hard copies [OUA Plans Room, Facilities Management, Building/Manager] and (1) electronic PDF copy to OUA for distribution.
C. Manuals shall be bound in a hard cover, high quality, three-ring binder. The binder shall include a transparent vinyl sleeve on the front cover and the binder spine to protect labeling. The manual shall be labeled on the front as well as the spine with the A/E, CSU project name, CSU project number, date, and the trade covered (i.e. “Plumbing”, “HVAC”, etc).
D. Maintenance manuals shall include the following at a minimum:
    1. Cover sheet with A/E name, project name, project number, and contractor.
    2. Table of contents, organized by specification section.
    3. Tabbed sections for each topic included in the table of contents.
    4. Contractor and subcontractor contact and phone list.
    5. Contractor warranty, indicating date of final acceptance.
    6. Each applicable section of the specification shall direct the contractors to include data in the O&M manuals, included but limited to:
        a. Elevators – O&M instructions and project specific wiring diagrams
        b. Piping systems – printed diagrams showing tagged valves
        c. HVAC controls – printed diagrams and operating instructions
        d. Valves – typed directory of tagged valves
        e. Communications – point-to-point wiring diagrams and operating instructions
        f. Motor control centers – overload heater charts
        g. Equipment – operating instructions
    7. Complete equipment list with model numbers, serial numbers, and final operating parameters (CFM, pressures, GPM, etc.).
    8. A list of local suppliers and contact information for supplied equipment.
    9. All final submittals to indicate actual device provided, not general product information. All included options shall be clearly indicated.
    10. Total air and water balance (TAB) report.
    11. Original copies of all warranties and certificates shall be included under a separate tab at the end, with an index listing all documents and the details of each.

017700.6 As-Built Documents:

A. The contractor’s responsibilities regarding as-built drawings are stipulated in Article 31 of the General Conditions.
B. A/E shall prepare the record documents based upon information provided by the GC/CMR. A/E shall verify and revise drawings to show as-built conditions, including the revision date and the words “as-built”.

C. Finish Legend: All as-built manufacturer, product, size, color, etc. information shall be listed in the Finish Legend **on the drawings**, and coded to coincide with the as-built Finish Schedule.
D. Prints: A/E shall provide one full size set of as-built prints to OUA. The first and last page of the set shall be laminated to protect against extended use. A letter shall accompany this set certifying that as-built conditions are shown.
E. Drawing Files – CAD/Revit: A/E shall provide OUA with electronic files of as-built drawings in AutoCAD. If the project was completed in Revit, the appropriate Revit files shall be provided in addition to AutoCAD files.
    1. All xref layers associated with the project (including but not limited to title blocks, backgrounds, key plans, logos, etc.) shall be integrated into the drawing file. No external xrefs will be allowed for final record documents.
    2. All layers shall be named per CSU's CAD standards.
    3. All applicable fonts, pen weights, and line types (.ctb files) shall be included.
F. Drawing Files – PDF: A/E shall provide OUA with electronic files of as-built drawings in PDF format with correct plotting line weights, sent as individual sheets and a batched/combined set.
G. All electronic drawing files shall be named with sheet number and sheet title.
H. Specifications: A/E shall provide OUA with electronic files of as-built specifications in PDF format. Files shall be named with section number and title, sent as individual sections and a complete project manual.
I. Shop Drawings: A/E shall provide OUA with electronic files of all approved shop drawings. Shop drawings to be named with specification section number and material type.

017700.7 As-Built Documents for Outside Utilities: The University shall be provided with as-built drawings on all outside utilities. Notes for these drawings shall be made in the field by GC/CMR during installation and verified by A/E.

017700.8 See Appendix M "Architect/Engineer Closeout Checklist" and Appendix N "Contractor Closeout Checklist" for additional information.

01 81 13 SUSTAINABLE DESIGN REQUIREMENTS

018113.1 Per the University's sustainable initiatives, each new building construction project, renovation, or retrofit, will require a life-cycle cost analysis (LCCA) to be undertaken by a qualified engineer or architect and in accordance with the standards established in ORC 3345.69. This will include an energy systems analysis and the results of these analyses will be a primary factor in developing the project design. The purpose of this section shall be to minimize energy consumption in University facilities (over the lifespan of the building) in a cost effective manner and to make decisions regarding the most effective ways to reduce energy.

018113.2 The University reserves the right to waive the LCCA requirement on a particular project, should it prove impractical or infeasible to undertake. If the A/E believes an exception is warranted, the A/E shall notify the University's project manager in writing at the outset of the project assignment and request a waiver.

018113.3 Where possible, materials are to be specified to meet or exceed the latest version of the USGBC's LEED rating system Silver level or better as discussed with OUA. Materials should be selected to minimize the embodied energy and other impacts associated with the extraction, processing, transport, maintenance, and disposal of building materials. Use of sustainable, recycled, and regional materials is encouraged.

018113.4 When possible and reasonable, a minimum of 10 percent of all building materials or products will

have been extracted, harvested or recovered, or manufactured within a 500 mile radius of the project site; or the requirement defined for Regional Materials by the current version of USGBC's LEED rating system.

018113.5 All buildings during construction and final occupancy shall meet "Environmental Tobacco Smoke Control" prerequisites in the most current version of USGBC's LEED rating system. All onsite personnel are required to abide by the University's Tobacco Free policy.

018113.6 Refer to Site Work General Requirements for Construction Activity Pollution Prevention recommendations.

END OF SECTION

DIVISION 02 – EXISTING CONDITIONS

02 00 00 GENERAL REQUIREMENTS

020000.1 A/E shall consult OUA during the early planning stage of the project concerning site work, excavation, grading, landscaping, removal of obstructions, alterations to existing campus drives, parking areas and walkways, removal of trees and shrubs, and access to and from the site.

020000.2 The site survey shall include information on underground utilities and structures (if required by the contract).

020000.3 A/E shall be responsible for preparing a subsurface investigation report which consists of test borings, laboratory testing and engineering analysis.

020000.4 Existing utility locations shall be determined by A/E in the preparation of plans for boring locations. A/E shall locate borings to avoid these utilities. Notify OUA to schedule the work.

020000.5 Boring locations and sections showing all soil conditions shall be shown on the drawings. The specifications shall state that the information is for the contractor's use and shall hold the University harmless for the accuracy of the information.

020000.6 A/E shall consult with OUA during early planning stages of the project to consider emergency vehicle access, service vehicle access, student disability services vehicles, snow removal, public transportation, parking, and pedestrian access including construction and staging areas.

020000.7 A/E shall indicate on drawings that the Ohio Utilities Protection Services (OUPS) does not locate utilities on campus nor does University personnel. Specifications should require contractor to hire utility location contractor services.

02 41 00 SITE DEMOLITION

024100.1 Remove existing foundations in open areas to a minimum depth of 5 feet below finish grade. If portions of the existing foundations remain, they must be shown on the "as-built" drawings.

024100.2 Indicate the extent of demolition on drawings where new structures will replace existing.

024100.3 Existing slabs scheduled to remain under fill for new structures shall be broken to provide for drainage. Slabs are to be broken into pieces no larger than 50 sq. ft.

024100.4 OUA reserves the right to remove and salvage items in areas to be demolished. OUA may remove items with their own forces or may want the contractor to remove items and turn them over to the University. Coordinate requirements on a project specific basis with OUA.

A. Historical items, relics, and similar items including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, antiques and other items of interest of value to the University which may be encountered during demolition remain the property of the University. Carefully remove and salvage each item or object in a manner to prevent damage and deliver promptly to the University.

024100.5 Underground utilities scheduled to be demolished shall be removed in entirety unless otherwise directed by OUA.

02 41 01 EXCAVATING AND BACKFILLING

024101.1 Removal of excavated materials from the site shall be reviewed with OUA during the design phase.

024101.2 Backfill only with acceptable materials that can be compacted, without containment, to the densities specified herein. Backfill under roads shall be per City of Cleveland's construction standards.

024101.3 Efforts shall be made to reduce construction and demolition waste disposed of in landfills and incineration facilities by recovering, reusing, and recycling materials. To reduce landfill waste, project over $1 million shall develop and implement a construction and demolition waste management plan that details all major waste streams, establishes waste diversion goals, and reports on disposal and diversion rates. Waste materials shall be disposed of offsite according to applicable jurisdiction.

024101.4 Compaction control requirements shall be specified for all fill, backfill, and embankments on site.

A. Compaction Requirements: Specify that soils are to be compacted to the following minimum densities, as determined by Standard Proctor Test (ASTM D-698) within an optimum moisture content range for the soils.
    1. 93% - Lawn, yard, planting beds, and unpaved areas.
        a. Trench and utility backfill away from paved areas.
    2. 98% - Zones within an area below an imaginary line drawn downward and outward at a 2 horizontal to 1 vertical slope from the outside edge of footings of buildings, walls, or edges of shoulders of paving and slabs on grade.
        b. Backfill on inside of buildings, under slabs on grade, paving, pads, stairs, and similar items.
        c. Trench and utility backfill under paving and within 10 feet of paved areas.
        d. Backfill around manholes, drainage structures, and underground structures.
    3. 100% - Top 12 inches of sub-grade under roadways, drives, parking areas, foundations, backfill, footings, pads, paved pedestrian walks and courts, loading docks, and paving primarily for vehicle traffic.

024101.5 Field compaction tests and related laboratory (ASTM member) analysis shall be performed by a registered Professional Engineer (PE) specializing in soils engineering. All soil used on this project shall be analyzed and approved by PE for each application prior to placement. A testing laboratory representative shall "spot check" during placement and compaction operations. Tests shall be made in sufficient quantity to assure uniform compaction and density of each course of fill.

024101.6 Payment for reimbursables shall be assigned to A/E. The testing laboratory will be under the direction of the A/E and will provide written reports to A/E and GC. A/E shall provide copies to OUA.

024101.7 Site utilities excavation shall be performed by each contractor including excavation, trenching, and backfill associated with the respective work. All work is subject to all requirements of Division 2 of the specifications including earthwork, excavating, backfilling, compaction, testing, and payment for testing. Include references to Division 2 in all other specification divisions when applicable.

024101.8 Rough grade lawn area to a maximum of 1 foot vertical to 4 foot horizontal. Steeper grades will require ground cover planting. Provide roundings at top and bottom of banks and at breaks in

grade.

024101.9 Scarify sub-grade to a minimum depth of 5 inches before placement of topsoil. Remove all waste material.

024101.10 Minimum depth for topsoil shall be 6 inches for grass and adequate depth for other planting materials.

024101.11 Protect new grade areas from the elements. Repair all settlement and erosion and re-establish grades to the required elevations prior to acceptance.

024101.12 All erosion control must comply with "Rainwater and Land Development – Ohio's Standards for Storm Water Management, Land Development, and Urban Stream Protection" for all sediment control, silt fences, and storm drain inlet protection.

02 41 02 CLEARING, GRUBBING, AND TOPSOIL REMOVAL

024102.1 Strip all objectionable growth. Remove from the site all debris resulting from the stripping operations at frequent intervals to prevent accumulation of material. On-campus disposal of material is prohibited.

024102.2 Strip topsoil to its full depth from entire area to be graded. Stockpile where directed and where it will not interfere with construction activities. Topsoil to be reused shall be free from roots, brush, and debris. Excess topsoil shall be deposited and/or spread on University property as directed unless otherwise approved by OUA.

024102.3 Protection of trees and shrubs scheduled to remain shall be assigned to the GC and shall include tops, trunks, and roots. A/E shall indicate on the drawings boxes, fences, or other protection required because of proximity to the work. Do not permit heavy equipment or material stockpiles within drip line. Any pruning required shall be with the approval and direction of OUA. GC shall be responsible for the survival of protected trees for 2 years after the date of substantial completion. GC shall be responsible for any tree that is considered to be in declining health (by a certified arborist) due to improper protection as documented during construction. An appraisal for determining a monetary opinion of the value of a tree shall be obtained by a certified arborist. Several methods for determining the value of a tree, including the replacement cost method or the trunk formula method, shall be used.

A. Replacement Cost Method: Applies to smaller trees with a trunk size up to 8 inches in diameter. The appraised value shall be determined by combining: price quote + transportation + planting + other costs, and apply the condition and location values to the trees. The sum of this is the appraised replacement cost.
B. Trunk Formula Method: Applies to trees that are too large for practical replacement and shall be appraised by determining the basic tree value by specific condition and location ratings. The appraised value shall be determined by the Ohio Chapter of the International Society of Arboriculture. All trees with a trunk larger than 8 inches in diameter when measured at 4 feet above natural grade shall be calculated in this manner.
C. If any contractor disregards the tree protections and procedure, the penalty as stated shall apply. GC shall be responsible for the survival of protected trees for 2 years after the date of substantial completion. GC Shall be responsible for any tree that is considered to be in declining health (by a certified arborist) due to improper protection. The tree(s) in question shall be replaced by trees of the same species and caliper. For all trees over 3 inch caliper, the

replacement shall be two 3-inch caliper trees at the location as directed by OUA. All associated costs for the removal of the declining tree(s) and any required professional assessment shall be the responsibility of the GC.

024102.4 Tree protective fencing should be 6 feet high, 2 inch mesh chain link fence with top rail and bottom tension wire and installed under the direction of OUA. Tree protection fence locations shall be shown on all site plans. Trees to be saved shall be labeled on all site plans including, but not limited to, demolition and grading plans. Tree protection limits shall be determined and verified by OUA. At a minimum, tree protection fence shall be 8 feet from the edge of tree canopy. No equipment or materials shall enter this area.

02 41 03 FOUNDATIONS

024103.1 Types of foundations shall be determined by A/E in consultation with his structural engineer based upon the types of soil encountered and other conditions. If pile foundations are necessary, A/E must thoroughly examine adjacent interior features and installations. At A/E's option, foundations may be a system of pre-case or cast-in-place concrete piles, concrete caissons, steel piles, or a combination of piles and caissons.

024103.2 Wood foundation systems are prohibited.

024103.3 Design of foundation systems shall be by an Ohio registered Professional Engineer (PE). All structural drawings shall bear the seal and signature of PE.

024103.4 Continuous inspection of pile and caisson installation shall be performed by an independent laboratory in cooperation with PE to assure compliance with contract documents.

024103.5 Payment for testing laboratory services shall be as specified by A/E.

024103.6 Quantity and location of test piles will be determined by the laboratory in cooperation with PE. The laboratory will locate the test piles such that if the test piles meet the project requirements, they may be used in the building foundation system.

024103.7 Test reports for the test and permanent piles shall include all information necessary by A/E. A copy shall be submitted to OUA.

024103.8 Drilled caissons shall be continuously inspected by the testing laboratory and PE during excavation, casing installation, and concrete placement.

024103.9 Data reports for caissons shall include all information as deemed necessary by the A/E. A copy shall be submitted to OUA.

024103.10 Basis of payment for base bid price shall be noted in the specifications as the depth and quantities of piles and caissons shown on the working drawings and on soil boring data. The form of proposal shall include separate lines for the unit price of material furnished and installed per lineal foot, to be added to or deducted from the base bid for depths differing from those indicated. State that payment will not be made for extra pilings that may be driven for the execution of the work. A/E must certify the depths of piles or caissons upon which the contractor's price is based.

END OF SECTION

DIVISION 03 – CONCRETE

03 00 00 GENERAL REQUIREMENTS

030000.1 Specification format shall follow the State Architect's Handbook if design requires engineering by a structural engineer. Otherwise, a short-form specification suited to job conditions is acceptable.

030000.2 Short-form specifications for small projects limited to patching of, or filling holes in existing concrete, may include job mixing of portland cement concrete. Patented cementitious patching compounds may also be included. Floor underlayment compounds will be specified in finish floor specification sections.

030000.3 Coordinate specifications with the requirements of the Portland Cement Association, especially concrete patching.

030000.4 Concrete floors shall be thermally isolated from exterior walls in compliance with current applicable building codes.

030000.5 Exposed concrete floors shall be specified with integral finish and hardener treatment. Separate topping is prohibited. A/E shall specify clear VOC-compliant water based sealant in Division 9. Non-floating fibermesh shall be used on interior exposed concrete flooring.

030000.6 All concrete slabs shall be fiber-reinforced at a minimum rate of 3 lbs. per cu. yd. with Fibermesh 650 by Propex or equal where welded wire mesh is not being used. 1-1/2 lbs. per cu. yd. of Fibermesh 300 is to be used on interior slabs where welded wire mesh is present.

030000.7 Provide a minimum compressive strength of 3,000 PSI at 28 days for general use. For slabs on grade and paving, use 4,000 PSI minimum.

030000.8 Concrete specified for filling excavations over footing may be 2,500 PSI minimum.

030000.9 Air Entrained Concrete: An air-entraining admixture shall be used for all flatwork concrete exposed to weather (to achieve 5-1/2 percent +/- 1-1/2 percent).

030000.10 Non-Slip Surfacing: Ramps, treads, and platforms of stairs shall have a non-metallic, non-slip surface with light broom finish when not covered with finish flooring materials.

030000.11 Structural design of slabs should include consideration of exposed construction which can be used for finished ceilings.

030000.12 Tests will be performed by a testing laboratory which has been approved by the A/E. The laboratory shall perform tests for wet density, dry density, and compressive strength for each specimen. Refer to Division 1 Testing Requirements for costs of tests and contracts. On projects using state funds, costs of tests may be as an allowance or reimbursable to A/E. Contractor to notify testing agency 24 hours in advance, prior to placement.

030000.13 Testing Agency: Owner will engage a qualified independent testing and inspecting agency to sample materials, perform tests, and submit test reports during concrete placement. Obtain one sample for each day's pour of each concrete mix exceeding 5 cu. yd. but less than 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof. A minimum of four test cylinders shall be

taken during each day's pour, and written reports of tests shall be sent directly to A/E.

030000.14 On-Site Construction Administration: A/E shall have a representative visit the site at appropriate intervals to observe the work and determine if the work is in accordance with the contract documents. A/E shall keep the Owner informed and will endeavor to guard against defective work. Report any non-compliance with the specifications to OUA.

030000.15 Addition of water to concrete during delivery, at project site, or during placement is prohibited, except as specified by the design mix on ticket.

030000.16 Placement Schedule: Contractor to submit concrete placement schedule before start of concrete placement operations. Include location of all joints including construction joints. Provide minutes of pre-installation conference.

030000.17 Specify only non-staining types of curing, sealing, and hardening products which are compatible with flooring materials. Take necessary precautions to prevent odor from entering adjacent occupied buildings.

030000.18 Sawed Joints: Cut joints into concrete when cutting action will not tear, abrade, or otherwise damage surface. Joins to be sawed within 24 hours of placement of concrete. A/E to specify joint width and depth.

030000.19 Joint Fillers: Prepare, clean, and install joint filler according to manufacturer's written instructions. Defer joint filling until concrete has aged at least 6 months. Do not fill joints until construction traffic has permanently ceased.

030000.20 Parking Garage Structures:

A. Parking spaces in garages shall be 8'-6" wide for stalls at 90 degrees. Parking spaces designated for handicapped shall comply with current ADA guidelines. Parking garages shall be designed to have a minimum of 7 feet clear height throughout, no exceptions. Signage, piping, ductwork, and other objects shall not be below 7' AFF.
B. Exposed steel or structural pre-cast concrete frames are prohibited.
C. Structural slabs for parking garages and other concrete to be subjected to deicing salts shall include micro-silica, corrosion inhibitor, and epoxy-coated reinforcing steel. Micro-silica concrete mix design shall be based on 6,000 PSI compressive strength and shall be moisture cured. Broom finish concrete in vehicular traffic areas.

03 30 00 CAST-IN-PLACE CONCRETE

033000.1 Concrete Mixing: Contractor to provide batch ticket for each ready-mixed batch discharged and used in the work, indicating project identification name and number, date, mix type, mix time, quantity, and amount of water added. Record approximate location of final deposit in structure.

033000.2 Vapor Retarder: Under building floor slabs, install, protect, and repair vapor-retarder sheets (minimum of 6 mil, reinforced) according to manufacturer's specifications. Place sheets in position with longest dimension parallel with direction of pour. Lap joints 6 inches and seal with manufacturer's recommended tape. Cover vapor retarder with fine graded granular material, moisten and compact with mechanical equipment to elevation tolerances of plus 0" or minus 3/4".

033000.3 Steel Reinforcement: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing,

and supporting reinforcement. Repair damage and reseal vapor retarder before placing concrete.

033000.4 Concrete Protection and Curing: Protect and cure in compliance with ACI recommendations.

033000.5 Formwork: Chamfer exterior corners and edges of permanently exposed concrete.

03 33 00 ARCHITECTURAL CONCRETE

033300.1 Definition: Concrete that is exposed to view on surfaces of the completed structure or building and that requires special concrete materials, formwork, placement, or finishes to obtain specified architectural appearance.

033300.2 Sample Panel: Architectural cast-in-place concrete specifications shall include a minimum of 4'x8' sample panel to be erected at the site. The sample panel shall be protected from construction operations, but shall be exposed to the elements.

A. The sample panel may be incorporated into final work if approved by OUA.
B. The sample panel shall remain on site until all architectural concrete has been approved by OUA.

033300.3 Provide temporary protection for nosings on interior concrete steps. Treads of concrete steps shall be provided with non-slip surface.

033300.4 Reinforcement Accessories – Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting and fastening reinforcing bars, and welded wire fabric in place. Where legs of wire bar supports contact forms, use as appropriate: a) all-plastic, b) CRSI Class 1 plastic-protected, or c) CRSI Class 2 stainless steel bar supports.

033300.5 Concrete Mixing: Refer to 033000 Cast-In-Place Concrete.

033300.6 Formwork: Fabricate forms for easy removal to prevent damage to concrete surfaces.

033300.7 Concrete Placement: Refer to 033000 Cast-In-Place Concrete.

033300.8 Concrete Curing: Refer to 033000 Cast-In-Place Concrete.

03 41 00 PRE-CAST CONCRETE

034100.1 Pre-cast concrete design and specifications for structural concrete and concrete panels shall be based upon recommendations of the Pre-Stressed Concrete Institute.

034100.2 Sample Panel: Refer to 033300.2

034100.3 Fabrication Qualifications: Engage a firm experienced in producing architectural pre-cast concrete units. Fabricator must participate in the Pre-Cast/Pre-Stressed Concrete Institute's (PCI) Plant Certification Program and be designated a PCI certified plant for Group A1 – Architectural Concrete at the time the project is bid.

03 52 16 LIGHTWEIGHT INSULATING CONCRETE

035216.1 Review use with OUA.

03 53 00 FLOOR TOPPING

035300.1 Project Conditions:

A. Place concrete floor topping per temperature recommended by manufacturer.
B. Close areas to traffic during topping application and after application.
C. Protect from weather until curing is complete.

035300.2 Preparation:

A. Examine substrates, with installer present, for conditions affecting performance of concrete floor topping.
B. Mechanically remove contaminants from existing concrete that might impair bond of floor topping.
C. Start floor topping application in presence of manufacturer's technical representative.

03 54 00 CAST UNDERLAYMENT

035400.1 Comply with manufacturer's recommendations and refer to project conditions and preparations in 035300 Concrete Floor Topping.

END OF SECTION

DIVISION 04 – MASONRY

04 00 00 GENERAL REQUIREMENTS

040000.1 Allowances for masonry materials to match existing are not permitted. A/E will determine the manufacturer, texture, and color of masonry units and mortar to match existing prior to bidding. Approval must be obtained from OUA. This information will be provided to the bidders in the contract documents.

040000.2 Where the phrase "or approved equal" or "approved substitution" occurs in the contract documents, do not assume that material, equipment, or methods will be approved as equal by A/E unless the item has been specifically approved for this work by OUA. Color choices will be one of the determining factors for approval of masonry.

040000.3 Match existing coursing, bonding, color, and texture of existing masonry unless otherwise approved by OUA.

040000.4 Waterproofing shall be applied to all exterior materials which are not inherently water resistant. Use water resistant mortar additive in walls which will not receive applied waterproofing.

040000.5 Dampproofing shall be applied to all walls below grade which are not otherwise sealed to prevent water entry.

040000.6 Sample Panels: Build sample panels to verify selections to demonstrate aesthetic effects. Build sample panels to approximately 4'x5' by full thickness.

040000.7 Approval of sample panels is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; aesthetic qualities of workmanship; and other material and construction qualities specifically approved by A/E in writing.

040000.8 Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially competed masonry when construction is not in progress.

040000.9 A/E shall specify factory blending for exposed unit masonry to produce a uniform blend of colors and textures.

04 01 20 MAINTENANCE

040120.1 A/E shall review all restoration and cleaning specifications with OUA.

040120.2 A/E shall schedule and coordinate testing of cleaning agents to be used prior to bidding.

040120.3 A/E shall specify cleaning to be performed from the bottom up.

040120.4 Specify pre-cleaning conference and test area.

040120.5 Brick and mortar selection for renovations or additions to buildings shall match the closest freshly cleaned adjacent wall unless otherwise approved by OUA.

040120.6 Face brick mortar shall be tinted to match adjacent building joints in addition work, or as otherwise approved by OUA in all other work.

04 05 00 COMMON WORK RESULTS

040500.1 Mortar for laying masonry may be ready-mix or job mix. Specify by types according to ASTM C270.

040500.2 Face brick mortar shall be tinted to match adjacent building joints in addition work, or as otherwise approved by OUA in all other work.

040500.3 Tooled joints shall be standard concave joints unless otherwise required to match adjacent existing joints.

040500.4 Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes. Use only pigments with a record of satisfactory performance in masonry mortar.

040500.5 Cold-Weather Mixture: Non-chloride, non-corrosive, accelerating admixture complying with ASTM C494/C494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.

040500.6 Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather condition, to ensure that mortar color is consistent.

040500.7 Protect stone and cast stone from masonry cleaners. Masonry cleaning to be scheduled to be performed immediately following grout set.

040500.8 Source Quality Control: A/E shall specify requirements for masonry mortar testing. Refer to Division 1 for testing.

04 05 19 MASONRY ANCHORAGE AND REINFORCING

040519.1 Masonry Joint Reinforcement: ASTM A951.

040519.2 Masonry Joint Reinforcement for Single-Wythe Masonry: Either ladder or truss type with single pair of side rods per structural engineer's recommendation.

040519.3 Masonry Joint Reinforcement for Multi-Wythe Masonry:

A. Ladder type with 1 side rod at each face shell of hollow masonry units more than 4 inches (100 mm) in width, plus 1 side rod at each wythe of masonry 4 inches (100 mm) or less in width.
B. Tab type, either ladder or truss design, with 1 side rod at each face shell of backing wythe and with rectangular tabs sized to extend at least halfway through facing wythe but with at least 5/8 inch (16 mm) cover on outside face.

040519.4 Hot-dip galvanized, carbon-steel wire or steel sheet.

040519.5 Wire, steel sheets, steel plates, shapes and bars.

040519.6 Stainless steel bars for stone trim or pre-cast concrete trim.

040519.7 Corrugated metal ties are prohibited.

040519.8 Reinforcing Bar Positioners: Galvanized wire units designed to fit into mortar bed joints spanning masonry unit cells with loops for holding reinforcing bars in center of cells.

04 05 23 MASONRY ACCESSORIES

040523.1 A/E to indicate all control and expansion joints on exterior elevation. Control joints shall be designed at one side of every opening and sill and at a maximum 20 foot horizontal spacing. Expansion joints shall be as designed by A/E.

040523.2 Stainless steel preferred. Review all other types with OUA. Isolate

040523.3 Weep Hole Wicking Material: Absorbent rope made from cotton 1/4" to 3/8" in diameter.

040523.4 Cellular Plastic Vent: One-piece, flexible extrusion made from UV-resistant polypropylene copolymer, full height and width of head joint and depth 1/8" (3 mm) less than depth of outer wythe, in color selected from manufacturer's standard. Install at heads and sills of all openings and top and bottom of wall.

040523.5 Cavity Draining Material (Mortar Net); Free-draining mesh, made from polymer stands that will not degrade within the wall cavity.

040523.6 Loose-Granular Fill Insulation: Perlite complying with ASTM C549, Type II (surface treated for water repellency and limited moisture absorption) or Type IV (surface treated for water repellency and to limit dust generation).

040523.7 Extruded-polystyrene board insulation, ASTM C578. Minimum R value to comply with current Ohio Energy Code.

04 20 00 UNIT MASONRY

042000.1 A/E shall determine unit compressive strength and weight classification of CMU.

042000.2 Exposed exterior CMU assemblies shall only use Grade A washed, crushed limestone aggregate and washed limestone sand. Units shall have integral water repellant.

042000.3 All exposed CMU outside corner assemblies (including at doors, windows, and wall offsets) shall be constructed with bullnose units.

04 21 00 CLAY UNIT MASONRY

042100.1 Modular brick coursing, 3 courses to 8 inches, is required unless existing conditions are different or as approved by OUA.

042100.2 Stack bond is prohibited unless approved by OUA for limited architectural effect.

042100.3 Split coursing is prohibited at the head of any opening.

042100.4 Efflorescence test certificate must be submitted to OUA prior to approval of selection indicating no efflorescence when tested in accordance with ASTM C67.

042100.5 Provide special shapes for applications where shapes produced by sawing would result in sawed surfaces being exposed to view.

042100.6 Brick Surface Coating: Brick with colors or textures produced by application of coatings are prohibited.

04 21 23 STRUCTURAL CLAY TILE MASONRY

042123.1 Structural clay facing tile shall be select quality, ceramic glaze, 8”x16” face. Reinforcing clay facing tile assemblies in alternating courses with approved truss-type reinforcing.

042123.2 Provide special shapes where required for corners, jambs, coved bases, sills, and other special conditions indicated, including applications that cannot be produced by sawing standard units.

042123.3 Provide bullnose units for outside corners, unless otherwise indicated, and coved internal corners. Provide recessed, coved base units.

04 43 00 STONE MASONRY

044300.1 Limestone shall be Buff Indiana limestone except where other types may be required to match existing surfaces. Backs and bonding faces shall be dampproofed with a water barrier as approved by the Indiana Limestone Institute of America (ILIA). Limestone shall not be installed lower than 4 inches above grade when adjacent to lawns or planted areas.

044300.2 Non-staining sealant or acrylic-based compounds shall be used for sealing stonework. Silicon-based compounds are prohibited for limestone.

044300.3 Handling, protection, and installation shall comply with the recommendations of ILIA.

044300.4 Limestone, ASTM C568 classification, 2 Medium density minimum. Comply with recommendations in ILIA handbook.

04 72 00 CAST STONE MASONRY

047200.1 All cast stone shall be minimum 6,500 PSI concrete. All exposed corners shall be eased.

047200.2 Embedded anchors and other inserts shall be fabricated from stainless steel.

047200.3 A/E shall specify cleaner that is compatible with cast stone.

END OF SECTION

DIVISION 05 – METALS

05 00 00 GENERAL REQUIREMENTS

050000.1 Refer to front end documents for domestic steel requirements.

05 10 00 STRUCTURAL METAL FRAMING

051000.1 Specifications shall be complete for this part of the work in addition to the structural engineer's notes on the drawings. A/E is responsible for complete coordination of statements in the specifications with notes on the drawings.

051000.2 Comply with American Institute of Steel Construction (AISC) for all structural steel.

051000.3 Erect structural steel within the tolerances stipulated in the AISC code of standard practice for buildings designed with future vertical expansion provisions.

051000.4 Specifications will require the erection subcontractor to provide an affidavit at the completion of the job which states that the structural steel frame is plumb and level within normal tolerances specified in the AISC code.

051000.5 Submit shop drawings in accordance with all applicable provisions of these specifications. A/E to review shop drawings for conformance with overall design intent.

051000.6 Shop prime all interior structural steel with oxide-rich primer.

051000.7 Hot dip galvanize all exterior or wet location steel. Repair all damage to galvanized coatings.

051000.8 An independent testing agency shall verify and report the strengths of all high strength, bolted connections, and welded connections. A/E to verify with OUA testing agency payment procedure.

05 21 00 STEEL JOISTS

052100.1 Manufacturer's certificate of compliance with Steel Joist Institute specifications is required.

052100.2 Shop prime coat and field tough-up painting are adequate for joists except where subject to moisture or exposed to view.

052100.3 Clean all joist members prior to acceptance by Owner. Verify that proper finishes have been applied to all faces of joist members.

05 30 00 METAL DECKING

053000.1 Manufacturer's certificate of compliance with Steel Deck Institute specifications is required.

053000.2 Galvanized decking shall be installed for all roof decks and all other moisture-prone floor slabs such as mechanical rooms, kitchens, and bathrooms. Coordinate with OUA.

05 40 00 COLD-FORMED METAL FRAMING

054000.1 This section pertains to load-bearing assemblies. Refer to Division 9 Finishes for non-load bearing metal stud assemblies.

054000.2 C-Shape Studs: Provide and install manufacturer's standard load-bearing metal studs of size, shape, and gauge indicated or as determined by design requirements with 1.625 inch minimum flange and flange return lip.

054000.3 Patented metal framing systems which are required for the support of plaster or gypsum board ceilings should be specified in this section and approved by OUA.

05 50 00 METAL FABRICATIONS

055000.1 Design shall be complete for all required metal fabrications. Contractor designed metal fabrications are prohibited (this includes stairs, ladders, and railings).

055000.2 Specify that GC will provide and install lintels for all openings through walls shown on drawings for all other prime trades.

055000.3 All exterior lintels, exterior gratings, and interior wet location ferrous metals shall be hot-dip galvanized after fabrication. Repair all damage to galvanized coatings. Fasteners shall be galvanized. Welded connections shall be re-galvanized to prevent rust.

055000.4 All exterior handrails and guardrails on concrete stairs shall be steel (not galvanized) with powder coat finish over oxide primer. Railings are to be set in concrete base outside of stair cheek wall.

055000.5 For all exterior steel, use of powder-coated metals is preferred. Verify with OUA before specifying.

055000.6 Interior metal stairs for public access shall not be exposed concrete. At a minimum, cover all concrete treads and risers with rubber stair materials.

055000.7 Interior metal stairs for public access shall not have open risers. Metal grate or perforated risers are not acceptable. Only solid risers are allowed.

055000.8 Exterior metal stairs are discouraged; when necessary, they shall be constructed of hot-dipped galvanized members. Fully weld all rails, handrails, attachments and supports, and repair welds with galvanizing repair paint. Stair treads and landing shall be perforated or grating type material to allow drainage. A/E to verify ADA compliance.

055000.9 Bilco "Ladder Up" or approved equivalent safety device is required at all roof ladders through the roof hatches. A/E to locate roof ladders in custodial closets or mechanical rooms.

055000.10 Metal expansion joint covers shall be aluminum and are required at all joints in traffic planes.

055000.11 Gratings shall be standard size, galvanized, and painted after fabrication. Provide galvanized hardware under all areaway gratings.

055000.12 All exterior gratings exposed to public pedestrian traffic shall be ADA compliant and safe for walking with shoes with narrow heels (1/4" maximum gap). Grating shall also be structurally rated for vehicular traffic. Refer to Division 2 for specific manufacturers and model numbers.

END OF SECTION

DIVISION 06 – WOOD, PLASTICS, AND COMPOSITES

06 00 00 GENERAL REQUIREMENTS

060000.1 Wood products must be certified by the Forest Stewardship Council or approved equivalent.

060000.2 Bio-based products must meet the Sustainable Agriculture Network's Sustainable Agriculture Standard.

06 10 00 ROUGH CARPENTRY

061000.1 Always provide and install fire-treated lumber unless otherwise directed by OUA. Back up all wall and ceiling mounted accessories with wood blocking (especially wall mounted door stops, grab bars, shelving standards, window treatment hardware, and wall cabinetry). Install only true, straight pieces.

061000.2 All lumber in contact with masonry, concrete or roof termination details shall be "ground contact" preservative treated to meet AWPA standards. All fasteners, anchors, plates and hardware shall be hot dipped galvanized or stainless steel to withstand the corrosiveness of preservative treatments.

061000.3 Truss shop drawings shall include a complete design analysis of structural components. On all roof projects, design fall protection anchor points. Data shall bear the seal and signature of an Ohio-registered professional architect or engineer certifying that the design of the trusses complies with the requirements of the building code. A/E shall review shop drawings to verify conformance with design intent.

061000.4 A/E shall verify grade stamps of all lumber installed.

061000.5 A/E shall verify and specify code-required wood fastening requirements.

06 20 00 FINISH CARPENTRY

062000.1 Conform to Architectural Woodwork Institute (AWI) Specifications for custom quality work.

062000.2 Back prime all exterior trim prior to installation. Spot prime ends.

062000.3 Shelving shall be 3/4 inch 5-ply plywood; no particleboard. Hardwood plywood shelves with hardwood edge may be stained, or shelves may be completely covered (all six faces) with plastic laminate. Melamine surfaces and T-edge molding is approved for spans 4 feet and under. Support shelves on heavy-duty adjustable steel standards and brackets unless otherwise indicated; Knape & Vogt or equal.

062000.4 Provide fire treated plywood telephone and electrical/data backboards where specified; paint gray. Verify size of plywood backboard with OUA.

062000.5 A/E shall specify "tamperproof" or "vandal resistant" fasteners in areas that are subject to vandalism by the general public. These fasteners shall have a "snake eyes" head.

06 40 00 INTERIOR ARCHITECTURAL WOODWORK

064000.1 Flush door and drawer design preferred on custom casework. Pre-manufactured cabinets are acceptable if construction will withstand use. Refer to Division 12.

064000.2 In wet areas (restrooms, kitchens, window sills, and similar locations), solid surface counter material is preferred if the budget allows.
A. Provide auxiliary support under counters to withstand sitting loads.

064000.3 Counter tops may be fabricated off site, but back and end splashes should be shipped loose for field installation. All countertop laminates to have a backer sheet. Carbonite countertops preferred for all laboratories. Specify scratch and abrasion resistant colors, textures, and finishes for abusive installations, such as geology rock labs, areas with fossil work, etc.

064000.4 ADA compliant cabinet hardware (drawer and door pulls) specifications should be included in this section for installation by the manufacturer/installer.

064000.5 All casework and countertop particleboard shall be LEED certified or equivalent formaldehyde-free sheet material such as "Wheatboard".

06 80 00 GLASS FIBER REINFORCED PLASTIC

068000.1 A/E to review all products with OUA.

END OF SECTION

DIVISION 07 – THERMAL MOISTURE PROTECTION

07 10 00 WATER RESISTANCE AND DAMPROOFING

071000.1 Membrane water resistance shall be a heavy duty permanent water-resistant type capable of adjusting to building movement without breaking the membrane seal.

071000.2 Preferred system is tar or asphalt impregnated fiberglass fabric. A/E to recommend preferred system. A ten-year experience clause is required in the specification.

071000.3 Fully detail all conditions on the drawings to prevent seepage from exterior sources. Concrete foundation walls around elevator pits and basements, from grade to footings, shall be treated with membrane water resistance.

071000.4 A/E shall determine compatibility with water stop materials as may be required at joints.

07 11 00 DAMPROOFING

071100.1 Bituminous dampproofing shall be installed on all walls where interior surfaces are scheduled to receive applied finishes.

071100.2 Install dampproofing prior to installation of interior finishes.

07 19 00 WATER REPELLENTS

071900.1 Exposed surfaces of exterior brick, concrete block, cut stone, and pre-cast concrete shall be coated with a penetrating, colorless, non-staining, mildew resistant water repellent.

071900.2 Water repellent coatings should be specified for all new and restored brick, concrete masonry, and architectural pre-cast concrete. Products specified should be breathable silanes or siloxanes as appropriate for the surface to be coated. Film forming surface coatings such as silicones, acrylics, mineral gum resins, and blends should not be used. Products specified should be those which have an estimated life expectancy of 10 to 15 years.

071900.3 Specify that adjacent and nearby surfaces be protected from spillage or overspray from repellents. Require that live plants, grass, windows, and other areas be covered.

071900.4 Coordinate water repellents with graffiti-resistant coatings to ensure compatibility and warranty requirements. Ideally these products should be from the same manufacturer.

07 22 00 ROOF INSULATION

072200.1 Roof deck insulation including cant strips and tapered edge strips shall be non-hygroscopic. Hygroscopic materials are prohibited in any part of the roof system.

072200.2 Minimum gap between roof insulation boards shall be the minimum as required by the manufacturer. This requirement is especially important around roof penetrations and projections.

072200.3 Daily installation of roof insulation materials shall be limited to that amount which can be covered with the roofing membrane prior to the end of the day or prior to the onset of inclement weather.

072200.4 Anchor roof insulation in accordance with manufacturer's recommendations for fastener type, size, placement, and density. Installation shall comply with Factory Mutual 1-90 rating against uplift.

07 21 00 BUILDING INSULATION

072100.1 On vertical surfaces, set units in adhesive applied according to manufacturer's written instructions. Use adhesive recommended by insulation manufacturer.

A. If not indicated, extend insulation to footer depth.

072100.2 Protect below-grade insulation on vertical surfaces from damage during backfilling and site work by applying protection board.

072100.3 The entire envelope of CSU buildings shall be insulated to no less than ASHRAE 90.1 2010 standards.

07 24 00 EXTERIOR INSULATION AND FINISH SYSTEMS (EIFS)

072400.1 Use of EIFS shall be limited and only as approved by OUA.

07 26 00 VAPOR BARRIERS

072600.1 Under floors use minimum 6 mil polyethylene sheet. If a crawl space occurs, protect the vapor barrier with a 3 inch (min.) concrete slab; where utilities occur, utilize a 2,000 PSI strength concrete.

072600.2 In exterior walls and ceilings under roofs which are scheduled to be finished gypsum board, use 6 mil fiber-reinforced polyethylene sheet.

07 27 00 AIR BARRIERS

072700.1 Provide building air infiltration barrier (building wrap) where appropriate; Tyvek or equal.

07 30 00 ROOFING SYSTEMS

073000.1 General Requirements:

A. Flat roofs shall be designed to provide a minimum 1/4 inch per foot slope as required by code. Increased slope up to 1/2 inch per foot is preferred to prevent standing water on roofs. Dead level roofs are prohibited. Slope shall be accomplished by clopped structural members whenever possible or tapered insulation if necessary (except for coal tar). Additional tapered insulation should be used at strategic locations to create saddles, crickets, and additional taper around equipment, perimeter areas, curbs, valleys, and other potential problem areas. Scupper openings and overflow roof drains shall be discussed with OUA.

B. Provide roofing membrane manufacturer approved walkway pads around all rooftop equipment and in areas subject to traffic.

C. On re-roofing projects, drainage should be assessed and, if necessary, provisions should be added to improve drainage. Consult with OUA for maintenance issues.

D. Rooftop piping, conduits, and equipment shall be mounted on supports specifically manufactured for roofing. Wood blocking is not an acceptable means of support.

E. High-Reflectance Roof: Use roofing materials that have an SRI equal to or greater than the values outlined in the USGBC "minimum solar reflectance index value" table.

073000.2 Roof System Selection:

A. The roof system selected shall be determined on a project-by-project basis. Although there is no single roof system requirement, the University requires that the following criteria be considered in selecting a roof system. Re-roofing projects shall include tear-off of old roofing systems to original substrates.
    1. Built-Up Roofing Systems: Built-up roofing (BUR) systems are preferred and should be utilized on all projects unless there is a project specific reason not to use them. BUR systems should be 4-ply coal tar or asphalt. Coal tar is preferred to asphalt. On projects where the fumes from hot tar are of concern, asphalt BUR should be specified. If the asphalt fumes are still more than the project can tolerate, other systems should be considered. On projects where staging a hot kettle would be a problem, or on small roofs where BUR is not feasible, a modified bitumen system should be considered.
    2. Modified Bitumen Roofing System: Modified bitumen roof systems should be considered when built-up roof systems are not appropriate. Modified bitumen systems are composed basically of factory fabricated reinforced rolls of asphalt that have either SBS (rubber) or APP (plastic) polymer modifiers. SBS systems typically con be hot mopped torch applied, or cold adhered. APP systems are traditionally torch applied. Torch applied systems should be used over buildings with concrete decks, or where mopping is not appropriate (high rise, small areas, etc.). Extra precautions need to be taken to ensure protection from fire hazard, especially at blocking locations. If fire hazard concerns cannot be resolved, cold adhered systems should be considered.
    3. Single-Ply Membrane System: Single-ply membrane systems should not be specified without specific approval from OUA. Only in the event that project conditions make a built-up or modified system inappropriate (as in areas of kitchen exhaust), single-ply systems should be considered. The type of single-ply membrane being considered should be based on project conditions. Reinforced and thicker (60 mil) membranes are preferred. Reinforced thermoplastic membranes (EP, TPO, PVC, CPA) are preferred over vulcanized elastomer membranes (SPDM) or non-vulcanized membranes (CSPE, CPE).

073000.3 Project Management and Coordination: Review methods and procedures related to roofing systems including, but not limited to, the following:

A. Review temporary protection requirements for existing roofing system that is to remain, during and after installation.
B. Review roof drainage during each stage of re-roofing and review roof drain plugging and plug removal procedures.
C. Review structural loading limitations of deck during re-roofing.

073000.4 Pre-Installation Conference: Before starting roofing installation, A/E shall conduct a meeting with the roofer and job superintendent, roofing material manufacturer's representative, and owner's representative to review roofing materials and procedures. Record discussions and furnish copy of meeting notes to each participant.

073000.5 Maintain roof drains in functioning condition to ensure roof drainage at end of each workday. Prevent debris from entering or blocking roof drains and conductors. Use roof drain plugs specifically designed for this purpose. Remove roof drain plugs at end of each work day, when no work is taking place, or when rain is forecast.

A. If roof drains will be temporarily blocked or unserviceable due to roofing systems removal or partial installation of new membrane roofing system, provide alternative drainage method to

remove water and eliminate ponding. Do not permit water to enter into or under existing membrane roofing system components that are to remain.

073000.6 Built-Up Coal Tar Roofing: Store liquid materials in their original containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.

A. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.
B. Provide tie-offs at end of each day's work to cover exposed roofing membrane sheets and insulation with a course of coated felt with joints and edges sealed.
C. Complete terminations and base flashings and provide temporary seals to prevent water from entering competed sections of roofing system.

07 31 00 SHINGLES AND ROOFING TILES

073100.1 Overlapping unit roof systems (shingles and tiles) shall not be used unless roof slope exceeds 3-1/2 units of rise per 12 units of run.

073100.2 Asphalt or fiberglass shingles shall be minimum fire resistive UL Class C, wind resistive type, 30 year guaranteed.

073100.3 Associate shall verify all fasteners are compatible with substrates and accessories and have adequate protrusions below sheathing. No staples shall be used.

073100.4 Water-resistant membrane shall be detailed in at valleys, roof edges, and other areas where ice build-up may cause water to enter the roof system.

07 41 00 METAL ROOF PANELS

074100.1 Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal roof panels that show evidence of deterioration of factory-applied finishes within specified warranty period.

074100.2 Finish Warranty Period: This warranty is project specific per product specified (how many years from date of contract completion).

074100.3 Review metal fastening system with OUA.

07 50 00 MEMBRANE ROOFING

075000.1 Factory Mutual: Materials and workmanship shall conform to 1-90 wind uplift resistance.

075000.2 Manufacturer's Warranty: After final inspection and approval by roofing manufacturer's representative, provide written warranty signed by manufacturer of primary roofing materials and his authorized installer, agreeing to replace/repair defective materials and workmanship as required to maintain roofing system in water-tight condition.

A. Warranty period is 20 years from date of contract completion.

075000.3 Contractor's Warranty: Submit two executed copies of the Contractor's Roofing Warranty, signed by the installer (roofer), agreeing to warrant the roof system. Review Manufacturer's Warranty with OUA.

A. Warranty period is 2 years from date of contract completion.

075000.4 Flashing shall be uncured neoprene sheet of not less than .60 mils (0.60 inch) thick of required shapes and sizes to suit project conditions. Flashing materials shall be furnished by the manufacturer of the sheet roofing membrane.

A. Pipe seals shall be pre-manufactured neoprene boots.
B. All flashings and counter-flashings, including pipe seals, shall be installed by the roofing contractor to assure a complete water-resistant installation.

075000.5 Wood members used in conjunction with roof system shall be pressure treated with water-borne preservatives for above ground use in compliance with AWPB LP-2.

075000.6 Minimum term for warranty shall be 20 years with no dollar limit, unless standard manufacturer's warranty exceeds this term. The general contractor, roofing subcontractor, and manufacturer shall furnish the written guarantee bearing their three signatures for the complete roof installation (including installation of items supplied by other contractors).

A. The manufacturer's guarantee for sheet membrane material shall be executed and submitted with the general contractor's guarantee.
B. The GC will submit the guarantee(s) in triplicate to A/E and the term shall begin upon contract completion.
C. The primary responsibility for executing guarantee work shall lie with the GC.
D. The guarantee shall include, at no cost to the University, all labor and materials required to repair or replace the entire roof system including insulation, membrane, slashing, sheet metal, coping, and roofing accessories as may be caused by faulty workmanship or materials.

07 62 00 SHEET METAL FLASHING AND TRIM

076200.1 All flashing and sheet metal work shall be as recommended by the sheet roofing membrane manufacturer and shall be included in the roof guarantee.

076200.2 All metal shall be compatible with surrounding systems.

076200.3 Gutters and downspouts shall be copper, stainless steel, or factory finished color-coated metal.

076200.4 Fascias and gravel stops shall be extruded aluminum, copper, stainless steel, or color-coated metal.

076200.5 The top of flashing (bottom of counter-flashing) shall be a minimum of 8" above the roof plane.

076200.6 The use of pitch pans is strongly discouraged. Items penetrating roof should be flashed with pre-formed accessories, secured to the roof and penetrating items.

076200.7 Relief vents shall not be installed unless roof no longer is under warranty and vents are recommended by the manufacturer of the sheet roofing membrane. For roofs beings constructed under warranty, all wet insulation shall be replaced.

076200.8 Walkways shall be provided to all major pieces of mechanical equipment and around all equipment that requires servicing. Provide elastomeric roof treads as recommended by the manufacturer of the sheet roofing membrane.

076200.9 Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect

galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by fabricators or manufacturers of dissimilar metals.

07 72 00 ROOF ACCESSORIES

077200.1 Fasteners: Same metal as metals being fastened or non-magnetic stainless steel or other non-corrosive metal as recommended by the manufacturer. Match finish of exposed fasteners with finish of material being fastened.

077200.2 Provide tie-off connections for life safety lines. Review locations with OUA.

07 81 00 FIREPROOFING

078100.1 Sprayed-on fireproofing shall be 100 percent asbestos free. Sprayed-on fireproofing shall be a cementitious type. Specify higher density products if needed based on project requirements. Sprayed fiber type products are prohibited.

078100.2 Specify field quality control testing of sprayed-on fireproofing by an independent testing agency to verify that installed fireproofing complies with specified thickness, density, and bond strength prior to ductwork installation.

078100.3 Specify that installed fireproofing which is damaged during construction shall be repaired to original condition. On multiple prime projects, require that the contractor that disturbs the fireproofing be responsible for having it corrected.

078100.4 Coordinate the extent of fireproofing between structural and architectural documents. Specify that structural steel to receive fireproofing shall not be prime painted. Such steel shall be properly stored and protected to prevent surface rust. Require that applicators prepare steel in accordance with fireproofing manufacturer's recommendations to ensure proper bond.

07 92 00 JOINT SEALANTS

079200.1 The term "caulk" or "caulking" may be used in the documents to indicate joint sealants. The drawings, however, shall not indicate the specific type of sealant. Specifications shall define the types of sealants to be used for each specific condition and adjacent materials. NOTE: "Caulking" is correctly used for interior applications only. The sealant specifications shall include all accessories such as seals, water stops, backer rod, bond break tape, and primer.

079200.2 Sealants shall be specified for all exterior applications and those interior applications where caulking compounds are not suitable.

079200.3 For horizontal joints in concrete pavements or walks, use pourable urethane base sealant.

079200.4 Five years experience of applicator shall be certified to A/E prior to the installation of any sealants.

079200.5 Acceptance of conditions for application of sealant materials shall be solely the responsibility of the sealant subcontractor.

A. If substrate is not ready or cannot be made ready for application of these materials, the subcontractor shall notify the GC and A/E.
B. After sealant materials are installed, this subcontractor assumes all responsibility for the

satisfactory installation of sealants.

079200.6 Installation of sealant materials shall be as late in the project as possible, but between cleaning operations and paint application. Do not install sealants when the temperature is below 40 degrees F unless approved by the manufacturer and Associate.

079200.7 A written guarantee for all joint sealants shall be provided by the GC and the sealant subcontractor agreeing to replace all materials which fail within 5 years after acceptance. Replacements shall be at no cost to the University. Guarantee shall be submitted to A/E in triplicate and shall be signed by the GC and the sealant subcontractor.

END OF SECTION

DIVISION 08 – OPENINGS

08 00 00 GENERAL REQUIREMENTS

080000.1 The minimum size for all doors shall be 3'-0" x 7'-0" x 1-3/4", except for chase access and other special doors. Mechanical room doors must be 42"W single leaf or 60" pair.

080000.2 Labeled construction shall be specified where required by code.

080000.3 ADA compliant access is required throughout the entire building except where specified by code. In storefront situations, provide 5" minimum high head frame for door operators. Run power through frame head to operator. Coordinate conduit and wiring pathways for operators, electric strikes, and access systems. Keep ceiling high enough so that there is ample space above the door for the operator.

080000.4 Multiple exterior doors shall be organized in pairs (latch to latch) and shall have fixed jamb separations between leafs except that at least one pair of doors shall have a keyed, removable mullion for large equipment access. Install locking device on one door leaf only.

080000.5 When possible, design a porch or overhang to protect exterior doors, card swipe readers, and pedestrians from snow and rain.

080000.6 Exit Doors: Coordinate conduit for operators, power, access systems, and stand alone or on-line security.

080000.7 Frameless Glass Doors: Are not acceptable unless approved by all Facilities stakeholders.

080000.8 Door Frames: Shall be tagged with room/door number. Refer to CSU Signage Standards.

08 11 13 HOLLOW METAL DOORS AND FRAMES

081113.1 All exterior doors, including exterior mechanical room doors, shall not be less than 16 gauge galvanized steel insulated doors with the top channel turned "web up" to eliminate dirt pockets.

081113.2 Interior doors and mechanical room doors shall not be less than 18 gauge metal. Solid grout head and jambs in high traffic or abuse locations.

081113.3 Door frames shall be one piece welded assemblies of not less than 16 gauge metal. Frames in interior walls of up to 8 inch thickness shall be full thickness of wall where wall finish protection is needed. Coordinate with OUA. Knock down frames may not be used unless otherwise approved by OUA.

081113.4 Frames in exterior walls and interior masonry shall be back primed with "Rhino Coat", recessed to inside face of wall and grouted solid.

08 11 16 ALUMINUM DOORS AND FRAMES

081116.1 Aluminum doors shall be medium or wide stile, thermal break construction with 10 inch bottom rail to accommodate wheelchairs.

081116.2 Heads of door frames shall be a minimum of 5 inches high.

081116.3 Standard finishes are clear anodized or bronze anodized aluminum. Any other manufacturer colors or custom colors shall not be specified unless approved by OUA.

081116.4 If custom colors are approved and specified, attic stock for doors, window stops, etc. shall be required in quantities of 200 feet per building.

08 14 00 WOOD DOORS

081400.1 Wood doors shall be solid core (particleboard preferred) with hardwood veneer; door shall be reinforced for all hardware including closers; prime or seal all hardware cutouts and top and bottom of door. Laminate clad doors may be preferred in some locations. All doors shall be prefinished unless otherwise approved by OUA.

081400.2 Bi-fold and bi-passing doors are prohibited.

081400.3 Exterior wood doors are prohibited unless specifically approved by OUA.

081400.4 Guarantee shall be a lifetime guarantee.

081400.5 Face veneers shall be book-matched. Rotary cut is prohibited. Coordinate door veneers with existing adjacent doors, if any. Verify door veneer selection with OUA.

08 33 00 COILING DOORS

083300.1 Upward acting doors shall be insulated metal or fiberglass with heavy duty track, electric operator, and weather-stripping. Verify spring duty cycle requirements for each installation. Motors shall be mounted to structure. (Clips in guides shall be cast metal, not stamped metal.)

083300.2 Multiple control locations may be required for operators. Include wall penetrations, pathways, stubs, pavement penetrations, and exterior conduit for exterior controls. With "foreseeable" future exterior controls, provide pathways including pavement knockout panels.

083300.3 Outside key switch or card swipe shall be coordinated with security requirements.

083300.4 Controls shall be up/down/stop.

08 51 00 ALUMINUM WINDOWS

085100.1 All habitable rooms shall have at least one operable window, or section of window (awning type preferred) unless otherwise approved by OUA. Verify screening requirements with OUA.

085100.2 In general, window frames shall be thermally broken 2" x 4-1/2" heavy commercial aluminum, flush dry glazed from the interior; bronze anodized finish.

085100.3 Spandrel panels shall be insulated units.

085100.4 Prior to acceptance by the University, proposed manufacturers must provide to the A/E copies of test reports by an independent laboratory which certify that the proposed window units meet or

exceed current performance standards. Verify current standards with OUA. The following standards were current when this Guideline was issued:

A. Air infiltration of an assembled sash and frame shall not exceed 0.70 cubic feet of air/minute/foot (ASTM E783-93) of sash perimeter when subject to the static air pressure developed from a wind velocity of 50 miles per hour.
B. No water leakage to the interior side of the window shall be present when tested according to the Metal Curtain Wall Manual Test C1.
C. Approved manufacturers: Vistawall, Kawneer, and Special-Lite.

085100.5 Written guarantee shall state that all components will meet specified performance requirements for a period of two years following acceptance.

A. Weather-stripping shall be guaranteed for a period of five years.
B. Guarantee shall certify that all work is in accordance with the specifications and that defects will be repaired during the term of the guarantee at no cost to the University.

085100.6 Install windows in wall to positively drain to the exterior. Insure proper head flashing details.

085100.7 If custom colors are specified, attic stock stops for doors or windows shall be required in quantities of 200 feet per building.

085100.8 University standard finish colors are clear or bronze anodized, or other colors as approved by OUA.

08 52 00 WOOD WINDOWS

085200.1 Wood windows are prohibited.

08 62 00 UNIT SKYLIGHTS

086200.1 Unit skylights are generally prohibited because of fall protection issues. Consider clerestory windows instead of skylights.

08 70 00 HARDWARE

087000.1 A/E shall specify all required hardware for each opening. One manufacturer shall be scheduled with two other acceptable manufacturers listed (unless excluded by the University). All hardware shall be approved by CSU Access Control.

087000.2 On auto operators, electric strikes, electronic locks, and any other electronically controlled hardware device, A/E shall designate specific scopes of work for completely integrated and operational installation. OUA recommends that all control wiring be designated as the scope of the GC, and that all 120V or higher power wiring be designated as the scope of the electrical contractor.

087000.3 Hardware finish is to be BHMA 626 (US26D) satin chromium plated unless otherwise required to match existing hardware.

087000.4 All new locksets shall be part of a Card Access System in lieu of mechanical keys unless designated otherwise by OUA.

A. Most exterior doors shall be part of an on-line, networked (hardwired) access system.
B. A/E shall design the exterior door hardware to integrate the electronic locks with the auto

operator and security control panels. A/E shall coordinate a meeting with OUA and Access Control to determine the scope of the on-line access system.

C. Protect exterior devices as much as possible from inclement weather.
D. Exterior doors shall include a proximity reader on at least one door with an auto operator.
E. Electronic Locking Hardware specifications are supplied in Division 28. The project construction budget shall be used to purchase these materials so the A/E shall include this in his estimate. A/E shall review the specific project purchasing requirements with OUA.
F. Non-powered Manual Locksets shall be full mortise.
    1. Acceptable Manufacturers: BEST locks with Universal Function.

087000.5 When metal keyed locks are to be used, specify **Stanley BEST seven pin Interchangeable Core (IC)** locks to be provided by a factory-direct supplier only. Cylinders shall be able to accommodate Stanley BEST IC 8P Master System master ring cylinder for all doors.

A. Cores shall be produced at the BEST factory. All cores shall be pinned following a building master schedule and added to the existing Great Grand Master key system.
B. A minimum of three construction master keys (which will be voided once change keys are inserted into cylinders) are absolutely required.
C. Key scheduling shall be determined by OUA and Access Control.

087000.6 The CM/GC or its subcontractor is responsible for the installation of door locks and hardware, including cylinders that will accept BEST interchangeable cores.

087000.7 CSU Locksmiths are responsible for ordering and installing BEST interchangeable cores, and for the production and issuance of all CSU keys.

087000.8 CSU Locksmiths will develop the key and core schedule into the CSU key system for the end users of the building.

087000.9 The CM/GC or its subcontractor shall coordinate door hardware with the PM and CSU Locksmiths.

087000.10 Costs, if any additional involvement is required by BEST after initial scheduling and manufacturing, shall be incurred by the CM/GC.

087000.11 Butt hinges for all interior doors shall be full mortise, 4-1/2" standard duty 3 ball bearing/5 knuckle. All exterior, mechanical room, and high traffic interior doors shall be full mortise 4-1/2" heavy duty ball bearing with non-removable pins – no pivots or cam action hinges allowed. Refer to General Requirements for paired mechanical room doors; provide surface mounted slide bolts top and bottom on fixed leaf with astragals.

A. Acceptable Hinge Manufacturers: Stanley, Hager, and McKinney.

087000.12 Door stops shall be wall mounted with concealed wood blocking. Use floor mounted stops where wall mount will not protect door and wall. Use door checks on exterior doors subject to wind loads.

087000.13 Closers shall be LCN 4000 series for exterior doors and heavy traffic doors, and LCN 1400 series for interior doors, sized per application. Floor recessed or concealed in head closers are prohibited. Through bolting attachment of closers required at wood and hollow metal doors.

087000.14 Exit devices shall be Von Duprin 99 series. Single point latching is required. Concealed vertical rods are prohibited. Surface mounted vertical rods are permitted. When possible, specify less bottom

rod (LBR). Refer to General Requirements for additional info.

087000.15 Radio controlled handicapped door operators shall be compatible with the campus standard, LCN 4600 series electronic low energy door operator. Height of door head must be a minimum of 5" to accommodate mounting of unit. Provide wall button, prox reader as appropriate, and all accessories including electric strike releases and related wiring for a complete installation. Coordinate with swipe card lockset as necessary. Mount transmitter (wall push button) adjacent to opening; for pairs of doors, mount on side opposite to controlled door. NOTE: At pairs of doors, only one leaf should operate by door operator. The door operator shall function in conjunction with the on-line access system. Verity wiring diagram with OUA.

087000.16 Transmitters and receivers shall be multi-code with 10 dipswitches. The code shall be open, closed, open, closed, open, closed, open, closed, open, closed, to work with all other campus doors.

087000.17 Kick plates shall be 16 gauge, 10"H x 2" less than door width.

087000.18 Push/pull sets shall be 4" x 16" plates with appropriate pull. Verify pull style with OUA.

087000.19 Exterior doors shall be equipped complete with weather-strip, threshold, and door sweep with rubber molding on inside.

087000.20 Battery operated exit alarms shall be manufactured by DETEX per guidelines noted above.

087000.21 When a PIN Lockset is required, provide Dormakaba Powerplex 2000 self-powered electronic pushbutton lock (PIN only) with lever. If the door is mortise or cylindrical, the lockset can be ordered to match, and must accept a BEST interchangeable core.

087000.22 On renovation projects, existing cores shall be removed by the CSU Locksmith or salvaged by the GC and turned over to CSU. No existing cores shall be disposed.

087000.22 Electric strikes to be HES.

087000.23 Retractable panic hardware to be Von Duprin.

087000.24 During construction, the CM/GC may choose to install temporary construction cores.

087000.26 A coat hook shall be installed behind each office or laboratory door. A/E shall coordinate quantities and locations with OUA.

08 80 00 GLAZING

088000.1 Exterior glazing shall be designed for energy conservation. In general, utilize solar cool gray glass in 1 inch insulated units.

088000.2 All glazing, including exterior windows, shall be tempered. If budget may restrict this item, bid this feature as an alternate.

088000.3 Where not required to be fire rated, interior borrowed lights shall be polished tempered or laminated glass.

088000.4 Glaze all windows and borrowed lights from “inside”, which will permit replacement without the use of multi-story scaffolding.

088000.5 When designing exterior facades and specifying glazing products for exterior applications, mitigating measures to avoid bird strikes must be factored into design decisions and materials selected accordingly. For useful information about bird friendly design solutions and cost effective products, see: https://abcbirds.org/wp-content/uploads/2015/05/Bird-friendly-Building-Guide_LINKS.pdf

08 90 00 LOUVERS AND VENTS

089000.1 Architectural and mechanical louvers and vents shall be clearly identified on drawings regarding prime contractor responsibilities for providing and installation.

089000.2 Louver finish shall be powder coated. Review final color selections with OUA.

089000.3 All exterior louvers shall be specified to include 1/2” x 1/2“ bird screen on the interior face.

089000.4 A/E shall verify elevator shaft ventilation requirements and specify those provisions accordingly.

END OF SECTION

DIVISION 09 – FINISHES

09 00 00 GENERAL REQUIREMENTS

090000.1 Provide minimum smoke and flame spread ratings for interior finish materials as required by code.

090000.2 Contractors shall use reputable vendors/subs that have previous experience working on campus.

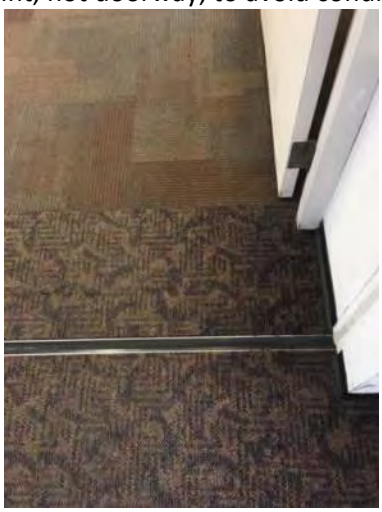
090000.3 A/E shall submit all technical data as required for finish certification to the building department for final plan approval.

090000.4 Finish Boards: A/E shall provide "presentation" boards to include labeled/coded samples of all major finish materials mounted on 24" x 36" black gatorboard. Sample codes to coincide with finish legend mounted to back of board and contract documents.

090000.5 Finish Binder: A/E shall provide labeled/coded samples of all finish materials along with the Bid Set submittal. Sample codes to coincide with finish legend. Samples and legend shall be bound in a hard cover, high quality, three-ring binder. The binder shall include a transparent vinyl sleeve on the front cover and the binder spine to protect labeling. The binder shall be labeled on the front as well as the spine with the A/E name, project name, CSU project number, and "Finish Specifications". Finish samples to be mounted on 8-1/2" x 11" cardstock and protected within plastic sleeves. Product specifications (manufacturer, model #, color, size, etc.) must be included. A/E shall provide updates as necessary so that the binder is accurate and complete with as-built information upon Record Drawing submittal.

090000.6 Finish Legend: All product information required for ordering (manufacturer, model #, color, size, etc.) MUST be included in the Finish Legend on the drawings. "TBD" or "refer to Specifications" notes are not permitted.

090000.7 Transition flooring materials at expansion joint, not doorway, to avoid conditions such as these:



09 22 00 METAL FRAMING SYSTEMS

092200.1 Patented ceiling systems which are required for the support of plaster or gypsum board ceilings should be specified in separate sections and noted on details.

092200.2 All framing shall be at a maximum of 16 inches on center minimum, 22 gauge metal studs.

092200.3 All door and window jambs shall show a minimum 18 gauge stud full height from floor to structural deck or top of wall, jack studs, and head framing. A/E shall indicate stud gauges on door and window details.

092200.4 Ceiling suspension attachment to structure above shall be designed and specified by A/E.

09 24 00 PLASTERING

092400.1 Plaster is permitted for ceilings and patch of existing plaster only.

092400.2 Stucco is prohibited.

09 29 00 GYPSUM BOARD

092900.1 All material to be minimum 5/8" fire resistance rated gypsum board unless otherwise required for special applications. Abuse resistant gypsum board is recommended for high traffic public areas.

092900.2 Gypsum sheathing is required behind acrylic or fiberglass reinforced panel systems when installed over metal framing systems.

092900.3 All corner bead to be metal unless identified for specific details.

092900.4 Finishing: A/E shall review the level of gypsum board finish as appropriate for specific locations with OCP during the Design Development phase.

A. A/E is encouraged to specify gypsum board finishes pursuant to the Gypsum Association's Levels of Gypsum Board Finish standard GA-214-M-97.
B. A/E shall review lighting conditions (wall wash type fixtures, paint gloss, etc.) to determine finish level required as well.
C. Level 5 finish is required where semi-gloss, gloss, or other non-textured paints are used. It shall also be specified where severe lighting conditions occur, such as with wall-wash light fixtures, light-wash from a nearby window, or long corridors. It is important that a Level 5 finish be clearly identified on the construction documents so bidders can properly price the increased amount of work.

092900.5 Moisture resistant gypsum board guidelines for specifications/drawing notes:

A. All moisture resistant gypsum board or shaftwall shall be fire rated.
B. Moisture Resistant/Fire Rated gypsum board shall be specified for the following areas (in addition to standard practice for restrooms and other wet areas).
    1. All partitions and furred walls at stories below or partially below grade.
    2. All vertical and horizontal pipe chases, soffits, and all inaccessible areas including plumbing and heating/cooling HVAC piping.
C. Moisture Resistant/Fire Rated gypsum board shall be required by coordinated drawing notes, general notes, special or supplemental conditions, and other directions to the GC and/or general trades contractors in reference to:
    1. Scheduling work and the project's construction schedule, delays due to weather, etc.
    2. Phasing, sequencing, and coordination of other contractor's work, delays due to others, etc.
    3. Providing building enclosures, temporary heat and dehumidification, etc. so that all

gypsum board installed on the project that may be exposed to moisture due to any of the above shall be installed as moisture resistant/fire rated gypsum board, whether specifically indicated on the drawings or not.

092900.6 Increased costs for moisture resistant/fire rated board, or replacement of previously installed gypsum board to moisture resistant gypsum board, due to delay or impediments caused by other contractors shall be back-charged to the parties causing the delay and exposure.

092900.7 Installation of all materials shall be as recommended by the Gypsum Association Handbook.

092900.8 A/E shall determine if more extensive measures (such as exterior gypsum board) are required due to project conditions or scheduling.

09 30 00 TILE

093000.1 Ceramic floor tile and wall tile, full height on ALL walls, is required for all restrooms and shower rooms. Other suitable solid surface materials are allowed. A minimum tile height of 66" is acceptable in restrooms ONLY if the project cannot afford full height and is approved by CSU Interior Designer and Facilities Director.

093000.2 Quarry tile flooring and ceramic wall tile is required in areas of food preparation, food serving, and other common areas of similar use.

093000.3 Floor tile to be installed flush with adjacent materials without the use of reducer strips.

093000.4 All exposed edges of wall tile to be bullnosed.

093000.5 A "Schluter-strip" type trim piece is required at all tile material terminations where a finished bullnose edge tile is not available.

093000.6 Provide tile or solid surface backsplash and end splashes above countertops.

093000.7 All floor tile grout shall be epoxy grout. Wall tile grout in high traffic wet areas shall be sealed. Grout color shall be approved by CSU Interior Designer and Facilities Director.

093000.8 Provide waterproof membrane at flooring above grade. Provide isolation membrane at all saw cut joints and areas of noticeable cracking in concrete.

09 51 00 ACOUSTIC CEILINGS

095100.1 Auxiliary support systems for acoustic ceilings should be specified within the section for acoustic ceilings. Ceiling systems shall be supported from structure or suspension system attached to structure with toggle bolts, self-drilling anchors, or their approved system. Ceilings shall not be supported from ductwork, conduit, HVAC lines, or associated supports.

095100.2 Mineral fiber lay-in panels shall be 2' x 4' or 2' x 2'. Non-standard sizes are prohibited. Basis of design product: Armstrong Dune 2x2.

095100.3 All ceiling systems should be readily accessible. Metal ceiling systems (i.e. paraline) and concealed specialty systems should be limited to areas which will require minimal access and approved by

CSU Interior Designer and Electricians. Spline systems are prohibited.

095100.4 Suspension systems shall be supported directly from the building structural system and shall be supported at four corners of each lay-in fluorescent light fixture.

A. Lay-in fluorescent light fixtures are to be supported directly to the structural system (independent of the ceiling grid) with a minimum of two auxiliary hangers at opposite corners of each fixture. Ceiling installer to provide and install auxiliary hangers to deck. Electric contractor to attach hangers to fixtures.
B. A/E shall identify this separation of work in both the ceiling sections and the electrical section of the specifications.

095100.5 Fire rated ceiling finish materials should be gypsum board or lay-in ceiling systems which do not require clips to achieve fire ratings.

095100.6 In renovation situations, A/E shall specify removed ceiling tiles shall be recycled in a program by or similar to Armstrong (www.Armstrong.com/environmental).

09 65 00 RESILIENT FLOORING

096500.1 A/E shall specify standard testing methods for determination of relative humidity in concrete flooring, moisture vapor emissions rate of concrete subfloor, and outline GC responsibility for conducting tests prior to installation of materials.

096500.2 Cleaning and waxing of all resilient flooring materials (per manufacturer's recommendation) is required by the GC (and/or subs) prior to acceptance.

096500.3 Resilient Base: Shall be 1/8 inch thick by 4 inch high coved or toed rubber for all installations. Straight base is not acceptable. Internal and external corners may be field formed with joints 18 inches minimum from the corners. Pre-molded corners are preferred. Ends shall be beveled and rounded. Resilient base color shall be integral throughout.

096500.4 Transition Strips: A/E shall specify transition strips between floor materials that meet all ADA requirements noted in ADAAG.

096500.5 Stairwells: Provide 1/8 inch thick rubber flooring (treads, risers, field tile) in all stairwells and stair landings. A/E shall specify in the finish schedule that landings are to be tiles and treads are to be pre-formed. Rubber shall be smooth or hammered. Raised patterns are not acceptable. Speckled color rather than solid color is preferred. Color shall be integral throughout.

096500.6 Linoleum: Homogenous linoleum sheet flooring or homogenous linoleum tile made of natural materials is acceptable when rated for extra heavy commercial traffic. A minimum of 45% post-industrial recycled content is preferred.

096500.7 Sheet Vinyl: Homogenous sheet vinyl flooring is acceptable when rated for extra heavy commercial traffic.

096500.8 VCT: If vinyl composition tile (VCT) is specified, a minimum post-consumer and post-industrial recycled content of 10% is preferred.

096500.9 Where budget permits, provide LVT in lieu of VCT or sheet vinyl/linoleum.

09 66 00 TERRAZZO

096600.1 In renovations, effort shall be made to preserve and restore existing terrazzo whenever possible.

09 68 00 CARPET

096800.1 Carpet will be specified as part of the general contract unless otherwise directed by PM.

096800.2 Carpet to be modular/tile, direct glue releasable installation.

096800.3 The use of broadloom carpet is not acceptable.

096800.4 Quarter-turn installations are not acceptable.

096800.5 A/E shall coordinate proposed carpet(s) with those listed on CSU Finish Standards. Any carpet not listed in the standards must be approved by CSU Interior Designer and Facilities Director.

096800.6 Action back carpet is not acceptable.

096800.7 Cushion back carpet tile may be used in specific non-high traffic locations only as approved by CSU Interior Designer and Facilities Director.

096800.8 A/E to determine attic stock percentage with CSU PM and Facilities Director.

096800.8 Carpet shall meet the minimum specified requirements:

A. Construction: tufted or woven
B. Fiber system: 100% recycled premium nylon fiber or post-consumer content nylon
C. Dye method: 100% solution dyed nylon fiber
D. Traffic classification: heavy or severe
E. Recycling: carpet to contain recycled content, is recyclable, and meets LEED standards
F. Maintenance: carpet shall generally have a stain resistance and soil resistance
G. Warranty: must meet or exceed a 15-year warranty from Substantial Completion. Fiber, backing, and final carpet product shall be manufactured and warranted by same company.
H. Indoor air quality: meets LEED standards

096800.9 Submittals required for approval by CSU PM and Interior Designer shall include:

A. Shop drawings of seam layouts and transition strip locations/ products.
B. Manufacturer's Environmental Product Declaration (EPD).
C. Warranty: Manufacturer's standard form in which the manufacturer agrees to repair or replace components of carpet installation that fail in materials or workmanship against edge ravel, delaminating, zippering, and backing failure for a period of 15 years from date of substantial completion.

096800.10 Low VOC adhesives are required. All adhesive materials, accessories, and application equipment shall be as approved by the carpet manufacturer.

096800.11 Entry and vestibule areas shall have modular, walk-off type carpet tile, similar to Interface "Entry Level" 28 oz. solution dyed. Refer to section 12 48 00 Entrance Mats.

096800.12 Preparation and Installation: shall comply with Carpet & Rug Institute Installation Standard 104 and with carpet tile manufacturer's written installation instruction for preparing substrates indicated to receive carpet tile.

096800. A/E shall specify that all existing carpet to be removed shall be recycled by Interface's "Re-Entry" Reclamation and Recycling program reentry@interface.com (1-888-733-6873), or similar.

09 69 00 ACCESS FLOORING

096900.1 Accessible flooring systems shall be specified as appropriate to project specific conditions. Coordinate with CSU PM, Electricians, and IS&T.

096900.2 Install system per manufacturer's recommendations, including auxiliary structural support and accessories.

096900.3 Coordinate heights of all mechanical and electrical fixtures with floor.

096900.4 Provide ramp or other transition for disabled access (and handrails) if access floor cannot be recessed to match adjacent finish floor elevations.

096900.5 Floor finish shall be integral to access panel system or floor tile size shall match panel size to facilitate future removal of access panels.

09 72 00 WALLCOVERINGS

097200.1 The use of wallcovering shall be limited and only where approved by CSU Interior Designer and Facilities Director. If approved, wallcovering shall only be used in upper echelon offices or focal walls as budget allows.

097200.2 All substrates shall be primed, sealed, and prepared for wallcovering removal with a mildew resistant primer.

097200.3 All marking on substrate from ink pens, markers, etc. shall be removed prior to finish.

09 84 00 SOUND ATTENUATION

098400.1 A/E shall specify wall and ceiling systems to insure acoustical privacy as follows:

A. Executive offices: STC 52 minimum
B. Offices, conference rooms, counseling rooms, meeting rooms, janitor closets, and electrical closets containing transformers: STC 45 minimum
C. Classrooms: STC 42-47 minimum
D. Toilet rooms: STC 47 minimum
E. Floors: IIC 55 minimum
F. Any other areas requiring confidentiality shall meet nationally recognized sound isolation criteria.
G. Sound isolation shall be specified and detailed as continuous sealant wherever possible.

098400.2 Ceilings do not require additional sound attenuation if insulated walls are continuous to the deck above. If walls are not continuous to the deck above, install a 4'W sound attenuation batt

over top of insulated walls to form a continuous sound barrier.

098400.3 Project requirements may dictate having an acoustic consultant on the A/E's design team. Review acoustic issues with CITDL.

098400.4 Room acoustics to be taken into consideration when planning for and designing Distance Learning rooms. A/E to consult with CITDL.

09 91 00 PAINT

099100.1 In lieu of attic stock of paint and sealant materials, the contractor is required to provide a detailed finish schedule denoting manufacturer, type, color, location and any other pertinent information required to match the product in future maintenance or repairs. The schedule is to be provided at project closeout to FM.

099100.2 Contractor shall remove remaining paint and coatings from the job site and properly dispose of after final punch list is competed at their own cost.

099100.3 A/E shall prepare a schedule for all surfaces to be painted and the number of coats with dry film thickness for each. Zero or low VOC products are preferred. Type and number of coats is variable, but the following systems are recommended.

A. Stained interior woodwork: 1 coat filler (for open grained wood); 1 coat stain; 2 coats satin clear finish (2.0 mil thickness minimum). Back prime all trim and fill nail holes and gaps at joints.
B. Painted interior woodwork: 1 coat premium water-based wood primer; 2 coats premium water-based semi-gloss finish. Back prime all trim and fill nail holes, caulk gaps at joints. Sherwin Williams Premium Wall & Wood Primer and ProClassic Waterbased Semi Gloss are preferred products.
C. Wood doors: For new construction, only prefinished doors shall be specified. For renovation work that requires matching existing wood doors, use 1 coat stain and 2 coats satin clear finish (2.0 mil thickness minimum).
D. Metal doors and frames: 1 coat factory shop primer; 2 coats semi-gloss epoxy. Paint tops and bottoms of doors. Sherwin Williams Pro Industrial ProCryl Primer and Pro Industrial Pre-Catalyzed Epoxy are preferred products.
E. Gypsum board: 1 coat primer/sealer; 2 coats eggshell (unless noted otherwise) latex enamel. Sherwin Williams Harmony is preferred product.
F. Interior concrete block: 2 coats latex block filler; 2 coats semi-gloss latex enamel. Sherwin Williams Harmony is preferred product.
G. Interior concrete floors: 2 coats water-based epoxy for moderate exposure, clear, with gloss finish. Prepare floor per manufacturer's recommendations.
H. Interior ferrous metal: 1 coat shop primer; 2 coats semi-gloss epoxy. Sherwin Williams Pro Industrial Pre-Catalyzed Epoxy is preferred product.
I. Exterior ferrous metal: if possible, powder coat exterior ferrous metal, refer to Section 055000 for requirements. Otherwise, 1 coat shop primer; 2 coats gloss epoxy. Sherwin Williams Pro Industrial Pre-Catalyzed Epoxy is preferred product.

099100.4 Accent Colors: If anticipated to exceed 5% of the project, A/E shall note accent color locations/ extents to aid the bidders, and include a statement that information given in no way restricts the A/E in the selection of paint colors.

099100.5 Preferred Product: is Sherwin Williams Harmony, which contains the following properties. To our knowledge there is no "or equal" currently on the market.

A. Zero VOCs
B. Colorants that do not add VOCs when tinted
C. Anti-microbial
D. Formaldehyde reducing technology
E. Odor eliminating technology
F. ASTM D-2486 Average Scrub Results: 1,000 cycles.
G. ASTM D-4828 Average Washability Results: Good/3.2

099100.6 Lab Spaces: Preferred product is Sherwin Williams Pro Industrial Pre-Catalyzed Epoxy.

099100.7 Wet Areas: Epoxy paint shall be specified for all wet areas, including but not limited to restrooms, shower rooms, and janitor closets with mop sinks.

099100.8 If water-based interior paint systems such as Scuffmaster are used in high traffic areas, A/E shall specify patch kits for Facilities Maintenance.

099100.9 Exposed piping to be painted shall be clearly identified by A/E on the drawings and specifications. A/E shall identify proper preparation technique for the pipe to receive paint.

099100.10 Hollow metal frames shall be caulked where they meet adjacent surfaces. A/E shall specify this work to be performed by the painting contractor.

099100.11 All markings on substrate from adhesives, pencils, markers, etc. shall be removed prior to finish.

09 97 00 SPECIAL COATINGS

099700.1 Special coatings shall be limited and used only where directed by OCP.

099700.2 Mechanical room and other service room floors in all buildings shall be completely sealed from water and moisture penetration to the floors below. Coating shall meet current VOC requirements set by the EPA for special coatings.

END OF SECTION

DIVISION 10 – SPECIALTIES

10 11 00 CHALKBOARDS, TACKBOARDS, AND MARKERBOARDS

101100.1 Markerboards are preferred in general classroom areas. Chalkboards are prohibited in dust critical areas such as computer labs.

101100.2 Chalkboards and markerboards shall be porcelain enameled steel as follows: 2 coats porcelain enamel; 28 gauge enameling steel; 1/2" industrial fiberboard core; 0.005" thick aluminum backing sheet.

101100.3 Chalkboards and markerboards shall be specified with 2" minimum map rail with cork tack strip.

101100.4 Tackboards shall be 1/4" thick cork over 1/4" hardboard backing or fabric laminated over 1/2" fiberboard (such as Homasote). A/E shall coordinate locations for tackboards in public areas with OUA.

101100.5 Frames and trays shall be aluminum with concealed fastening devices. Mount boards to wall with necessary blocking in stud cavity.

101100.6 Guarantee shall be submitted to OUA, signed by an officer of the manufacturer, stating that all chalkboards and markerboards which do not retain the original writing quality, erasing quality, and visual acuity for 20 years after acceptance shall be replaced, including installation, at no cost to the University.

101100.7 For interactive whiteboards, follow mounting specifications provided by manufacturer and consult with CITDL for mounting height and location. Provide low voltage pathway back to location of room computer.

101100.8 Each whiteboard to be provided with (4) sets of markers, Expo brand or type as recommended by board manufacturer.

101100.9 Boards for Rhodes Tower (RT) and Union Building (UN) shall be a maximum of 6' in length to fit in elevator cab. For all other locations, verify board size with freight elevator cab size.

101100.10 Glass markerboards to be Claridge Invisi-Mount, 1/4" thick magnetic tempered glass on steel, seamless, borderless, with eased polished edges, or equal. Include accessory tray/ marker holder and standard magnet set.

10 14 00 SIGNAGE

101400.1 Room numbering shall be coordinated with OUA Planner and Access Control.

101400.2 All signage shall comply with CSU Sign Standards Manual and ADA requirements.

101400.3 Unless otherwise directed by OUA, the project shall include:

A. Exterior monument sign
B. Exterior secondary building ID signs (at secondary entrances)
C. Entry door decals: welcome, no trespassing, and college ID
D. Building directory
E. Floor directories

F. Directional signs
G. Code required signage (such as occupant load, emergency refuge area, etc.)
H. Room ID signs
I. Notebars/ message holders at all offices, conference and classrooms
J. Door frame tags
K. Donor recognition signage

101400.4 A/E shall specify sign contractor to provide a full sign schedule and interior/ exterior location plans for review during shop drawing phase of project. A/E shall review drawings with OUA prior to issuance for fabrication.

10 21 00 TOILET PARTITIONS

102100.1 Finish shall be baked on enameled steel, phenolic core, or solid HDPE plastic. Coordinate finish selections per location with OUA.

102100.2 Toilet compartments shall be floor to ceiling supported with a continuous hinge, overhead braced, and with stainless steel shoes. Overhead bracing or brackets shall be aluminum or stainless steel.

102100.3 Urinal screens (when required) shall be stainless steel with secure mounting to withstand lateral and vertical loads.

102100.4 All anchors, fasteners, fittings, and required hardware (hinges, latches, etc.) shall be stainless steel, vandal-proof type.

102100.5 Spring loaded, hold open hinges are preferred.

102100.6 Associate shall indicate on drawings and specifications that toilet stalls shall comply with current ADAAG.

10 22 19 DEMOUNTABLE PARTITIONS

102219.1 Demountable wall systems are prohibited.

10 22 23 OPERABLE PARTITIONS

102223.1 Support shall be overhead with no bottom track.

102223.2 Typically, operation shall not be motorized except for special installations.

102223.3 Sound rating shall be STC 45 minimum, STC 50-55 is preferred if budget allows.

102223.4 Accessories shall include automatic bottom seal, jamb seals, and doors on storage pockets.

102223.5 Passage doors, if requested by users, through operable partitions are not recommended for primary circulation. Design spaces so required exits do not occur through operable partitions.

102223.6 Preferred finish is fabric. Coordinate with OUA.

102223.7 Coordinate tack surface or markerboard requirements, if any, with OUA.

10 26 00 WALL AND DOOR PROTECTION

102600.1 Coordinate required wall and corner guard locations and material selections with Facilities Services.

102600.2 Typically, corner guards will only be required in public corridors and high abuse service areas.

10 28 00 TOILET ACCESSORIES

102800.1 A/E to define all accessory types, specifications, locations, and quantities on construction drawings.

102800.2 A/E shall indicate mounting heights and dimensioned plan locations on the construction drawings. All equipment/accessory locations to comply with the current edition of ADAAG. A/E to insure adequate space, clearance, and blocking for installation.

102800.3 Solid wood blocking shall be specified behind all items. Mount with concealed fasteners wherever possible. Tamper-proof fasteners shall be used at all other locations.

102800.4 All dispensers to be surface mounted.

102800.5 Any electric dispensers shall be hard-wired, not battery operated.

102800.6 Products:

A. Hand soap dispenser: Purell #ES4 push-style, 9.33”H x 5.51”W x 3.90”D
B. Shower soap dispenser: discuss product type and locations with Facilities Services
C. Toilet paper dispenser: Von Drehle #3253 JRT Twin, 11.5”H x 20.5”W x 4.825”D
D. Paper towel dispenser:
    a. Standard size: Tork PeakServe #552520, continuous dispenser, white, 28.74”H x 14.57”W x 3.98”D
    b. Small size: Tork PeakServe Mini #552530, continuous dispenser, white, 19.3”H x 14.44”W x 3.97”D, to be installed at kitchenettes and low traffic areas only.
    c. Confirm locations with Facilities Services.
E. Hand dryer: World Dryer SLIMdri #L-974, white, surface mounted
F. Hand sanitizer: Purell #CS4 push-style, 15.63”H x 5.51”W x 4.48”D, to be installed at building entrances, outside of restrooms, and other locations as directed by Facilities Services.

102800.7 Free standing waste receptacles are preferred. Design sufficient floor space in toilet room for freestanding unit (24”W x 24”D).

102800.8 Sanitary napkin receptacles best application is: “Safe-Use Sanitary Napkin Receptacle” model COM-1102. Available through www.hescoinc.com [Unit empties from the bottom so hands never touch the contents. Prevents exposure to and the spread of disease. Wall mount unit operates by pulling forward at bottom of unit and liner automatically drops into waste receptacle for safe use action.] 10-5/8” x 9” x 4-5/8”. White color. Provide and install one (1) per toilet compartment in women’s restrooms and unisex toilet rooms.

102800.9 Vending machines for sanitary napkins and condoms are not required.

102800.10 Mirrors shall be 1/4” float/plate glass with wrap-around stainless steel frame and steel back plate. Provide mirrors above lavatories and one wall mounted full-length mirror (for disabled) per restroom outside of stalls.

102800.11 Garment hooks shall be compartment manufacturer's standard. Mount one per stall door with integral door bumper.

102800.12 Parcel shelves minimum depth to be 8". Provide at least one per toilet room outside of stalls.

102800.13 Broom/mop holders shall be installed over the mop basin in every custodial space. Provide waterproof wall finish (i.e. stainless steel or FRP) to underside of mop holder at these locations.

10 44 00 FIRE PROTECTION ACCESSORIES

104400.1 A/E shall specify and indicate on drawings number, type, location, and size of extinguishers and cabinets per NFPA. A/E shall specify that GC shall provide all extinguishers as well as cabinets.

104400.2 Typically, extinguishers shall be multi-purpose (ABC) dry chemical type, minimum capacity 10#. Coordinate unique location requirements with OUA and CSU Fire Prevention Officer. "Amerex" Brand extinguishers are not acceptable. Extinguishers shall be purchased by the GC through the current vendor of the the University.

104400.3 Fire extinguisher cabinet shall be recessed type and installed with self-latching door by Larsen. "Break glass to enter" type cabinets are prohibited.

104400.4 Fire extinguisher cabinets shall be supplied with labels on both sides indicating "Fire Extinguisher" per NFPA. Wall mounted signs are prohibited unless approved by State Fire Marshall or CSU Fire Prevention Officer.

104400.5 Fire extinguishers required in classrooms (i.e. labs, places of assembly) shall be located closest to the exit doors. Where design conflicts occur, and a cabinet cannot be installed, a fire extinguisher mounting hook is permitted. However, no hardware for use in a motor vehicle (clasp style) shall be permitted.

104400.6 In some instances, a Knox Locking Storz Cap #3080 will be required, keyed identically to all other CSU Knox Boxes. Coordinate with CSU Access Control.

104400.7 The Cleveland Fire Department can mandate use of a "Knox Box" Rapid Entry System key holder #3270, hinged door, recessed mount. A/E shall indicate that the Knox Company requires authorization from CSU Fire Prevention Officer coordinated with Cleveland Fire Department/ Fire Prevention for order and that the box shall be keyed identically to other CSU Knox Boxes.

10 51 00 LOCKERS

105100.1 Material shall be enameled steel unless project requirements dictate otherwise.

105100.2 Size and quantity will be shown on the drawings and determined by the user program.

105100.3 Install lockers fully recessed into wall or with sloped top.

105100.4 Doors shall be vented with silencers, latch, and integral recessed hasp.

105100.5 Base shall be solid base with toe kick and sanitary cove base.

105100.6 Accessories shall include shelves, robe hooks and/or rods as defined by user program.

10 55 00 POSTAL SPECIALTIES

105500.1 In general, only residence halls require USPS approved mailboxes.

END OF SECTION

DIVISION 11 - EQUIPMENT

11 00 00 GENERAL REQUIREMENTS

110000.1 The user program will identify which equipment is to be specified and which equipment is to be provided by the University. Specify all electrical and mechanical connections for University provided equipment.

110000.2 Specify all fixed equipment as required to respond to the program. Where applicable, OUA will advise A/E of experience with specific types and manufacturers.

110000.3 Moveable equipment will be specified by OUA unless specifically included in the A/E's scope of work. A/E to coordinate all necessary components for the moveable equipment to be functional upon occupancy.

110000.4 Submittals by A/E specified equipment suppliers shall include rough-in drawings for the other prime contractors.

110000.5 A/E shall coordinate all aspects of equipment installation including receiving, unloading, distribution, and trade jurisdictions.

11 32 00 UNIT KITCHENS

113200.1 Unit kitchens are prohibited. When serving kitchens are required, use base cabinets with drop-in appliances or with recesses for owner supplied appliances.

11 52 13 PROJECTION SCREENS

115213.1 Manually operated. Concealed blocking or reinforcing for mounting must be specified.

115213.2 Electrically operated screens for large lecture halls, auditoriums, etc. are to be specified with fully automatic operation. Two control stations (front and rear of room) are required. When controlled AV system present, screens are to be controlled automatically by the AV system. Concealed blocking or reinforcing for mounting must be specified.

115213.3 Refer to Division 27 for additional information.

11 53 13 FUME HOODS AND SAFETY EQUIPMENT

115313.1 The design of fume hoods shall be based on end use of science being performed and coordinated with OUA. Fume hood design shall include the following options and specifications:

A. Standard fume base of design shall be provided with a food face velocity of 100 FPM in occupied room condition and minimum of 65 FPM in an unoccupied room condition. Velocities above 100 FPM shall be reviewed with OUA. Only radioisotope and perchloric fume hoods can be designed with higher velocity rates (not greater than 125 FPM). Perchloric hoods shall be avoided.
B. Low flow hoods based on 85 to 65 FPM shall be reviewed with OUA and EHS. Use of low flow hoods should not be considered for any research or high toxic or heavy concentration of chemical use. Low flow hood applications have to be approved by OUA, EHS, and end users. Written sign-on shall be required.

C. Fume hood designs should be based for VAV applications unless designed for single exhaust fan application in which case fume hood could be constant volume. Engineer shall incorporate energy reduction measures whenever possible and all control sequence of operations shall be coordinated with OUA and end user.
D. Fume hood lab controls and room pressurization shall always be reviewed with OUA prior to selection of fume hood design. Room or hood occupancy sensors shall be used for control of fume hoods for both an occupied and unoccupied control strategy. Fume hoods shall maintain constant 100 FPM across the sash opening during occupied and 65 FPM in unoccupied room condition.
E. Fume hoods base of design will incorporate latching hood sash positioners for horizontal sash set at 6", 18", 24", and full open positions above hood working surface. Fume hoods having a sash above 18" shall be coordinated with OUA. Vertical sash side by side hood design shall also be coordinated and shall include 100 FPM throughout the hoods whole open face area.
F. Walk-in fume hoods shall be reviewed with OUA prior to consideration or selection.
G. Dual sash or bi-directional fume hoods shall be coordinated with OUA.
H. Fume hoods shall be furnished with baffle plates, audible and visual alarms devices complete with mute. Hoods shall indicate normal operation of face velocity. Face velocity readings are preferred. Indicator lights red, yellow, and green shall be optional.
I. Fume hoods shall be of a by-pass design and shall include proximity sensors if part of a central fume hood system. If single hood with single fan, hood fan switch shall be furnished.
J. Fume hoods shall be designed with interior lighting package and factory wired switch mounted on the outside of the hood.
K. Fume hoods shall be reviewed for associated lab gases and all fume hood piping shall be coordinated and extended to the edge of the fume hood assembly. Pipe orientation shall be coordinated by installing contractor based on position to building services. Power wiring for fume hoods shall be of single point of connection having a j-box for final termination. All wiring within the fume hood shall be factory installed, tested, and meets NEC and UL classifications along with AHJ for state and local codes.
L. Fume hood working surface shall be made of acid resistant material. All hood components associated with the hood shall be epoxy resin or stainless steel which is designed for the chemical in which the fume hood will be exposed. Fume hood material selection shall be coordinated with OUA. Chemical concentration level shall be required from end user along with lab operations and safety protocols to design professional. Bottom sash by-pass shall be made of stainless steel for impact and added chemical resistant. Review location and construction with OUA.

115313.2 Lab Safety Equipment:

A. Each research or general laboratory shall be furnished with an emergency eyewash station, combination eyewash/shower, and shower. These fixtures shall meet OSHA and ANSI X358.1 and installed to ASPE, OSHA, ASSE and LABS21 guidelines and manufacturers' recommendations for both use and installation.
B. Sanitary drainage system shall be coordinated with science and use of chemical resistant type of system shall be reviewed with OUA.
C. Tepid domestic water system shall be utilized for any safety equipment. Temperature setting shall be reviewed with CSU safety personnel and end user of the laboratory. Written operating, testing, and maintenance program of emergency lab safety devices of system shall be required to be submitted on any system being installed. Training on proper use shall also be incorporated into the design for lab spaces. Tepid water system shall use mater mixing valve designed for use in this type of application. Lawler is the preferred mixing valve manufacturer.
D. Emergency shutoff valves for lab gases (flammable) shall be installed for all classrooms and

research laboratory facilities. Shutoff valves are to be recessed, provided with panic button and keyed for manual override to close gas process. Isolation valves shall be UL rated for the gas type and pressure rated to meet ASTM and ANSI standards.

E. Laboratory process gas material, cylinder system, central plants, and manifolds shall be reviewed with OUA. All piping and fittings for lab equipment shall be designed to meet ASTM and ANSI standards for all lab equipment, materials, and pressure ratings associated with the process requirements of the process gas being furnished. Quantities and storage requirements shall comply with NFPA.

115313.3 Lab Chemical Storage and Flammable Storage Cabinets and Rooms:

A. Chemical storage cabinets shall be constructed and ventilated per manufacturer's recommendations. The exhaust from chemical storage shall be connected to the building chemical and fume hood exhaust systems. The duct connection and cabinet shall be made of such materials which can handle the chemical resistance of the materials being stored. The exact CFM quantity shall be reviewed with OUA and lab safety personnel. Engineer shall provide in the design a means of balancing the ventilation air from the storage device or casework.

B. Flammable storage cabinets shall be ventilated per NFPA and manufacturer's recommendations. Flammable storage cabinet shall be UL approved for storage cabinet classification of quantities allowed to be stored according to the building classification, quantities allowed by code, AHJ, and the University. Flammable storage cabinets shall only be exhausted into an approved exhaust system designed for flammable vapors. Explosion proof ventilation system shall be used at all times. The connection, locations, size, and ventilation needs of such cabinets shall be reviewed with OUA, EHS and lab safety personnel prior to design and installation.

C. Storage rooms for chemical or flammable liquids shall be reviewed with OUA, EHS, and lab safety personnel.

115313.4 Work tops within fume hoods shall be solid epoxy or stainless steel. Sinks shall be integral.

END OF SECTION

DIVISION 12 – FURNISHINGS

12 00 00 GENERAL REQUIREMENTS

120000.1 Interior furnishings will be specified by A/E unless directed otherwise by OUA.

120000.2 Furniture Binders: A/E shall provide furniture photos, specifications, fabrics, finish materials, schedules and plans bound in a hard cover, high quality, three-ring binder along with the Bid Set submittal. The binder shall include a transparent vinyl sleeve on the front cover and the binder spine to protect labeling. The binder shall be labeled on the front as well as the spine with the A/E name, project name, CSU project number, and "Furniture Specifications". Samples to be mounted on 8-1/2" x 11" cardstock and protected within plastic sleeves. Two sets of binders shall be provided: one for OUA and one for the client. A/E shall provide updates as necessary so that the binders are accurate upon Record Drawing submittal.

12 20 00 WINDOW TREATMENTS

122000.1 A/E will specify window treatments to be included in base bid work.

122000.2 The preferred product for interior sun control is manually operated shading fabric such as Mechoshade Series 1300. Coordinate shading density and material selections with OUA and CITDL.

122000.3 Use Mechoshade's Mech/5x mechanism as needed to accommodate larger shade sizes.

122000.4 Horizontal aluminum slat blinds with jamb channels are acceptable when matching existing window treatments within a renovation project.

122000.5 Vertical blinds are prohibited.

122000.6 Specify blackout treatment in audio visual areas when required.

122000.7 Coordinate motorized blind requirements with OUA. Specify electrical connections and controls clearly within electrical contract. For rooms with AV controls, tie in control of the shades with AV system.

122000.8 Specify all concealed blocking or reinforcing as required for secure installation.

12 35 53 LABORATORY CASEWORK AND FIXTURES

123553.1 Utility fixtures and fittings shall be at least of the quality specified for the plumbing, mechanical, and electrical prime contractors. A/E shall verify corrosive resistant materials are required.

123553.2 Water faucets with hose connections shall be specified with vacuum breakers.

123553.3 Ducts for fume hoods shall be specified with non-corrosive lining.

123553.4 Laboratory casework and countertop material selection shall be coordinated with OUA.

12 46 19 CLOCKS

122000.1 A/E will specify clocks to be included in base bid work.

124619.2 All clocks shall be battery operated and wifi connected: National Time & Signal model #LR-12SS-WIFI-4B-SP, low profile, round, 12" dia. steel case, (4) AA batteries (Energizer Ultimate Lithium for 5 year life), shatter-proof crystal lens, tamper resistant mounting bracket.

12 46 33 TRASH RECEPTACLES

124633.1 A/E will specify receptacles to be included in base bid work.

124633.2 Outdoor Trash and Recycling Receptacles: Max-R, Terra model, single unit, 39"W x 20"D x 45"H, double-stream, front-load, dome-top system. Gray frame with gray top. Each bin to have 32 gallon capacity. Unit to be bolt-mounted to concrete.

A. Bin 1 (left): green left panel, green front panel with white recycling arrow symbol, white "BOTTLES & CANS" label and round opening.
B. Bin 2 (right): black right panel, black front panel with white waste/person symbol, white "LANDFILL" label and rectangle opening.
C. Max-R lumber is made from 97% post consumer HDPE (milk jugs) that is moisture, mold, rot, and insect resistant.
D. See Appendix P "Trash & Recycling Standard" for images.

124633.3 Indoor Trash and Recycling Receptacles: Max-R, Verde model, single unit, 40"W x 24"D x 40"H, triple-stream, top-load, flat-top system. Gray frame with gray 3-hole top. Each bin to have 22 gallon capacity.

E. Bin 1 (left): green left panel, green front panel with white recycling arrow symbol, round opening in top with white "BOTTLES & CANS" label.
F. Bin 2 (middle): blue front panel with white paper symbol, slit opening in top with white "PAPER" label.
G. Bin 3 (right): black right panel, black front panel with white waste/person symbol, rectangle opening in top with white "LANDFILL" label.
H. Max-R lumber is made from 97% post consumer HDPE (milk jugs) that is moisture, mold, rot, and insect resistant.
I. See Appendix P "Trash & Recycling Standard" for images.

124633.4 All large interior public areas such as entry lobbies, atriums, wide corridors, etc. should receive standard 3-bin systems.

124633.5 Each interior room such as classrooms, labs, lecture halls, office suites and corridors not wide enough to accommodate a 3-bin system should receive (1) paper, (1) bottle/can, and (1) landfill receptacle: Rubbermaid Slim Jim model #3540, 23 gallon capacity, 20"W x 11"D x 30"H each.

A. Bin 1: green receptacle with green bottle and can recycling top #2692-88.
B. Bin 2: blue receptacle with blue paper recycling top #2703-88.
C. Bin 3: black receptacle, no top.
D. Labels provided by the Office of Sustainability and installed by contractor.

124633.6 Receptacle standards are intended to create a unified and consistent recycling and landfill waste system on campus, both inside and outside. Any deviations must be approved by the Office of Sustainability.

12 48 00 ENTRANCE MATS

124800.1 Entrance "mats" to be modular, walk-off type carpet tile, 28 oz. and solution dyed. Preferred

product is Interface “Entry Level” in Black, currently referred to as Step & Repeat #SR999. Deviations must be approved by OUA Interior Designer and Facilities Director.

124800.2 Use of recessed mats supported on aluminum extrusions are discouraged. If recessed mats are proposed, they must be readily removable for cleaning, and approved by Facilities Services.

124800.3 Floor drains below entrance mats are prohibited.

12 50 00 FURNITURE

125000.1 Classroom Furniture:

A. Tables and chairs shall be nesting or stacking for reconfigurability and storage.
B. Tables and chairs shall have a 300 lb. weight capacity.
C. Chairs shall carry a minimum 10-year warranty.
D. Task Chairs: are discouraged unless used at “fixed” stations like computers. If required, task chairs shall be armless KI Strive with height adjustment lever only (or similar model).
E. Tablet Chairs: KI Strive Nesting Oversized Tablet Arm, or similar.
F. Mobile Collaboration Chairs: KI Learn2 with Strive seat and Bookbag rack, or similar.
G. Nesting Tables: KI Pirouette, or similar. DO NOT specify locking/ganging mechanism as they are constantly broken when trying to move tables.
H. Nesting Chairs: KI Strive, armless, or similar.
I. Computer Labs: KI InTandem tables with wire management.
J. Media Tables: KI Backbone, or similar.
K. Instructor Lectern: if CITDL standard lectern is not required, provide an instructor station similar to Steelcase Verb.
L. Instructor Chair or Stool: KI Strive Task, armless, height adjustable only (or similar model).
M. Provide at least (1) height adjustable table per classroom for ADA use.
N. Where tablet arm chairs are used, provide at least (1) row left-handed.
O. All poly (no fabric) is preferred for classroom chair seats and backs.
P. Tables with glued-in flat T-mold (not laminate) and squared edges (for abutting) are preferred.
Q. Verify if casters are required on tables and/or chairs with users.
R. Include attic stock on larger projects – coordinate quantities with Facilities Services.
S. Any deviations from the above products must be approved by OUA Interior Designer and Facilities Services (for storage, maintenance and reconfigurability).

1250000.2 Seat Counts: If a required seat count is given during programming, that seat count must be achieved maintaining proper aisles, clearances, and instructional areas. Squeezing the required seat count into a room too small will not be accepted.

12 61 00 AUDITORIUM SEATING

126100.1 If program calls for articulating tablet arms, ten to twelve percent of the seats should have left hand tablet arms.

126100.3 Minimum size of tablet arm shall be sufficient to completely support a laptop computer.

126100.4 Provide multiple locations and writing surfaces for wheelchairs within the fixed seating area.

126100.5 Pre-approval of fixed seating by OUA Interior Designer is required. A full-size sample showing all features, materials, and finishes shall be provided for final acceptance prior to ordering.

12 93 00 SITE FURNISHINGS

129300.1 A/E shall consult with OUA during early planning stage of project regarding site furnishings. A/E to verify with OUA what street furnishings shall be included in the construction documents.

129300.2 All site furnishings to be powdercoated. Furnishings shall be bolted or securely anchored.

129300.3 Benches: Landscape Forms, Gretchen, with back, no arms, Polysite slats (wood-look recycled plastic) in Bark (brown), and RAL 6029 (similar to "University Green") powdercoat finish.

129300.4 Picnic Tables: Landscape Forms, Gretchen, backless, armless, Polysite slats (wood-look recycled plastic) in Bark (brown), and RAL 6029 (similar to "University Green") powdercoat finish. Include ADA compliant version within grouping in quantity as directed by OUA/Grounds.

129300.5 Dining Tables: Landscape Forms, Mingle, backless, armless, 5-seat or 6- seat, standard perforated seats, RAL 6029 (similar to "University Green") powdercoat finish. Include ADA compliant version within grouping in quantity as directed by OUA/Grounds.

129300.6 Bicycle Parking: Forms + Surfaces, Trio, solid cast aluminum with powdercoat finish in Silver or Aluminum Texture. Provide at least (4) bicycle parking spaces per building.

129300.7 Signs: per CSU Signage Standards and Division 10.

129300.8 Warranties:

A. Contractor shall provide the University with the manufacturer's warranty.
B. Contractor shall warranty installation of site furnishings for one year from the date of the Certification of Contract Completion.

END OF SECTION

DIVISION 13 – SPECIAL CONSTRUCTION

13 00 00 GENERAL REQUIREMENTS

130000.1 Each item of this division of work will require specific approvals from OUA.

130000.2 Items to be approved include: air supported structures, cable and fabric structures, sound rooms, cold rooms, clean rooms, integrated ceilings, stand-alone shelters, saunas, steam baths, radiation protection, pre-engineered building systems, swimming pools, and other similar items.

13 34 00 PRE-ENGINEERED STRUCTURES

133400.1 Specify that analysis of framing and structural components be submitted to A/E for approval.

133400.2 The signature and seal of an Ohio registered professional architect or structural engineer shall be on the analysis, certifying that the structure meets the requirements of the specifications and the Ohio Basic Building Code.

133400.3 Copies of this data shall be submitted to OUA.

13 34 13 GLAZED STRUCTURES

133413.1 Comply with all glazing specification sections.

133413.2 Integral drainage system shall be specified to positively drain the glazing system.

133413.3 Access shall be designed around the structure to permit maintenance for the structure as well as for adjacent equipment.

133413.4 Design structure to support mechanical and electrical items which may be suspended from the structure, as well as loading which may occur during repair/maintenance of structure.

13 49 00 RADIATION PROTECTION

134900.1 Materials and equipment shall conform to the recommendations of the National Council on Radiation Protection and Measurements.

134900.2 Materials and equipment shall be furnished and installed in strict conformity with the Code of Federal Regulations, Title 21, Department of Health, Education, and Welfare, FDA Division, and the manufacturer.

END OF SECTION

DIVISION 14 – CONVEYING SYSTEMS

14 20 00 ELEVATORS

142000.1 A planning conference shall be scheduled by A/E with OUA to determine elevator requirements. For "service" or "freight" type elevators, A/E shall verify type of freight and method of moving (i.e. pallet jack) to determine state elevator code requirements and floor load design criteria. If the elevator shall be dual use (passenger and freight), a variance may be required and A/E shall apply for the variance at the time of plan approval. Extent of upgrades to existing elevators shall be discussed at same meeting. A/E is encouraged to bring existing elevators into current compliance if possible.

142000.2 Elevator cab size shall be nominally 7'W x 5'D and be able to accommodate a paramedic stretcher cot (76" x 23") in the fully reclined position for emergencies.

142000.3 Entrances shall be fully automatic except for "freight only" elevators. Avoid the use of double sided entrances whenever possible.

142000.4 Full accessibility is required for the disabled including features for the hearing and vision impaired, per ADA requirements.

142000.5 Elevator cab shall be assigned a room number on the first floor plan. Coordinate number with OUA Planner and Access Control during design development.

142000.6 Coordinate numbering designations (of floor levels at cab buttons and door locations) with OUA and Access Control.

142000.7 Elevator cab finishes shall be specified on the room finish schedule:

A. Flooring shall be resilient or walk-off type carpet tile.
B. Doors and jambs shall be brushed finish stainless steel; painted finishes are prohibited.
C. Wall panels shall be plastic laminate or solid surface with stainless steel rails on three walls.
D. The ceiling system and lighting shall be vandal resistant with no exposed lamps within reach inside the cab.
E. An inspection certificate frame shall be mounted in the cab with tamper resistant screws.
F. Review all finishes with OUA and FM for approval.

142000.8 A/E shall specify protective moving blankets and associated hooks as part of the base bid.

142000.9 If building generator is not required/provided, the elevator machine shall include battery back-up lowering device.

142000.10 A/E shall verify code requirements for fireman's emergency return system, shunt trip devices at elevator pit and machine room.

142000.11 A/E shall specify that the fireman's service key shall be keyed alike to University standard.

142000.12 Elevator pit shall be complete with ladder, light, sump, sump cover, sump pump, oil interceptor (for hydraulic elevators), and all electrical and drainage connections. A/E shall insure lighting levels in the pit comply with the elevator code requirements. Consider providing additional fixture(s) in the pit.

142000.13 Provide quantity of light fixtures in the elevator pit and machine room necessary to insure code required lighting levels are met in all areas (corners) of the room.

142000.14 Any and all bracing and connections required by the elevator contractor shall be provided by the GC under the miscellaneous metals portion of the contract.

142000.15 Elevator Shaft Requirements: A/E shall verify code requirements for pressure relief vents and smoke dampers and clearly specify which contract is to provide and/or install louvers and/or vents.

142000.16 Facilities Maintenance Requirements:

A. Always provide at least two elevators if one is required for the building.
B. Controllers must be non-proprietary. Complete access must be provided to CSU technicians to fully control the elevator and make any necessary changes to default settings. Access must include auxiliary (handheld) devices or a laptop.
C. If the elevator is equipped with a communication chip, it must be included with the unit to provide full control access. If a password is needed, one must be provided.
D. Detailed wiring and component diagrams and specifications must be turned over to Facilities as soon as the elevator is ready for use.
E. For electric traction elevators, use Schindler 400A as a standard of design.
F. Elevators must have a machine room. Machine-room-less elevators are not acceptable.
G. Elevator cab lights shall be serviced and maintained by the elevator technicians and included in the elevator service contract.

142000.17 Telephones:

A. Elevator cars shall receive a Gai-Tronics #397-001 stainless steel, flush mount, Emergency hands-free telephone. In the event that this model will not fit due to size limitations, the Gai-Tronics #397-001FS may be substituted. Any other substitutions must be approved by CSU IS&T Telecom.
B. Elevator contractor shall coordinate dialing and identification requirements with CSU IS&T.

142000.18 Access Control Equipment, (quantity) per car:

A. (1) Network drop – CSU supplied, Electrical Contractor (EC) installed.
B. (1) AC 120vAC drop with two duplex receptacles – EC supplied and installed. Substituting a quad receptacle is not acceptable.
C. (1) Keyscan #EC1500 elevator control panel – CSU supplied, EC installed.
D. (1) Keyscan #NETCOM2P – CSU supplied, EC installed.
E. (1) 12VDC/7AH battery – CSU supplied, EC installed.
F. (2) 40 VA transformers – CSU supplied, EC installed.
G. (1) Card reader #HID 920PTNNEK00000 multi-class, wall mounted – CSU supplied, EC installed
H. (1) West Penn #253270B, 6 cond. 18 or 22 AWG stranded shielded card reader cable – CSU supplied, EC installed. This connects reader cable from traveler in elevator controller to EC1500.
I. (1) Elevator I/O control cable: West Penn #25753B, 4 pair 18 AWG unshielded cable – Shindler supplied, Shindler installed. This connects EC1500 access controller to elevator controller for car calls.
J. (1) Traveler cable, 18 pair – Shindler supplied, Shindler installed. Two pair are for future use, three pair (five wires) for access, one pair for video, at the end of the traveler cable in the machine room one pair will be landed on a Mobotix media converter (CSU supplied) and transition to ethernet (CSU supplied).

142000.19 Camera Equipment, (quantity) per car:

A. (2) AXIS #3046 camera (one in cab, one in elevator lobby) – EC supplied, EC installed.
B. (1) Mobotix MX2wire Plus (media converter located in cab above drop ceiling) – EC supplied, EC installed.
C. (1) Network drop to elevator machine room – EC supplied, EC installed.
D. (1) Network drop to main floor lobby – EC supplied, EC installed.
E. CSU will supply the camera licenses.
F. Elevator cameras use the elevator's traveler cable for the Mobotix system. EC shall provide, install, and label two wire pairs in the traveler cable (one pair for use and one spare pair).

142000.20 Elevator contractor shall perform and confirm all programming is correct with CSU BACC upon completion.

142000.21 Mechanical Level Security Requirements: If an elevator cab has a stop that enters only into a mechanical space, security measures are required. The elevator shall require a key or electronic card swipe access to allow access to that level. The key shall match CSU mechanical room master key with master ring cylinder.

142000.22 Miscellaneous security requirements may be required by program. Coordinate with OUA.

142000.23 A pre-installation conference shall be scheduled with the GC, elevator contractor, fire protection contractor, HVAC contractor, and electrical contractor (and fire alarm subcontractor) to coordinate layout and requirements of all related systems. The State requirements checklist shall be verified and signed off at this meeting.

142000.24 All permit fees including inspection and first operation permit are to be included in the elevator specifications/subcontract. Subsequent re-inspection fees shall be paid by the GC; a deduct change order will be issued to the parties responsible for initial failed inspection.

142000.25 A/E shall specify that the elevator contractor is to include an additional site visit in his base bid for the State elevator re-inspection. This presumes that the elevator will not pass the inspection on the first visit.

142000.26 A/E and elevator contractor shall notify the University of the date and time of the elevator inspections so that a representative from OUA (FM, EHS, ACSS) may participate in the inspection.

142000.27 A/E shall specify that the GC and elevator contractor must turn over the elevator for use by the owner immediately following successful inspection and prior to final payment.

142000.28 The elevator will not be used during construction for transport of materials or workmen unless approved by OUA and only if adequate protective measures are taken.

142000.29 Final payment for the elevator will not be made until maintenance and instruction manuals are submitted and approved by A/E. Specifically note that the project specific wiring diagrams are required before release of final payment will be approved. Generic wiring diagrams are unacceptable.

04 42 00 WHEELCHAIR LIFTS

044200.1 Wheelchair lifts are discouraged. A mid-level or bi-level elevator is preferred.

044200.2 If the program necessitates a wheelchair lift, A/E shall specify a phone jack on the lift.

END OF SECTION

DIVISION 21 – FIRE SUPPRESSION

21 00 00 GENERAL REQUIREMENTS

210000.1 See Appendix K "CSU Mechanical & Plumbing Standards".

210000.2 Coordinate all other work with OUA and FM.

END OF SECTION

DIVISION 22 – PLUMBING

22 00 00 GENERAL REQUIREMENTS

220000.1 Indoor Water Conservation:

A. Fixture and appliance selection shall promote efficient use of water resources.
B. All newly installed eligible toilets, urinals, lavatory faucets, and shower heads must be WaterSense labeled.
C. No once-through cooling with potable water for any equipment or appliances that reject heat.
D. Install permanent water meters that measure the total potable water use for the building and associated grounds.

220000.2 See Appendix K "CSU Mechanical & Plumbing Standards".

220000.3 Coordinate all other work with OUA and FM.

END OF SECTION

DIVISION 23 – HVAC

23 00 00 GENERAL REQUIREMENTS

230000.1 Indoor Air Quality: Building design shall promote occupants' comfort, well-being, and productivity by improving indoor air quality through the following means:

A. Mechanical and natural ventilation
B. Filtration
C. Selection of low or no VOC content paints and coatings, adhesives and sealants, flooring, composite wood, thermal and acoustic insulation, and furniture.

230000.2 Refrigerant Management: Select refrigerants and heating, ventilating, air conditioning, and refrigeration (HVAC&R) equipment that minimize or eliminate the emission of compounds that contribute to ozone depletion and climate change.

230000.3 See Appendix K "CSU Mechanical & Plumbing Standards".

230000.4 Coordinate all other work with OUA and FM.

END OF SECTION

DIVISION 25 – INTEGRATED AUTOMATION

25 00 00 GENERAL REQUIREMENTS

250000.1 See Appendix K “CSU Mechanical & Plumbing Standards”.

250000.2 Coordinate all other work with OUA and FM.

END OF SECTION

DIVISION 26 - ELECTRICAL

26 00 00 GENERAL REQUIREMENTS

260000.1 The Ohio Revised Code requires that separate drawings and specifications be prepared for all Fire Protection, Plumbing, HVAC, and Electrical work.

260000.2 Safety Requirements:

A. Contractor shall be required to comply with OSHA requirement for physical hazards, safety equipment, firefighting equipment, and protective equipment.
B. Belt guards, coupling guards, rails, roof fall protection, etc. shall be provided to meet OSHA requirements. Vent shafts and vertical openings shall be enclosed and comply with all OSHA requirements.
C. Refer to Division 1 Owner Safety Requirements.

260000.3 Utility/Electrical Connections:

A. Connections to the existing utilities must be prearranged for a time suitable to the University.
B. Contractor is required to give a minimum of two (2) weeks notice prior to any outages resulting in power loss to more than one room.
C. Contractor must submit a "MEP & Fire Protection Shutdown Request Form" online – located on the OCP website: https://www.csuohio.edu/capital-planning/contractor-info
D. Refer to Division 1 Temporary Facilities.

260000.4 Submittals:

A. Equipment shop drawings shall include nameplate data, model number, and efficiency rating along with full load amps for all electrical motors.
B. Coordination drawings should be required at 1/4"=1'-0" or larger. All systems shall be required. GC shall prepare based on extent of work involved. All plans shall indicate potential restrictions. Use of graphics packages for coordination drawings shall be coordinate with OCP.
C. All major equipment (electrical distribution, lighting, metering, motors, emergency system components, surge arrestors, fire alarm systems, light fixtures, lighting controls and associated equipment, receptacles, switches, cables, raceways, etc.) shall require submittals.
D. Refer to Division 1 Submittals.
E. A complete Power System study and analysis shall be provided. All corresponding labels and signs must be provided. The study must take appropriate upstream and downstream connected devices into account.

260000.5 One-Line Diagrams: CSU Facilities Electrical Operations is the owner and keeper of all One-Line Diagrams. Any changes (additions or deletions) made to the building One-Line Diagram will need to be coordinated with Electrical Operations and executed on drawings supplied by CSU. The existing drawing will be provided to the A/E firm, which will be updated with changes clouded and appropriate revision added to the title block. The final approved drawing will be submitted back to CSU Electrical Operations at the conclusion of the project (As-Built drawing set), with all clouds and revisions removed and in the same format as originally received by the A/E firm. No new one-line diagrams shall be created without approval from Electrical Operations.

260000.6 As-Built Documents: Refer to Division 1 Project Closeout.

260000.7 O&M Manuals: Refer to Division 1 Project Closeout.

260000.8 Prohibited Construction: All plumbing and mechanical equipment, especially piping, shall be at least 3 feet away horizontally from any electrical switchgear or transformers. No mechanical lines of any kind shall pass through telephone, transformer, switchgear, or elevator equipment rooms.

260000.9 Testing Results:

A. All tests performed on electrical equipment and parts are to be documented based on industry standards and applicable codes.
B. All testing documents shall be submitted to the Facilities electrical department in its original format as a hard copy, or electronic format.

260000.10 Inspections:

A. Contractor is responsible for following current guidelines related to electrical safety and installation inspections.
B. Inspections are to be conducted through the State of Ohio and /or City of Cleveland governing jurisdiction bodies.
C. All inspections are to be documented and final approval forms must be submitted to the Facilities electrical department.

260000.11 Commissioning:

A. Commissioning of all new and existing equipment must be done within NFPA, OSHA, and NEC guidelines.
B. Facilities electrical department is required to approve all commissioning procedures. Commissioning procedures are to be submitted for approval at least three (3) business days prior, accompanied by all supporting documents.
C. Contractor will not be allowed to proceed with commissioning of equipment unless approval has been received by Facilities electrical department.

260000.12 Warranty:

A. A copy of original manufacturer warranty for all equipment shall be submitted to the Facilities electrical department.
B. All contractor workmanship warranties shall be submitted to the Facilities electrical department.
C. Refer to Division 1 Project Closeout.

260000.13 System Voltage Definitions:

A. Medium Voltage (MV) is defined as 1000V up to 15kV class equipment.
B. Low Voltage (LV) is defined as 50V up to 600V class equipment and is divided into two categories:
    1. 250V to 600V
    2. 50V to 250V

260000.14 Electrical Spaces:

A. Wall space must be kept 30% free and open for future use.
B. All panels, switches, relays, disconnects, etc. must be mounted no higher than 84” AFF.
C. Main entry door is required to have electronic access control connected to the CSU BACC.
D. It is the responsibility of the Electrical Contractor to leave electrical spaces clean and free of extra material, tools, storage equipment, ladders, garbage, and other debris.

260000.15 Information Systems & Technology (IS&T) project requirements are located within Appendix Q “IS&T Construction and Cabling Requirements”.

26 01 00 DEMOLITION

260100.1 General Guidelines:

A. Demolition of electrical items is not permitted on CSU grounds, without the approval of OCP/Facilities Management.
B. A pre-demolition walkthrough must be scheduled with the CSU Facilities Electrical Department to assess any equipment or material that will be removed by CSU.
C. All items removed by the contractor shall be disposed of as part of the contractor's work, using contractor resources. These items shall not be disposed on CSU grounds and using CSU resources.
D. Items to be salvaged shall be disassembled and delivered to the storage location.

260100.2 The following items are an example of equipment that will always be salvaged by the CSU Facilities Electrical Department:

A. Light poles with LSI LED Heads and Philips Lumec Optima Post tops.
B. Draw-Out Breakers.
C. Automatic Transfer Switches.
D. Lutron lighting controls and associated devices.
E. Douglas lighting controls and associated devices.
F. Power Metering and Monitoring Equipment.
G. Ladders; Locks and Chains; Tools and Carts.

260100.3 All unused wiring, raceways and general purpose devices shall be removed as part of the project.

26 01 09 CABLES AND CONDUCTORS

260109.1 Medium Voltage Cables:

A. For 15kV Class Cables: Only Insulated Single Conductor Copper Cables are allowed for use in power feeder routing. Cable properties must include 133% EPR Insulation with PVC Jacket, MV-105 Cables and Copper Tape Shield.
B. For 5kV Class Cables: 3 Conductor Copper Cables are allowed for use in power feeder routing. Cable properties must include 133% EPR Insulation with PVC Jacket, MV-105 EPR Cables and Copper Tape Shield.

260109.2 Low Voltage Cables:

A. All Conductors shall be THHN-2 or THWN-2 Stranded Copper type and Follow Phase Conductor Identification Schedule.
B. SO Cable:
    1. Permitted for use as cord drops, portable equipment and permanent equipment not subject to physical damage.
    2. Cord grip connector with integral wire mesh strain relief (Kellum) shall be installed at each termination.
    3. Insulation used shall be suitable for the installation environment.
C. MC Cable:
    1. Not permitted for use in exposed areas and shall not pass through a wall of any construction type.
    2. No more than 10' of each cable run may be installed above a drop ceiling.
    3. Total length of any individual continuous cable run shall not be longer than 100' of cable length regardless of junction points.

4. Assemblies longer than 6’ must follow Phase Conductor Identification Schedule.
5. Anti-short bushing shall be installed on each cable termination regardless of type of fitting used.
6. May not terminate in a box size greater than 42 cubic inches.
7. A maximum of Four (4) assemblies are allowed in any box.
8. A maximum of Three (3) assemblies may be bundled together or pass through a single opening in a framing member or any other penetration.

D. Phase Conductor Identification Schedule:
1. Conductor insulation must be factory colored along entire length of the conductor.
2. Phase Colors for 120/208 Volt Systems shall be - Phase A: Black; Phase B: Red; Phase C: Blue; Neutral: White.
3. Phase Colors for 277/480 Volt Systems shall be - Phase A: Brown; Phase B: Orange; Phase C: Yellow; Neutral: Gray.

E. Connections:
1. Branch circuits with wire sized smaller than 10 AWG shall use twist-on wire connectors for joining 2 or more wires together.
2. Push-On connectors are NOT allowed.
3. Stranded wire connected to a single device screw without a clamp will terminate with an insulated ring or fork crimp type terminal.

26 01 06 WIRING DEVICES

260106.1 All wiring shall be directly wired to the device. Modular connectors that detach the wiring to the device using a twist or push style plug are not allowed.

260106.2 All devices shall be industrial extra heavy-duty, specification grade and self-grounding type. A grounding conductor shall always be bonded to the device.

260106.3 All devices shall have a minimum current rating of 20A.

260106.4 Combination devices on the same yolk are NOT allowed.

260106.5 All wall plates for all devices shall be standard size and mechanically fastened with screws. NO snap-on devices or cover plates allowed.

260106.6 USB Receptacle:
A. Duplex + 2 USB, Hubbell #HBL USB20A5W or approved equal.
B. Each Classroom shall have at least One (1) USB receptacle per wall.
C. Each Office space shall have at least One (1) USB receptacle next to the desk.
D. All Common Spaces/Gathering areas to have at least Two (2) USB receptacles within reach of the seating furniture provided.

260106.8 Color System:
A. All wall plates for all devices shall be 430 Stainless Steel or 302 Brushed.
B. Isolated Ground Connection Devices shall be Orange.
C. Backup and/or Emergency System Devices shall be Red.
D. All devices not mentioned above shall be White.

26 01 07 SUPPORT SYSTEMS

260107.1 Only One-Hole, Two-Hole and Duplex Straps are permitted for use.

260107.2 Conduit Hanger, Conduit Clip, Pipe Clamp, Cable Clip, Beam Clamp, Stud Fastener or any combination off these items are permitted for use for the purposes of securing conduits.

260107.3 Malleable Iron, Hot Dipped Galvanized – Use in Exterior RMC Installations and where subject to vehicular damage.

260107.4 Steel, Hot Dipped Galvanized – Use in Parking Structures.

260107.5 Steel, Zinc Plated or other finishes – Use in Interior installations for metal conduits and metal clad cable.

260107.6 Any trapeze installed for the purpose of a conduit rack must have at least 50% free space for future use.

26 01 08 RACEWAYS AND ENCLOSURES

260108.1 General Guidelines:

A. Installation of raceways is permitted as mentioned based on material type and environmental factors. Only the types specified below are allowed for installation. All other installations are not permitted on CSU campus.
B. All conduits must be minimum ¾" trade size unless otherwise specified.
C. Factory Elbows are not permitted on metallic conduit's smaller than 1-1/4" and non-metallic conduits smaller than 2-1/2", unless otherwise specified.
D. All wiring accessible by a removable cover of any type shall be permanently and clearly labeled with the originating panel name(s) and circuit number(s) contained in the enclosure.

260108.2 RMC (Steel Hot-dip Galvanized):

A. Not permitted for use in installations involving underground, concrete encasement, direct contact with earth and corrosive environments.
B. Compression and push-on style connectors and couplers are not permitted for installation.
C. Malleable Iron Threaded conduit bodies are permitted.

260108.3 RAC (Rigid Aluminum Conduit):

A. Not permitted for use in installations involving underground, concrete encasement and direct contact with earth.
B. Compression and push-on style connectors and couplers are not permitted for installation.
C. Aluminum Threaded conduit bodies are permitted.

260108.4 IMC (Steel Hot-dip Galvanized):

A. Not permitted for use in installations involving exterior conditions, underground, concrete encasement, direct contact with earth and corrosive environments.
B. Compression and push-on style connectors and couplers are not permitted for installation.
C. Malleable Iron Threaded conduit bodies are permitted.

260108.5 EMT (Steel):

A. Not permitted for use in installations involving damp and wet locations, subject to vehicular damage, parking garages and areas, concrete encasement, direct contact with earth and corrosive environments.

B. Cast zinc, snap-in style and push-on style connectors and couplers are not permitted for installation.
C. Set Screw conduit bodies are permitted.

260108.6 PVC Sch40: Not permitted for use in installations involving exposed conditions and concrete encasement.

260108.7 PVC Sch80:
A. Not permitted for use in installations involving exposed conditions, except in interior conditioned spaces for transitioning from concrete and not subject to physical damage.
B. Not permitted for use in installations involving concrete encasement except Medium Voltage Duct Bank.

260108.8 FMC (Flexible Metallic Conduit):
A. Not permitted for use in installations involving exposed conditions.
B. Conduit must be a minimum ½" trade size.
C. Maximum length installation of 6 feet allowed.
D. Malleable Iron Clamp type connectors and couplers are permitted for use.

260108.9 LFMC (LiquidTight Flexible Metallic Conduit):
A. Maximum linear length installation of 6 feet allowed.
B. Malleable Iron Clamp type connectors and couplers are permitted for use.

260108.10 Metal Wireways:
A. Surface Metallic Raceway/Wiremold is permitted in 3000 aluminum for installation in labs and 4000 steel for use in existing spaces.
B. Cable Trays can only be used for cables carrying 50V or less.
C. A minimum of One (1) home run 1" Spare Raceway/Conduit shall be provided for every 3500sf of interior finished space and must be easily accessible.
D. Extension Rings or Extension Boxes are not permitted for use.
E. Installation of Boxes must meet the following conditions:
    1. FS and FD Malleable Iron.
    2. Cast Aluminum FS & FD where not subject to vehicular damage.
    3. Size must be a minimum of 29 ci square box, except –
        a. 22 ci non-gangable masonry box allowed for new work concealed in Masonry Wall.
        b. 12 ci box allowed for old work in stud wall or hard ceiling.
        c. 22 ci box allowed with a raised cover with dimpled corners for surface mounted devices.
F. NEMA 1 enclosures permitted for use in Indoors and dry location only.
G. NEMA 3R enclosures are required for all other installations.
H. NEMA 4-4X enclosures are required for special environments as determined by CSU Facilities.

26 10 00 TRANSFORMERS

261000.1 General Specifications:
A. This section covers transformers that are both medium and low voltage in nature.
B. Transformers under 50V are not defined under this section.
C. CSU requires all transformer installation to be indoors and be of a dry-type nature. Outdoor installations are prohibited.
D. Any transformer installed shall not exceed 40% of its rated capacity.

E. The use of cooling fans shall not be used to increase rated capacity.
F. Transformers shall be floor mounted and include vibration isolation.

261000.2 Medium Voltage (MV) Transformers: CSU only deals with MV transformers with 11.4kV as the primary voltage and an equipment class of 15kV.

261000.3 Low Voltage (LV) Transformers: Low voltage, under 250VAC, electrical distribution systems shall be designed so that the largest transformer does not exceed 120kVA.

261000.4 Equipment Naming Convention:
A. All normal power transformers will be identified using 2-ply, high contrast, durable engraved plastic mounted via screws equipment tags. Tag dimension to be 2"H x 4"W x 1/16"D with black lettering on white background.
B. All emergency power transformers will be identified using 2-ply, high contrast, durable engraved plastic mounted via screws equipment tags. Tag dimension to be 2"H x 4"W x 1/16"D with white lettering on red background.
C. Tags will have three lines of text: 1st line will be transformer name, 2nd line will be primary and secondary voltages, 3rd line will be primary source.

26 20 00 DISTRIBUTION EQUIPMENT

262000.1 General Specifications: This section covers all distribution equipment that is not considered a panelboard for the purposes of branch circuit distribution.

262000.2 New Installations: Approved manufacturers include Square D, Eaton, and Siemens.

262000.3 Modifying Existing Distribution Equipment:

262000.4 Equipment Naming Convention:
A. All distribution equipment serving normal power loads will be identified using 2-ply, high contrast, durable engraved plastic mounted via screws equipment tags. Tag dimension to be 1"H x 3"W x 1/16"D with black lettering on white background.
B. All distribution equipment serving emergency power loads will be identified using 2-ply, high contrast, durable engraved plastic mounted via screws equipment tags. Tag dimension to be 1"H x 3"W x 1/16"D with white lettering on red background.
C. Tags will have three lines of text: 1st line will be the equipment name, 2nd line will be the nominal voltage, 3rd line will be primary power source.

26 21 00 POWER SYSTEMS PROTECTIVE DEVICES

262100.1 Fuses: Current Limiting Fuse Types allowed are:
A. Class CC.
B. Class J; must contain indication.
C. Class RK5; must contain indication.
D. Class RK1; must contain indication.
E. Class L.

262100.2 Breakers: Draw-Out breakers shall be used to protect all feeders rated over 400A.

262100.3 Trip Units:

A. Ground Fault Protection is required on all Motor Control Center feeders, Main Distribution Panels and/or individual Motor feeders, for motors equal to or greater than 20HP. Any exceptions must be approved by Facilities Electrical Department.
B. Long time, short time, instantaneous, and ground fault protection is required on all distribution breakers rated over 250A.

26 24 16 PANELBOARDS

262416.1 General Specifications:

A. Panelboards in this section are defined as circuit breaker distribution centers with a dead front assembly, used for local area branch circuit loads such as lighting and power.
B. Certain existing distribution centers with fuse blocks also fall under the panelboard category, used for local area branch circuit loads such as lighting and power.

262416.2 New Installations:

A. Installations shall only be allowed in rooms designated as Electrical rooms.
B. Panelboards shall be installed with a count of 24, 30, or 42 circuit breakers configuration only. A minimum of 40% spare circuits will always be provided.
C. All spaces classified as Lab, Research, or Computer areas shall be provided with a minimum of 30% spare circuits.
D. Minimum 100A main circuit breaker configuration is required.
E. Panelboards shall only be mounted in a surface configuration.
F. Circuit breakers will be installed to match the manufacturer of the panel.
G. Provide panelboard identifying tag per CSU requirement.
H. Installation of mini breakers are prohibited.
I. "CSU Standard Panelboard Schedule" shall be used as an insert on inside of panelboard door. See Appendix H. Each circuit shall be uniquely labeled with locations.
J. Approved manufacturers include Square D, Eaton, and Siemens.

262416.3 Modifying Existing Panelboards:

A. Circuit breakers shall be installed to match the manufacturer of the panel. Electrical characteristics of the breaker shall match existing breakers in the panel.
B. Installation of mini or tandem breakers are prohibited.
C. "CSU Standard Panelboard Schedule" shall be used as an insert on inside of panelboard door. See Appendix H. Each circuit shall be uniquely labeled with locations.

262416.4 Equipment Naming Convention:

A. All distribution equipment serving normal power loads will be identified using 2-ply, high contrast, durable engraved plastic mounted via screws equipment tags. Tag dimension to be 1"H x 3"W x 1/16"D with black lettering on white background.
B. All distribution equipment serving emergency power loads will be identified using 2-ply, high contrast, durable engraved plastic mounted via screws equipment tags. Tag dimension to be 1"H x 3"W x 1/16"D with white lettering on red background.
C. Tags will have three lines of text: 1st line will be the equipment name, 2nd line will be the nominal voltage, 3rd line will be primary power source.

26 25 00 METERING AND MONITORING

262500.1 Metering:

A. Substation Mains and Tie(s), for both normal and emergency distributions shall be Eaton

PXM1300 series or equivalent. These include both Medium Voltage 11.4kV switches and Low Voltage 480V main breakers.

B. Substation or Main Distribution Panel Secondary Feeders or other submetering for normal or emergency distributions shall be Eaton PXM1100 series or equivalent.
C. Tenant and other feeds requiring only energy demand monitoring shall be Eaton PXM1000 series or equivalent.

262500.2 Monitoring:

A. All meters and sub-meters at the time of installation shall be compatible and connected to existing Power Monitoring System at CSU: Eaton Foreseer. Future software and hardware upgrades must be supported and compatible with Eaton Foreseer.
B. All monitoring and control equipment shall be powered via a dedicated circuit, sized appropriately from the emergency distribution system and be hard wired to a UPS capable of handling the load. The installation should ensure uninterruptible power supply to monitoring and metering equipment.
C. Provide appropriate data drop(s)/connection(s) to CSU network.

26 50 00 LIGHTING

265000.1 General Specifications:

A. All new lighting designs shall incorporate only LED luminaires.
B. All luminaires and associated devices connected to the electrical distribution system shall be permanently and clearly labeled with the panel name and circuit number(s) feeding the device(s).
C. It is the responsibility of the Electrical Contractor to leave the installed fixtures free of any construction debris, dust, or fingerprints upon building occupancy.

265000.2 Lighting Design: All lighting shall be designated to footcandle levels as outlined in Appendix J "CSU Photometrics" by area and function. Areas and functions that are not specified in the appendix shall default to IES standards.

265000.3 LED Luminaire – Exterior:

A. All exterior luminaires to be 4000K with a minimum 5-year warranty on parts.
B. All poles shall be black painted aluminum.
C. Fixtures allowed are based on compatibility with current CSU installation:
    1. LSI LED Slice (XLCS/XLCM/XLCL) for Outdoors, Surface Lots, Garage Rooftops, and Large Areas.
    2. Philips Lumec Optima Series, OT10-SHA, for Pathway and Pedestrian Walkways.
D. Exterior Lighting Design shall be integrated into the CSU campus and shall not be a stand-alone design.

265000.3 LED Luminaire – Interior:

A. All interior luminaires to be 4000K with a minimum 5-year warranty on parts.
B. Shall include 0-10V dimming capabilities.

26 51 00 LIGHTING CONTROL

265100.1 General Guidelines:

A. All components making up the system must be supplied by the same manufacturer.
B. Manufacturer must be a supplier of these components for over 5 years.

C. Parts warranty for all components shall be a minimum of 1 year.
D. Design shall be Lutron Vive wireless system using PowPaks to control the fixtures.
E. Final locations of installed PowPaks must be noted on the as-built drawings.
F. Lutron Vive Hubs shall be connected to the BAS via BACnet over ethernet.
G. Lighting Control are divided into the following categories: Interior, Exterior, Stairwells, and Parking Structures.

265100.2 Interior:

A. Defined as interior areas including but not limited to classrooms, lecture halls, labs, offices, conference rooms, restrooms, lobbies, corridors, and storage areas.
B. Lutron PowPak locations shall be in ceiling above main entry to each space as close as possible to the first fixture.
C. Lutron Vive Hubs shall be located in a common hall or corridor and supplied by a normal non-emergency lighting circuit serving the area where it is located.
D. The Electrical Contractor shall install the Lutron Vive Hubs and record the wifi SSID and the ethernet MAC address as well as the ethernet cable number and submit it to the CSU IS&T via a form on the IS&T's Sharepoint site to request a static IP address for each hub.
E. Dedicated custodial and storage closets no larger than 100 square feet may be operated by a combination switch/vacancy sensor.
F. Dedicated electrical and mechanical spaces shall be controlled by a line voltage toggle switch independent of any other control.
G. Part Numbers:
    1. Vive wireless hub: Lutron HJS-0-FM
    2. Vive BACnet license software upgrade per hub: Lutron HJS-UPDATE
    3. PowPak 0-10v dimmer: Lutron RMJS-8T-DV-B
    4. PowPak 16A switch: Lutron RMJS-16R-DV-B
    5. PowPak 16A switch with contact closure: Lutron RMJS-16RCCO1DV-B
    6. PowPak 16A emergency switch: Lutron RMJS-16R-DV-B-EM
    7. Line voltage wall sensor 0-10v dimmer: Lutron MRF2S-8SD010-WH
    8. Line voltage wall sensor switch: Lutron MRF2S-8SS-WH
    9. Line voltage toggle switch: Hubbell HBL1221W
H. Manual Control:
    1. Switches for room control shall always be located within 12" from the latch side of the door regardless of the construction material, including glass.
    2. All wireless switches and dimmers shall be wall mounted to a single gang switch box with a wall box adapter and must include a 3/4" stub up above the ceiling for future wired use. If a wall box is not possible because of a glass panel on the latch side of the door, a surface mount adapter shall be mounted to the mullion.
    3. A wireless 2-button non-dimming switch controlling all the main light fixtures in the room shall be located at each door or opening to the room.
    4. If a projector screen is present, a wireless 3-button dimmer with preset controlling all the lights in the room shall be wall mounted and ganged with screen controllers. If a screen is not present, the dimmer shall be wall mounted as close as possible to the lectern. If the nearest wall is more than 6 feet away from the lectern, the dimmer may be mounted on a pedestal and placed on the lectern.
    5. Preset on the 3-button wireless dimmer with preset shall be configured according to the layout of the room. In a classroom with a projector and screen, the row of lights in front of the screen shall be turned off and the main lights dimmer to 30%.
    6. If a dedicated whiteboard light exists, a separate wireless 2-button non-dimming switch to control only the whiteboard light shall be hanged with the 3-button wireless

dimmer with preset.

7. Part Numbers:
    a. Wireless 2 button non-dimming switch: Lutron PJ2-2B-GWH-L01
    b. Wireless 3 button dimmer with preset: Lutron PJ2-3BRL-GWH-L01
    c. Wall box adapter: Lutron PICO-WBX-ADAPT
    d. Surface mount: Lutron PICO-MOUNT-1-XX-CPN6774
    e. Single pedestal: Lutron L-PED1-WH
    f. Double pedestal: Lutron L-PED2-WH

I. Automatic Sensors:

1. Sensors used shall be wireless vacancy type. Corner mounted, or 90-degree, sensors are preferred because of their coverage. Wall mounted, or 180-degree, sensors can be used to fill the gaps in very large rooms. Hallway sensors are to be used at the end of every corridor longer than 50 feet. Wall sensors must be securely fastened to the wall using the included hardware at a height of 90" AFF. Ceiling mounted sensors shall only be used for small rooms less than 250 SF. If ceiling sensors are used, they must be recessed in the ceiling using a flush mount adapter.
2. Configuration for the occupancy sensors is as follows:
    a. Timeout: 30 min.
    b. Sensitivity: Low Activity
    c. Auto-On: Disabled
3. Daylight harvesting shall be utilized according to ASHRAE 90.1.2010
4. Part Numbers:
    a. Wireless corner 90-degree vacancy sensor: Lutron LRF2-VKLB-P-WH
    b. Wireless wall 180-degree vacancy sensor: Lutron LRF2-VWLB-P-WH
    c. Wireless hall vacancy sensor: Lutron LRF2-VHLB-P-WH
    d. Wireless ceiling vacancy sensor: Lutron LRF2-VCR2B-P-WH
    e. Ceiling recess mounting bracket: Lutron L-CRMK-WH
    f. Daylight sensor: Lutron LRF2-DCRB-WH

265100.3 Exterior:

A. Defined as all lighting outside of a building including canopy, wall, accent, architectural, post top, bollards, area, floods, landscape, etc.
B. Lutron PowPaks shall be located inside the exterior wall as close as possible to the first fixture.
C. All exterior lighting shall be wirelessly connected to the nearest Lutron Vive hub and configured to operate on an astronomical schedule.

265100.4 Stairwells:

A. Fixtures shall be accessible from a landing and shall not be mounted more than 8' AFF.
B. Shall use occupancy sensors to reduce light levels in the stairwells to no less than 10 fc.
C. Part Numbers:
    1. 4' High Power 40W fixure: Lutron FXSWLX4H
    2. 4' Low Power 20W fixture: Lutron FXSWLX4L
    3. Occupancy sensor: Lutron LRF2-OWLB-P-WH

265100.5 Parking Garages:

265100.6 Lutron Vive Hub configuration as of firmware version 1.13.10

A. Vive Hub name should be the default (Vive-000x0x00) plus the 2-digit building code and the room number that the hub is closest to, ex: Vive-017d7e45 RT 708
B. Set wifi password to Lutron@123

C. Set Vive Hub sign-in password to 38324038 and enable ethernet to DHCP
D. Update Vive Hub to the latest firmware
E. Add rooms by number, set room type, add and label load controllers, sensors, Picos
F. Set Low end trim as low as possible
G. Set occupancy sensors to Occupancy and set the main lights to 30%
H. To set preset on 3-button wireless dimmer, turn off the row of lights directly in from of the screen as well as the whiteboard light (if present) and set the main lighting in the room to 30%
I. Extron A/V Integration:
    1. Set the following scenes: All ON, Presentation, and All OFF for each room separately on the Hub. The Presentation scene shall turn off the row of lights directly in front of the screen as well as the whiteboard light (if present) and set the main lighting in the room to 30%
    2. Add an API integration for touch panels for each room separately -> choose login with a username/password -> set username as the 2-digit building code then room number without spaces -> set password to Lutron@123
    3. When each Vive Hub has been configured, the API Resource Report shall be downloaded from each of the Vive Hubs and turned over to the System Integrator.
    4. Lutron Vive uses a web-based API to integrate with Extron touch panels. System integration contractor will use the API Resource Report to program the Extron TouchLink Pro touchpanel.

26 52 00 EMERGENCY LIGHTING

265200.1 General Guidelines:
A. All emergency luminaires shall be installed to allow use as normal lighting.
B. A UL 924 relay with capabilities of opening the 0-10V dimming circuit at the fixture to bring the fixture to full brightness shall be used. Locate the relay in the ceiling near the associated fixture.
C. Luminaries shall be supplied by life safety generator power. Battery powered emergency lighting or emergency signage is prohibited.
D. Part Numbers:
    1. Emergency PowPak 0-10v dimmer: Lutron RMJS-8T-DV-B-EM
    2. Emergency PowPak 16A switch: Lutron RMJS-16R-DV-B-EM
    3. Emergency PowPak 0-10v fixture dimmer: Lutron FCJS-010-EM

26 60 00 SPECIAL AREA DESIGN

2666000.1 Kitchenette:
A. Any area or location being designed to accept a small appliance typically found in a kitchen setting, such as microwaves, toasters, coffee makers, refrigerators, etc. shall be wired/circuited based on NEC's definition of a kitchen.
B. A minimum of (2) 20A, 120V GFCI protected circuits shall be provided above the countertop.

266000.2 Small Appliances:
A. Small appliances shall be hard wired and not battery operated.
B. This includes installations such as, but not limited to:
    1. Kitchen Appliances
    2. Hand-Dryers
    3. Towel Dispensers
    4. Automatic Restroom Devices such as faucets, flush valves, and soap dispensers.

266000.3 Wall Clocks:

A. All wall clocks for classrooms, hallways, and office areas shall be Wi-Fi enabled.
B. Provide clock capable of operating from four (4) Energizer ultimate lithium 'AA' batteries.
C. National Time & Signal # LR-12SS-WIFI-4B-SP preferred. Alternates must be approved by CSU Electricians and Facilities Maintenance.

266000.4 Automatic Door Systems: All panic hardware and/or crash bar systems associated with emergency egress systems shall be hard wired and not be battery operated. Such systems shall be tied to the emergency generator power.

END OF SECTION

DIVISION 27 – TELECOMMUNICATIONS

27 00 00 GENERAL REQUIREMENTS

270000.1 Information Services & Technology (IS&T) project requirements are located within Appendix Q "IS&T Construction and Cabling Requirements".

27 40 00 A/V SYSTEMS

274000.1 While difficult to specify "one size fits all" solutions for AV integration into various room types due to the unique nature of each room and ever evolving instructional technology, this section attempts to provide general expectations of the functionality of each room type. Due to this complex nature of integrated AV systems, it is therefore critical to involve the Center for Instructional Technology and Distance Learning (CITDL) early on in the design process starting from schematic design. Involvement with CITDL at the beginning phases will ensure the proper planning and coordination of the room layout and infrastructure necessary to create optimal technology enhanced learning environments.

274000.2 OUA and/or consulting A/E firms are to collaborate with CITDL starting from the schematic design phase for any project where audio/video equipment will be installed.

274000.3 All state building codes and American's with Disabilities Act (ADA) standards are to be adhered to when designing and specifying the equipment, location, and installation method.

27 41 13 ARCHITECTURALLY INTEGRATED A/V EQUIPMENT

274113.1 Reach Limits:

A. Where wall mounted controls are present, all mounting heights shall comply with ADA.
B. Where wall mounted or freestanding tech boxes are used, any equipment that the user is to interact with, including controls, inputs, media openings, cables, or drawers, shall comply with ADA reach limits.
C. Where Lecterns/Teaching Stations are present, height adjustable furniture is to be used to allow for ADA accessible use of the work surface. Additionally, any inputs or controls mounted to the work surface shall comply with ADA reach limits.

274113.2 Projector/Display Mounting:

A. Location:
    1. Coordinate location and height with CITDL and Users.
    2. Avoid placing near HVAC equipment that could cause vibrations, especially where longer mounting pipes are required. If this cannot be avoided, vibration-dampening hardware shall be utilized.
    3. For wall or ceiling mounted displays, comply with ADA requirements regarding protruding objects.
B. Method:
    1. Projectors:
        a. Mounts are to be of the type that allow for fine tuning the pitch, roll, yaw.
        b. Projectors are to be able to allow for lens shifting.
    2. Displays:
        a. Consult with CITDL for best mounting method on a case by case basis.
        b. Articulating mount is default. Static mount must be approved by CITDL.

274113.3 Lecture Capture/Demonstration Camera Mounting:

A. Location:
    1. Coordinate with CITDL and Users.
    2. Avoid placing near HVAC equipment that could cause vibrations.
    3. Ceiling mounted is preferred, however wall mounted is acceptable only when the camera would be completely out of reach to prevent it from being tampered with.
B. Method:
    1. Provide an enclosure with a dome when the camera is placed in a room that is generally unsecured or would be easily within arm's reach.
    2. Use ceiling recessed cameras when ceilings are 8'-6" or lower.
    3. Provide vibration dampening if required due to ceiling vibration.

274113.4 Screen Mounting and Type:

A. Fixed vs. Retractable: Retractable screens are to be used in locations where the screen will cover up a portion of the wall that would otherwise be usable for a whiteboard, mounting service, or other educational tool. For instance – for large lecture halls where the screen will be up higher on the wall and there is no need for it to be retracted, use a fixed screen with black border.
B. Manual vs. Electric:
    1. Electric screens are required, except as a last resort in those rooms that are intended primarily for discussion where projected images are rarely needed.
    2. All manual screens are to be of the type that slowly retracts for the last 10% of the screens in order to limit damage to the equipment.
C. Mounting locations for retractable screens:
    1. All screens, whether electric or manual, are to be ceiling recessed with no exposed mounting brackets or hardware.
    2. In cases where a ceiling recessed screen is not practical due to the height of the ceiling and a fixed screen also is impractical, a surface mounted electric screen is acceptable. Provide adequate in-wall blocking.
    3. Comply with ADA requirements regarding protruding objects.
D. Screen Surface: matte white with approximately a 1.0 gain.
E. Size:
    1. Aspect ratio to be 16"x10".
    2. Screen size to be scaled appropriately to the room. Screen drop to be no more than 3'-0" AFF. Coordinate screen size for each room with CITDL.

274113.5 Speaker Mounting:

A. Consult with CITDL for location and number for each room.
B. Extron FFT (70v) series speakers are preferred in classrooms, where applicable.
C. 8 ohm surface mount speakers are default.
D. Tapped at 80% headroom for series.

274113.6 Cabling:

A. For all video and control wiring, use plenum-rated (CMP) shielded cable when running through a plenum.
B. For HDMI cable lengths greater than 25', use shielded 24 AWG twisted pair minimum with transceivers.
C. All control and low voltage cabling must comply with AVIXA standards.

274113.7 Security: Provide SonicShock 5 alarm with remote alarm contacts for projectors and displays. Provide PC tabs on switchers and computers. Tie into CSU security back bone. SonicShock requires a 5.5k resistor built into the remote alarm circuit contact. Comprotec has made this modification to these units before and understands what the CSU spec is. The monitoring voltage needs to pass through a 5.5k end-of-line resistor. Alarm to be keyed #530.

27 41 16 INTEGRATED A/V SYSTEMS AND EQUIPMENT

274116.1 PTZ Cameras:

A. Must have minimum optical zoom of 20x for classrooms; greater in lecture halls.
B. Must be powered over ethernet (PoE) and support network control.
C. Resolution of 1080p or greater.
D. Camera outputs to be determined by project/room type; at a minimum, USB and HEMI output. Coordinate with CITDL.

274116.2 Projectors:

A. Must be ceiling mounted.
B. Resolution: Minimum 1920 x 1200
C. Input: HDMI and HDBT support
D. Lumens: Minimum 5000 ANSI
D. Contrast Ratio: Minimum 600:1
E. Zoom Range: Minimum 2:1
F. Lens Shift capabilities: Power preferred.
G. Must be professional grade and be able to receive RS232 controls.
H. Projector decibel level not to exceed 34dB in video conferencing rooms or distance learning rooms.
J. Laser (non-lamped) projectors are preferred.

274116.3 Displays: Must be professional grade and be able to receive RS232 controls. Minimum resolution: 1920 x 1080.

274116.4 Standard functionality to be included based on Room Type – consult CITDL for current standard equipment:

A. Basic A/V Classroom:
    1. Wall Rack.
    2. Basic connectivity for devices using:
        a. HDMI
        b. USB 3.0 input to room computer
        c. Wireless Presentation device compatible IS&T security network standards
    3. Switcher/Scaler.
    4. Ceiling mounted projector.
    5. Ceiling recessed electric screen (refer to section 27 41 31)
    6. Ceiling mounted speakers
    7. When required, rack mountable SFF (small form factor) desktop PC. Refer to IS&T standard equipment.
    8. Room A/V controls: Extron (PRO) Controller. GUI to follow CITDL design.
    9. Network drops: One each for the following:
        a. Controller
        b. Misc-4 data drops
        c. Built-in computer (if present)

B. Advanced A/V Classroom with Interactive Learning & Lecture Capture Functionality, including Lecture Halls:
    1. Motorized ADA-compliant height adjustable lectern and integrated equipment rack.
    2. Basic connectivity for devices using:
        a. At a minimum, USB-C Gen2 (10Gbps) connectivity and cabling (supporting 60w power delivery, 4k display, and data capability)
        b. HDMI
        c. USB 3.0 input to room computer
        d. Wireless Presentation device compatible IS&T and CITDL standards.
        e. 2 AC ports free for use
    3. Switcher/Scaler.
    4. Document Camera: Contact CITDL for output type.
    5. Ceiling mounted projector.
    6. Ceiling recessed electric screen (refer to section 27 41 31).
    7. Ceiling mounted speakers.
    8. Rack mountable SFF (small form factor) computer. Refer to IS&T standard equipment.
    9. Room A/V controls: Touch panel Extron Pro version.
    10. Room Lighting/Shades/Blinds: Auxiliary control via the Touch Panel.
    11. Network Drops: One each for the following:
        a. Integrated, networked PDU
        b. Controller
        c. Misc-4 data drops
        d. Built-in computer (if present)
    12. Integrated Networked PDU device compatible with IS&T and CITDL standards.
    13. Annotation-capable monitor device compatible with IS&T and CITDL standards on adjustable swing arm. Screen size: 22" minimum as appropriate to the space.
    14. USB Capture devices for camera feed and content feed from switcher.
    15. Voice Audio Reinforcement provided by:
        a. Gooseneck microphone
        b. Wireless wearable microphone for instructor
    16. PTZ camera (see 274116.1)
    17. 12" minimum Extron Touch Panel control with video preview. Consultant shall collaborate with CITDL in the design, layout, and functionality of the Pro controls and GUI to ensure standards and interface are consistent throughout campus.
    18. Refer to 374143.6 Lighting.
    19. Where longer use durations are expected, presence detection or other methods should be considered to ensure uninterrupted use of the room.

27 41 43 A/V CONFERENCING

274143.1 Design Considerations based on Room Type:

A. Seminar Rooms & Conference Rooms:
    1. Basic Connectivity via table/lectern mounted inputs: (1) USB-C Gen2 and (1) HDMI.
    2. Functionality:
        a. Provide solution for Zoom, Microsoft Teams, Cisco WebEx, or other standards-based video conferencing. Consult with CITDL.
        b. Camera: Must be co-located with display/projector screen that displays remote participants. Camera height installation to maintain ideal eye

contact and avoid harsh viewing angles. Video bars must be provided and installed with a display (VESA) type mount.

c. Microphones: Ceiling microphone array is preferred. Table top microphone design must be approved by CITDL.
d. Screen/Displays: Two displays is the industry standard. If space does not allow for two, then one monitor with a minimum size of 75" is required.

3. Controls: To eliminate the need for remote controls, provide wall mounted or table top controls for complete system/room control.
4. Lighting/Shades/Blinds: Auxiliary control via the Touch Panel.
5. When required, provide a SFF (small form factor) desktop PC. Refer to IS&T standard equipment.
6. Refer to 374143.6 Lighting.

B. Distance Learning Rooms:
1. Refer to CSU CITDL IVDL Room Design guidelines for further recommendations.
2. Acoustics: In order to limit outside sound transmission into the room and reduce reverberation within the room, the design consultant is required to bring in an acoustic engineer to design a solution for acoustic treatments for all distance learning rooms. Collaborate with CITDL.
3. Layout: Room should be laid out such that the distance from the students to the instructor and screens is minimized, and that all students are still within the field of view of the camera at the front of the room.
4. Functionality:
    a. Microphones:
        i. Ceiling mics should be used where needed.
        ii. Instructor to be an omni-directional mic.
    b. Screens/Display:
        i. Front of Room:
            A. Content:
                1. Two screens mirroring the content at the front of the room is required where poor viewing angles or sightlines would impede the student's experience with a single display.
                2. Where space is limited, content screens are to be the predominate feature and larger than the far site screen.
            B. Far Site: Centered on seating area.
        ii. Back of Room:
            A. Content
            B. Far Site
            C. Confidence monitor (if not provided elsewhere)
        iii. Refer to Section 27 41 13 for additional information regarding screen size, location, and type.
        iv. In situations where a display of adequate size can be used in place of a projector and screen, a display is preferred due to its lower sound dB operating levels and improved brightness.
        v. Confidence monitor (a monitor/screen/display allowing the instructor to see which source is being projected to the far site). Provide means for a confidence monitor by any of the following means: through the touch panel display, a separate screen on the

desk, a picture in picture on the back of room content monitor, or through a dedicated display in the back of the room.

c. Speakers: Stereo forward facing speakers at the front of the room are required (see surface mount speaker requirement). If using "Touch to Talk" ceiling mounted downward facing speakers are unacceptable due to the potential for audio feedback with the microphones on the student desks.
d. Controls:
    i. 12" Touch Panel Control with video preview.
    ii. Vendor shall collaborate with CITDL in the design, layout, and functionality of the Touchlink controls and GUI to ensure standards and interface are consistent throughout campus.
    iii. Extron Touchlink Pro (w/ link license) required where program dictates third party user interface (browser, iOS, and Android devices).
    iv. Lighting/Shades/Blinds": Control via the Touch Panel.
e. Basic Connectivity:
    i. HDMI
    ii. USB-C Gen2
    iii. USB 3.0 input to room computer
    iv. Wireless Content Sharing device
f. Rack mountable "SFF" computer. Refer to IS&T standard equipment.
g. Capture Device for camera feed and content feed.
h. Document Camera: Contact CITDL for required output type.
i. Interactive Screen size: 22" minimum, monitor mount.
j. Network drops: One each for the following:
    i. Controller
    ii. Built-in Computer
    iii. Touchlink Panel
    iv. DMP Audio Processors (1 per 8 microphones)
    v. Video/Audio encoder
    vi. Auxiliary
    vii. Wireless Content Sharing Device

274143.2 Furniture:

A. Work surface to be a lighter reflective color with a matte or semi-matte finish, but not glossy.
B. Instructor: Ample work surface area to accommodate the touch link panel, document camera, displays, keyboard, mouse, and instructional materials required. Consult with CITDL for the configuration and layout of the furniture and equipment. Include a height adjustable chair/stool for the height adjustable lectern.
C. Student: Tables are to include an integrated cable management raceway for concealment of microphone wiring. Provide one power port per student seat.
D. Cabling Pathways:
    1. Raised floor with accessible panels where possible for the front of room.
    2. Sufficient conduit diameter where raised floors are not used with pull string for future reconfiguration or expansion.

274143.3 Refer to Appendix R "IS&T/CITDL Room Paint Guide" for acceptable background paint colors.

274143.4 Where possible, minimize equipment, doors, cabinets, and visual clutter from camera field of view behind participants.

374143.5 Where windows are unavoidable, provide light blocking shades.

374143.6 Lighting:

A. Indirect lighting is preferred. Fixtures are to disperse the light and provide no glare from the lamp for the students, instructor, or cameras.
B. Pendant lights are unacceptable.
C. Acceptable Kelvin Temperature range: 4000 to 4100.
D. Facial lighting of 200 to 400 lux.
E. For adequate distribution of light, a greater quantity of smaller fixtures are preferred over fewer larger fixtures.
F. Indirect asymmetric fixtures are preferred for lighting participants but will limit light from spilling onto screens/displays or directly into the cameras.
G. To reduce natural light and glare:
    1. Provide blackout shades or diffusion blinds.
    2. Avoid reflective blinds, wall, and table surfaces.
    3. Dark table finishes and warmer wood grains are preferred.
    4. Avoid glass tables and walls and etched glass.
    5. 20-60% reflectance on tables and chairs.
    6. 40-60% reflectance on walls.
    7. Avoid small, intricate graphic patterns.
    8. Logos should have dull, non-reflective surfaces.

END OF SECTION

DIVISION 28 – ELECTRONIC SAFETY AND SECURITY

28 13 00 ACCESS CONTROL SYSTEMS

281300.1 Work Includes:

A. Access Control Panels
B. Card Readers
C. Door Monitoring and Control Equipment
D. Input/Output Devices
E. Enclosures
F. Power Supplies
G. Cabling

281300.2 Related Work Specified Elsewhere:

A. Technology General Provisions
B. Cabling Systems Administration
C. Technology Pathway Hardware
D. Structured Cabling System
E. Intrusion Detection System
F. IP Based CCTV System
G. Door Intercom System

281300.3 Description of Work:

A. The Access Control System shall consist of all Access Control Panels, Network Controllers, Door Controllers, Card Readers, Biometric Readers, Request to Exit devices, Door Contacts, and all other devices and cabling needed to form a complete access control system.
B. The Access Control System is an extension of the existing enterprise wide Access Control system in use at this facility and as such must be capable of integrating with all other existing systems.
C. Technology, Electrical, Architectural, HVAC, Structural, Civil and all other Drawings as well as the Specifications for all the Divisions shall be defined as the Contract Documents. Contractor shall review the entire set of Contact Documents prior to bidding.
D. Drawings and Specifications are to be considered as supplementing each other. Work specified but not shown, or shown but not specified, shall be performed or furnished as though mentioned in both the Specifications and the Drawings.
E. Visit the site of the work and become familiar with the conditions affecting the installation. Submission of a proposal shall presuppose knowledge of the conditions and no additional compensation shall be allowed where extra labor or materials are required because of ignorance of these conditions.
F. Proposal shall include and special phasing requirements related to the construction work as described in the Division 1 Specifications.
G. Extra costs which might result from deviations from the Drawings, so as to avoid interferences, shall be considered a “Job Condition”, and no additional compensation shall be considered applicable. In the event that such interferences occur in course of the Work, due to an error, omission, or oversight by the Contractor, no additional compensation shall be allowed.
H. Interferences that may occur during the course of construction shall be brought to the immediate attention of the Architect and Engineer, and the Architect and Engineer’s decision, confirmed in writing, shall be final.

281300.4 Submittals:

A. Drawings: Shop drawings to provide details of proposed system and the work to be provided. These include scaled plan drawings of device locations, cable routing and quantities, point-to-point drawings of systems and wiring and mounting diagrams of individual devices.
B. Specification Sheets: Submit equipment specification sheets for all materials specified.
C. Submit quantity breakdown of all proposed equipment.

281300.5 Contractor Qualifications:

A. The Contractor shall be fully qualified to perform installations as described on the Contract Drawings and within these Specifications.
B. The Contractor shall have been active in bidding, being awarded, and performing work consistent with that which is indicated on the Contract Documents for a period of not less than five (5) years.

281300.6 Work Includes:

A. The Security Contractor is responsible for all work scope defined in the Security Contract Documents, unless otherwise indicated. Coordinate required systems rough-in work and equipment power requirements with the Electrical Contractor.
B. The Contractor shall review the Electrical and Technology Contract Documents to fully understand the scope of work requires. Any questions shall be submitted to the Engineer in writing prior to the bid submission. After this time, the Owner, Engineer and Architect shall not be liable for additional Work required due to the misunderstanding or misinterpretation of these requirements.
C. Include all labor, material, equipment, services and permits necessary for the proper completion of all work shown. Items omitted, but necessary, to make the Technology Systems complete and workable shall be understood to form part of the work.
D. Material for work required by the Contract Drawings and Specifications such as earthwork, concrete, masonry, and reinforcing steel patching and painting shall be provided as specified in other applicable Divisions covering such work.
E. It is the purpose of the Drawings to indicate the approximate location of all equipment and devices. Ascertain exact locations, and arrange work accordingly. The right is reserved by the Engineer to effect reasonable changes in the location of devices up to the time of roughing-in, without additional cost to the Owner. Changes in location of devices, or equipment necessitated by interference with the work of other trades shall be made only with the consent of the Architect's or Owner's Representative, and at no additional cost. Changes in location of devices resulting from the Contractor's failure to comply with the Drawing or Specification requirements shall be made at no additional cost to the Owner.

281300.7 Codes and Standards: The installation shall comply with all applicable code requirements. Code requirements and their amendments will include, but are not limited to:

A. NEC, Article 800 Communication Circuits.
B. ANSI/EEE 241, Recommended Practice for Electric Power Systems in Commercial Buildings.
C. ANSI/NEMA 250, Enclosures for Electrical Equipment.
D. Safety Rules, U.S. Department of Health and Human Services.
E. CSU Environmental Health and Safety Rules.

281300.8 Guarantee and Warranties:

A. Warrant that all equipment and work is installed in accordance with good engineering and installation practices. Furthermore, warrant that all equipment will meet the requirements specified, as well as other criteria which may not be explicitly documented in these Specification, but which are accepted as industry standards, as published by ANSI, EIA/TIA, IEEE and BICSI.
B. Any device or equipment failing to perform or function as specified shall be replaced with complying equipment without cost to the Owner.
C. Guarantee against defects in workmanship and materials: repair or replace any defective work, material or equipment within two (2) years from date of formal written acceptance by the Owner. An additional product warranty provided by individual equipment manufacturers shall supersede this two year workmanship and materials guarantee for installation of the appropriate equipment, as described in the individual section.
D. The Contractor, within ten (10) business days of project completion shall fully complete and submit all documentation to the manufacturer as required to implement the extended warranty period. Coordinate guarantee and warranty requirements with the Division 1 Specifications.

281300.9 System or Service Shutdowns:

A. The existing electrical, network, telephone, CCTV and other technology systems, related to this work shall be maintained throughout the construction period. Any system or service shutdowns that may be required shall be scheduled through the Owner, and shall be done at a time as directed by the Owner. No additional compensation shall be allowed for these shutdown periods even though premium time work may be required. Provide temporary services to equipment or systems that cannot be shutdown, as determined by Owner.
B. Provide a minimum of one week's notice to the Owner before any system or service shutdown is scheduled

281300.10 Equivalent Products: Only products listed as approved shall be utilized. Substitutions, under normal circumstances, shall not be allowed. However, in unusual cases, substitutions may be unavoidable. All requests for product substitutions must be approved by the Engineer prior to the bid submission. Loss of certification by the Contractor, or unavailability of product to the Contactor that is not of a market wide nature, shall not be construed as an unavoidable circumstance. The request for product substitution and supporting documentation must be submitted, in writing, along with any samples requested by the Engineer. Written approval for product substitution must be submitted with the bid.

281300.11 Products:

A. Cabinet: Altronix Trove Cabinet Trove2KA2
B. Altronix Power Supplies: eFlow6N8D
C. Altronix EAC board: ACM8S
D. Renovation Work Only:
    1. Networked Door Controller: Keyscan CA 8500
    2. Keyscan Power Supplies: (2) 12v 7AH F1 Battery and (2) 16vAC 40VA, PTC Transformers. Note that transformers require (2) duplex receptacles.
    3. Keyscan Card:
        a. Keyscan CIM card when connecting comms to existing Keyscan 8500
        b. Keyscan Netcom card when connecting standalone panel to CSU Network
    4. Lock Power Supply: Alarm-Saf Beacon BN6-004-APD8F-UL @ 12 or 24v DC
E. Readers:

1. HID 920PTNNEK00000 MultiCLASS wall mount
2. HID 910PTNNEK00000 MultiCLASS mullion mount

F. Request to Exit Device: PIR motion sensor, Honeywell 320
G. Mag Lock Override Keyswitch: Best1W7J1 on 1 gang SS plate
H. Door contacts: Sentrol 1078 (seven models dependent on door style)
I. Magnetic Locks: Securitron M68 or M38
J. Electric Strikes: HES 1006, 4500, 9600, or 9400 (dependent on door hardware)
K. Cable:
   1. Composite Access Control Cable, West Penn LS251822, consisting of:
      a. 1 West Penn 253270B, 6 cond. 22 AWG stranded shielded card reader cable.
      b. 1 West Penn 25241B, 4 cond. 22 AWG stranded, unshielded request-to-exit cable.
      c. 1 West Penn 25221B, 2 cond. 22 AWG stranded, unshielded door contact cable.
      d. 1 West Penn 25244B, 4 cond. 18 AWG stranded, unshielded lock cable.
   2. Elevator I/O control cable: West Penn 25753B, 4 pair 18 AWG unshielded cable.
   3. Card Reader Cable: West Penn 253270B, 6 cond. 22 AWG stranded shielded cable.
   4. Horn/Strobe cable: West Penn 25224B, 2 cond. 18 AWG stranded unshielded cable.
   5. RS485 Data Cable: West Penn D25510B, 2 pair, 22 AWG stranded shielded cable.
   6. Network Cable: General GenSPEED 6500.

281300.12 Electronic Keyboxes:

A. Shall be KeySystems Inc. Single Asset Management (SAM).
B. SAM 32 is the smallest unit approved for installation.
C. Unit size, cores and ring docking keys, including panel door and interior panel, shall be coordinated with the CSU Lock Shop.
D. Unit location shall be determined by AC&SS.
E. Contractor shall install two conduits exiting the bottom or near bottom of the enclosure. One conduit is for CSU Network drop. One conduit is for CSU 120vAC power drop. Conduit entry points are not to interfere with SAM battery, battery housing, circuit boards, or with operation of electronic cores.
   1. When SAM is located under a drop ceiling, the two metallic conduits will extend to a length above the ceiling tile and have a 4x4 junction box at that end above the ceiling and secured to the wall. Location of junction box will allow for easy removal and replacement of the tile.
   2. When SAM is not location under a drop ceiling, two conduits will extend from the enclosure to 4x4 junction boxes at a location coordinated with CSU Electrical and CSU Network.
F. The AC power drop will follow current electrical specifications. A three conductor “pigtail” will be left in the junction box by the installation contractor for CSU Electricians to splice in CSU power. In the SAM enclosure, the three conductors will terminate in a 2x4 junction box in a workmanlike manner and be spliced to the AC power cable of the SAM power supply.
G. The network drop will be coordinated with CSU IS&T Enterprise Network. IS&T will extend a Cat 6e cable through the junction box above the ceiling and terminate in the enclosure into a IS&T approved biscuit. SAM installation contractor will provide the Cat 6e patch cable between SAM network card and IS&T biscuit.

281300.13 Installation:

A. Install all equipment and materials in accordance with current recommendations of the manufacturer. The work shall also be in accordance with
   1. Installation criteria defined in these specifications and in the construction documents.

2. Factory Representative's requirements.
3. Approved submittals.
4. Applicable requirements of referenced standards.

B. No head-end security hardware is to be installed until location is determined by a representative the Access Control and Security Systems (AC&SS) department.
C. All Access Control Panels and Power Supplies shall be installed in technology rooms.
D. All Access Control Panels and Power Supply enclosure shall be equipped with tamper switches to alert security personnel to unauthorized access.
E. All Access Control Panels and Power Supplies shall be connected to generator backed up, emergency power circuits dedicated solely to security systems equipment.
F. All Access Control Panels and Power Supplies shall be equipped with battery backup for four hours of normal operation.
G. All enclosures for access control equipment shall be keyed alike to E005.
H. Door power supplies shall be monitored by the access control system controller for battery management.
I. Door supply panels must be on the same AC circuit as the controllers so that if the AC circuit loses power, the controller will send an alert.
J. An interface shall be provided to the Fire Alarm system to release all magnetically held open doors in the event of a Lock-down or active shooter condition.
K. An interface shall be provided from the Fire Alarm system to release all magnetic locks in the event of a fire alarm.
L. An interface to the elevator controls shall be provided which will read on occupant's card and accept dry contact closure inputs to determine the floor selected. The access control system will then determine whether the occupant can access the selected floor and send a dry contact closure to the elevator controller to allow the floor selection.
M. Proximity readers shall be included with the Aiphone video door intercom stations. These readers shall be connected to the access control system.
N. Provide input points to accept dry contact outputs from the Aiphone AX door Intercom system for door release and alarm shunt functions.
O. Door function programming shall conform to drawing notes and instruction from the representative of the Access Control and Security Systems Department (AC&SS).
P. Door power supplies to be monitored for AC fail, battery trouble, and cabinet tamper through Keyscan panel inputs.
Q. Request-to-exit key switches shall be equipped with cores that conform to the building's master key plan. Interchangeable cores shall be used.
R. Where card readers are used on the secure side of a door, their function shall be to activate a contact closure that is sent to the intrusion detection panel which disables all alarms for the associated area. Prior to departing the area, the last person out shall present their key card to activate the intrusion detection alarms for the area after a pre-programmed egress delay period. Key pads shall be used by CSU AC&SS personnel for maintenance and programming only.
S. The Intrusion system contacts shall never be wired into the Access system ACU and the Access contacts shall never be wired into the Intrusion/ Burg system control panel.

281300.14 Programming:

A. Programming system configuration parameters (hardware and software, zone/circuit numbers, communication parameters).
B. Programming operational parameters such as opening/closing reports and windows, system response text (custom English) displays of events, activation of relays that drive auxiliary devices, and identifying types of zones/loops.

C. Programming User Ids and Passwords according to the authorities and functions defined by the Owner.
D. Programming of system graphics is the responsibility of the Contractor.
E. Other system programming tasks required by the Owner. These additional programming requirements shall be coordinated between the Owner and the Contractor.

281300.15 Testing:

A. The Contractor shall test each and every access control device for proper operation. The Contractor will also test each and every door for proper function and interoperability of associated components. A test report shall be prepared and submitted prior to system commissioning listing each component and system, the tests performed, and any discrepancies. Any device or system found to be unacceptable shall be corrected or replaced until every device and system is functioning properly. Details of the resolution of any discrepancy shall be provided as part of the test results.
B. Hard-copy System Printout: The contractor shall submit a hard-copy system printout of all components tested and certify 100 percent operation indicating all devices/panel/units have passed the test criteria set forth by the manufacturer.

281300.16 Training: The Contractor shall provide a minimum of (2) 4 hour in-service training session with this system. These sessions shall be broken into segments that will facilitate the training of individuals in the operation of this system. Operation manuals and user guides shall be provided at this time. Contractor to record training sessions and provide (2) copies on DVD to owner.

281300.17 Commissioning: The Contractor shall certify completion in writing and schedule the commissioning walk-through. The Contractor shall provide all the tools and personnel needed to conduct an efficient commissioning process.

28 16 00 INTRUSION DETECTION SYSTEM

281600.1 Work Includes:

A. Intrusion Detection Panels Motion Sensors
B. Keypads
C. Miscellaneous Input Devices
D. Strobes and Horn/Strobes
E. Power Supplies
F. Enclosures
G. Cabling

281600.2 Related Work Specified Elsewhere:

A. Technology General Provisions
B. Cabling Systems Administration
C. Technology Pathway Hardware
D. Structured Cabling System
E. Access Control System
F. IP Based CCTV System
G. Door Intercom System
H. AV Systems

281600.3 Description of Work:

A. The Intrusion Detection System shall consist of all Alarm Panels, Network Controllers, Motion Sensors, Miscellaneous monitored inputs, Property theft alarm devices, Safe monitoring points, duress buttons, alarm signaling devices, enclosures, power supplies and cabling to make a complete system. The contractor shall provide and install any and all required devices to form a complete system, whether or not they are specifically mentioned in these specifications or shown on the drawings.
B. The Intrusion Detection System is an extension of the existing enterprise wide Intrusion Detection system in use at this facility and as such must be capable of integrating with all other existing systems.
C. Technology, Electrical, Architectural, HVAC Structural, Civil and all other Drawings as well as the Specifications for all the Divisions shall be defined as the Contract Documents. Contractor shall review entire set of Contract Documents prior to bidding.
D. Drawings and Specifications are to be considered as supplementing each other. Work specified but not shown, or shown, but not specified, shall be performed or furnished as though mentioned in both the Specifications and the Drawings.
E. Visit the site of the work and become familiar with the conditions affecting the installation. Submission of a proposal shall presuppose knowledge of such conditions and no additional compensation shall be allowed where extra labor or materials are required because of ignorance of these conditions.
F. Proposal shall include any special phasing requirements related to the construction work as described in the Division 1 Specifications.
G. Extra costs which might result from deviations from the Drawings, so as to avoid interferences, shall be considered a “Job Condition”, and no additional compensation shall be considered applicable. In the event that such interferences occur in course of the Work, due to an error, omission, or oversight by the Contractor, no additional compensation shall be allowed.
H. Interferences that may occur during course of construction shall be brought to the immediate attention of the Architect and Engineer, and the Architect and Engineer’s decision, confirmed in writing, shall be final.

281600.4 Submittals:

A. Drawings: Shop drawings to provide details of proposed system and the work to be provided. These include scaled plan drawings of device locations, cable routing and quantities, point-to-point drawings of systems and wiring and mounting diagrams of individual devices.
B. Specification Sheets: Submit equipment specification sheets for all materials specified.
C. Submit quantity breakdown of all proposed equipment.

281600.5 Contractor Qualifications:

A. The Contractor shall be fully qualified to perform installations as described on the Contract Drawings and within these Specifications.
B. The Contractor shall have been active in bidding, being awarded, and performing work consistent with that which is indicated on the Contract Documents for a period not less than five (5) years.

281600.6 Work Includes:

A. The Security Contractor is responsible for all work scope defined in the Security Contract Documents, unless otherwise indicated. Coordinate required systems rough-in work and equipment power requirements with the Electrical Contractor.

B. The Contractor shall review the Electrical and Technology Contract Documents to fully understand the scope of work requires. Any questions shall be submitted to the Engineer in writing prior to the bid submission. After this time, the Owner, Engineer and Architect shall not be liable for additional Work required due to the misunderstanding or misinterpretation of these requirements.
C. Include all labor, material, equipment, services and permits necessary for the proper completion of all work shown. Items omitted, but necessary, to make the Technology Systems complete and workable shall be understood to form part of the work.
D. Material for work required by the Contract Drawings and Specifications such as earthwork, concrete, masonry, and reinforcing steel patching and painting shall be provided as specified in other applicable Divisions covering such work.
E. It is the purpose of the Drawings to indicate the approximate location of all equipment and devices. Ascertain exact locations, and arrange work accordingly. The right is reserved by the Engineer to effect reasonable changes in the location of devices up to the time of roughing-in, without additional cost to the Owner. Changes in location of devices, or equipment necessitated by interference with the work of other trades shall be made only with the consent of the Architect's or Owner's Representative, and at no additional cost. Changes in location of devices resulting from the Contractor's failure to comply with the Drawing or Specification requirements shall be made at no additional cost to the Owner.

281600.7 Codes and Standards: The installation shall comply with all applicable code requirements. Code requirements and their amendments will include, but are not limited to:
A. NEC, Article 800 Communication Circuits.
B. ANSI/EEE 241, Recommended Practice for Electric Power Systems in Commercial Buildings.
C. ANSI/NEMA 250, Enclosures for Electrical Equipment.
D. Safety Rules, U.S. Department of Health and Human Services.
E. CSU Environmental Health and Safety Rules

281600.8 Guarantee and Warranties
A. Warrant that all equipment and work is installed in accordance with good engineering and installation practices. Furthermore, warrant that all equipment will meet the requirements specified, as well as other criteria which may not be explicitly documented in these Specification, but which are accepted as industry standards, as published by ANSI, EIA/TIA, IEEE and BICSI.
B. Any device or equipment failing to perform or function as specified shall be replaced with complying equipment without cost to the Owner.
C. Guarantee against defects in workmanship and materials: repair or replace any defective work, material or equipment within two (2) years from date of formal written acceptance by the Owner. An additional product warranty provided by individual equipment manufacturers shall supersede this two year workmanship and materials guarantee for installation of the appropriate equipment, as described in the individual section.
D. The Contractor, within ten (10) business days of project completion shall fully complete and submit all documentation to the manufacturer as required to implement the extended warranty period. Coordinate guarantee and warranty requirements with the Division 1 Specifications.

281600.9 System or Service Shutdowns:
A. The existing electrical, network, telephone, CATV and other technology systems, related to this work shall be maintained throughout the construction period. Any system or service shutdowns that may be required shall be scheduled through the Owner, and shall be done

at a time as directed by the Owner. No additional compensation shall be allowed for these shutdown periods even though premium time work may be required. Provide temporary services to equipment or systems that cannot be shutdown, as determined by Owner.

B. Provide a minimum of one week's notice to the Owner before any system or service shutdown is scheduled

281600.10 Equivalent Products: Only products listed as approved shall be utilized. Substitutions, under normal circumstances, shall not be allowed. However, in unusual cases, substitutions may be unavoidable. All requests for product substitutions must be approved by the Engineer prior to the bid submission. Loss of certification by the Contractor, or unavailability of product to the Contactor that is not of a market wide nature, shall not be construed as an unavoidable circumstance. The request for product substitution and supporting documentation must be submitted, in writing, along with any samples requested by the Engineer. Written approval for product substitution must be submitted with the bid.

281600.11 Products:

A. Renovation Work Only:
   1. Alarm Panel: DSC Security Maxsys PC4020 Control Panel, if needed.
   2. Input Expander: DSC Security PC4116 Zone Expander, when utilizing existing Maxsys system.
   3. Relay Output Module: DSC Security PC4204 Relay Output Module.
   4. Keypad: DSC Security LCD4501T LCD keypad.
B. Alarm Panel: DSC PowerSeries NEO HS2032 Control Panel.
C. Input Expander: DSC PowerSeries NEO HSM2018 Zone Expander.
D. Relay Output Module: DSC PowerSeries NEO HSM2208 Relay Output Module.
E. Keypad: DSC PowerSeries NEO HS2LCDP LCD Keypad.
F. Motion Sensor: DSC Security BV-502 360 PIR Motion Sensor
G. Horn/Strobe: Federal Signal 50GC-024BG horn with UTM Tone Module, FG Grille, and FBL Flush Back Box, Federal Signal VALS-024B Blue Strobe.
H. Strobe: Federal Signal VALS-024B Blue Strobe mounted on 2 gang SS plate.
I. Holdup Button: United Security Products HUB2-USP
J. Duress Button: Dortronics 5211 Call Button. Provide clear plastic security cover to prevent accidental activation.
K. Flat-Screen Theft Alarm: Pc-Tab Security Sensor with PCT-T56 Terminator.
L. Projector Theft Alarm: Sonic Shock Plasma with optional Remote Output Module.
M. Power Supplies: All aux power supplies for intrusion panels to be DSC.
N. Cable:
   1. Motion Sensor: West Penn 25241B, 4 cond. 22 AWG stranded unshielded cable.
   2. Alarm Contacts: West Penn 25221B, 2 cond. 22 AWG stranded unshielded cable.
   3. Horn/Strobe Cable: West Penn 25224B, 2 cond. 18 AWG stranded unshielded cable.
   4. RS485 Data Cable: West Penn D25510B, 2 pair, 22 AWG stranded shielded cable.
   5. Network Cable: general GenSPEED 6500.

281600.12 Installation:

A. Install all equipment and materials in accordance with current recommendations of the manufacturer. The work shall also be in accordance with:
   1. Installation criteria defined in these specifications and in the construction documents.
   2. Factory Representative's requirements.
   3. Approved submittals.
   4. Applicable requirements of referenced standards.

B. No head-end security hardware is to be installed until location is determined by AC&SS.
C. All Alarm Panels and Power Supplies shall be installed in technology rooms.
D. All Alarm Panels and Power Supply enclosure shall be equipped with tamper switches to alert security personnel to unauthorized access.
E. All Alarm Panels and Power Supplies shall be connected to generator backed up, emergency power circuits dedicated solely to security systems equipment.
F. All Alarm Panels and Power Supplies shall be equipped with battery backup for four hours of normal operation.
G. Provide an alarm input to each Flat-Screen display as shown on the drawings. Cabling shall terminate at the AV connection panel adjacent to the device. A 2-conductor modular telephone cable shall connect the PC-tab sensor mounted on the device to the 2C6P jack on the AV plate.
H. Provide an alarm input to each projector as shown on the AV drawings. Cabling shall terminate at the AV connection panel adjacent to the device. A permanently mounted remote output module shall connect the Sonic Shock device to the alarm cabling. A 2-conductor modular telephone cable shall connect the Sonic Shock Plasma mounted on the projector to the 2C6P jack on the AV plate.
I. Provide a Key Systems SAM 64 slot Key Cabinet. Install at location as shown on drawings. Key cabinet requires 120 VAC power and an Ethernet connection to the CSU network.
J. Duress buttons shall be installed as shown on the drawings. Cabling shall home run to the DSC alarm panel. Activating a duress button shall activate a wall mounted strobe outside the room. Activation of a duress button shall also activate a horn/strobe at the receptionist or nurses' station adjacent to the button location. The universal tone module in the horn shall be adjusted to provide a tone which is acceptable to the occupants of the area. The volume of the horn shall be adjusted to 10 dB SPL, A-weighted, above ambient noise level at the monitoring workstation.
K. The Intrusion system contacts shall never be wired into the Access system ACU and the Access contacts shall never be wired into the Intrusion/ Burg system control panel.

281600.13 Programming:

A. Programming system configuration parameters (hardware and software, zone/circuit numbers, communication parameters).
B. Programming operational parameters such as opening/closing reports and windows, system response text (custom English) displays of events, activation of relays that drive auxiliary devices, and identifying types of zones/loops.
C. Programming of Intrusion Zone Labels and Point ID labels in both the local Intrusion system and the head end DSC database, and the Monitoring program, Continuum, is the responsibility of the Contractor.
D. Other system programming tasks required by the Owner. These additional programming requirements shall be coordinated between the Owner and the Contractor.

281600.14 Testing:

A. The Contractor shall test each and every access control device for proper operation. The Contractor will also test each and every door for proper function and interoperability of associated components. A test report shall be prepared and submitted prior to system commissioning listing each component and system, the tests performed, and any discrepancies. Any device or system found to be unacceptable shall be corrected or replaced until every device and system is functioning properly. Details of the resolution of any discrepancy shall be provided as part of the test results.

B. Hard-copy System Printout: The contractor shall submit a hard-copy system printout of all components tested and certify 100 percent operation indicating all devices/panel/units have passed the test criteria set forth by the manufacturer.

281600.15 Training: The Contractor shall provide a minimum of (2) 8 hour in-service training session with this system. These sessions shall be broken into segments that will facilitate the training of individuals in the operation of this system. Operation manuals and user guides shall be provided at this time. Contractor to record training sessions and provide (3) copies on DVD to owner prior to completion.

281600.16 Commissioning: The Contractor shall certify completion in writing and schedule the commissioning walk-through. The Contractor shall provide all the tools and personnel needed to conduct an efficient commissioning process.

28 23 00 IP BASED CCTV SYSTEMS

282300.1 Work Includes:

A. Video Management System VMS software
B. Cameras Indoor
C. Cameras Outdoor
D. Camera Outdoor PTZ
E. Camera Mount
F. Camera Mount
G. Cabling
H. Service Loop

282300.2 Related Work Specified Elsewhere:

A. Technology General Provisions
B. Cabling Systems Administration
C. Technology Pathway Hardware
D. Structured Cabling System
E. Access Control System
F. Intrusion Detection System
G. Door intercom system

282300.3 Description of Work:

A. The IP Based CCTV System consists of all cameras, mounts, cabling, patch panels, network storage devices, software, power supplies, and any other equipment to form a complete system, the Contractor shall provide and install any and all required devices to form a complete system, whether or not they are specifically mentioned in these specifications or shown on the contract drawings.
B. The IP Based CCTV system is an extension of the existing university-wide CCTV System in use at these facilities and as such must be capable of integrating with the existing system.
C. Technology. Electrical, Architectural, HVAC, Structural, Civil and all other drawings as well as the specifications for all the divisions shall be defined as the contract documents, Contractor shall review entire set of contract documents prior to bidding.
D. Drawings and specifications are to be considered as supplementing each other. Work specified but not shown, or shown but not specified, shall be performed or furnished as though mentioned in both the specifications and the drawings.
E. Visit the site of the work and become familiar with the conditions affecting the installation.

Submission of a proposal shall presuppose knowledge of such conditions and no additional compensation shall be allowed where extra labor or materials are required because of ignorance of these conditions. Proposal shall include any special phasing requirements related to the construction work as described in the Division 1 Specifications.

F. Extra costs which might result from deviations from the drawings, so as to avoid interferences, shall be considered a "job condition" and no additional compensation shall be considered applicable. In the event that such interferences occur in course of the work, due to an error, omission, or oversight by the Contractor, no additional compensation shall be allowed.
G. Interferences that may occur during the course of construction shall be brought to the immediate attention of the architect and engineer. And the architect and engineer's decision, confirmed in writing, shall be final.

282300.4 Submittals:

A. Drawings: Shop drawings to provide details of proposed system and the work to be provided. These include scaled plan drawings of device locations, cable routing and quantities, point-to-point drawings of systems and wiring and mounting diagrams of individual devices.
B. Specification Sheets: Submit equipment specification sheets for all materials specified.
C. Submit quantity breakdown of all proposed equipment.

282300.5 Contractor Qualifications:

A. The Contractor shall be fully qualified to perform installations as described on the Contract Drawings and within these Specifications.
B. The Contractor shall have previous experience with the bidding process, performing installations and system integration of IP-based camera systems for a period **not less than five (5) years.**

282300.6 Work Includes:

A. The Security Contractor is responsible for all work scope defined in the Security Contract Documents, unless otherwise indicated. Coordinate required systems rough-in work and equipment power requirements with the Electrical Contractor.
B. The Contractor shall review the Electrical and Technology Contract Documents to fully understand the scope of work requires. Any questions shall be submitted to the Engineer in writing prior to the bid submission. After this time, the Owner, Engineer and Architect shall not be liable for additional Work required due to the misunderstanding or misinterpretation of these requirements.
C. Include all labor, material, equipment, services and permits necessary for the proper completion of all work shown. Items omitted, but necessary, to make the Technology Systems complete and workable shall be understood to form part of the work.
D. Material for work required by the Contract Drawings and Specifications such as earthwork, concrete, masonry, and reinforcing steel patching and painting shall be provided as specified in other applicable Divisions covering such work.
E. It is the purpose of the Drawings to indicate the approximate location of all equipment and devices. Ascertain exact locations, and arrange work accordingly. The right is reserved by the Engineer to effect reasonable changes in the location of devices up to the time of roughing-in, without additional cost to the Owner. Changes in location of devices, or equipment necessitated by interference with the work of other trades shall be made only with the consent of the Architect’s or Owner’s Representative, and at no additional cost. Changes in location of devices resulting from the Contractor’s failure to comply with the Drawing or Specification requirements shall be made at no additional cost to the Owner.

282300.7 Codes and Standards: The installation shall comply with all applicable code requirements. Code requirements and their amendments will include, but are not limited to:

A. NEC, Article 800 Communication Circuits.
B. ANSI/EEE 241, Recommended Practice for Electric Power Systems in Commercial Buildings.
C. ANSI/NEMA 250, Enclosures for Electrical Equipment.
D. Safety Rules, U.S. Department of Health and Human Services.
E. CSU Environmental Health and Safety Rules

282300.8 Guarantee and Warranties:

A. Warrant that all equipment and work is installed in accordance with good engineering and installation practices. Furthermore, warrant that all equipment will meet the requirements specified, as well as other criteria which may not be explicitly documented in these Specification, but which are accepted as industry standards, as published by ANSI, EIA/TIA, IEEE and BICSI.
B. Any device or equipment failing to perform or function as specified shall be replaced with complying equipment without cost to the Owner.
C. Guarantee against defects in workmanship and materials: repair or replace any defective work, material or equipment within two (2) years from date of formal written acceptance by the Owner. AXIS and Hanwha Cameras, carry a five (5) year warranty. An additional product warranty provided by individual equipment manufacturers shall supersede this two year workmanship and materials guarantee for installation of the appropriate equipment, as described in the individual section.
D. The Contractor, within ten (10) business days of project completion shall fully complete and submit all documentation to the manufacturer as required to implement the extended warranty period. Coordinate guarantee and warranty requirements with the Division 1 Specifications.

282300.9 System or Service Shutdowns:

A. The existing electrical, network, telephone, CCTV and other technology systems, related to this work shall be maintained throughout the construction period. Any system or service shutdowns that may be required shall be scheduled through the Owner, and shall be done at a time as directed by the Owner. No additional compensation shall be allowed for these shutdown periods even though premium time work may be required. Provide temporary services to equipment or systems that cannot be shutdown, as determined by Owner.
B. Provide a minimum of one week's notice to the Owner before any system or service shutdown is scheduled.

282300.10 Equivalent Products: Only products listed as approved shall be utilized. Substitutions, under normal circumstances, shall not be allowed. However, in unusual cases, substitutions may be unavoidable. All requests for product substitutions must be approved by the Engineer prior to the bid submission. Loss of certification by the Contractor, or unavailability of product to the Contactor that is not of a market wide nature, shall not be construed as an unavoidable circumstance. The request for product substitution and supporting documentation must be submitted, in writing, along with any samples requested by the Engineer. Written approval for product substitution must be submitted with the bid.

282300.11 Products:

A. Video Management Software: GENETEC SECURITY CENTER
B. Indoor ceiling/wall mount H.264 Camera: Axis or Hanwha Dome, 4 megapixel

C. Outdoor wall mount H.264 camera: Axis or Hanwha, 5 megapixel, unless otherwise designated by CSU to ensure proper surveillance requirements are achieved.
D. Outdoor PTZ camera: Axis or Hanwha outdoor camera, unless otherwise designated by CSU to ensure proper surveillance requirements are achieved.
E. Outdoor PTZ corner mount: Factory manufactured mount arms and enclosures designed for camera type, exact model to be decided prior to installation by CSU.
F. Outdoor PTZ parapet mount: Factory manufactured mount arms and enclosures designed for camera type, exact model to be decided prior to installation by CSU.
G. Cable: 1. Network cable: Hubbell approved listing for Critical use Warranty, CAT5e/6, Plenum Rated Cable
H. All camera locations will have a 30 ft. service loop at the end of the cable run.
I. Outdoor camera: each outdoor camera requires a separate lightning arrestor. Arrestor will be installed per code with proper grounding at the switch rack where the camera joins the CSU network.

282300.12 Installation:

A. Install all equipment and materials in accordance with current recommendations of the manufacturer. The work shall also be in accordance with:
    1. Installation criteria defined in these specifications and in the construction documents.
    2. Factory Representative's requirements.
    3. Approved submittals.
    4. Applicable requirements of referenced standards.
B. No CCTV IP cameras to be mounted or aimed without approval of AC&SS Director or his approved representative. Failure to do so may result in rework and repairs to finishes at the CCTV contractor's expense.
C. No head-end security hardware is to be installed until location is physically marked by the AC&SS Director or his approved representative.
D. Network IP cameras are to be terminated in a dedicated server rack in a CSU IT room as specified.
E. Provide AXIS 16-CHAN VIDEO ENCODER H.264 Encoder for conversion of analog video signal.
F. Network cameras shall have H.264 or H.265 video compression capability for transmission of signal to the recording server to minimize impact on network traffic.
G. All cameras shall utilize Power Over Ethernet (POE) for a power source. Coordination regarding POE requirements with the CSU Information Services & Technology Department (IS&T) will be the responsibility of the Contractor.

282300.13 Programming and System Integration:

A. All cameras and recording devices shall have fixed IP addresses programmed into the device prior to connection to CSU network infrastructure. These IP addresses are assigned by the CSU Information Services and Technology (IS&T) department. Any questions related to IP addresses, cables, ports, patch panels, or switches shall be directed to IS&T.
B. Programming of all camera titles, display screens, mapping camera responses to alarm inputs, motion detection zones, recording schedules, and alarm schedules as required and requested by AC&SS Director or designee.
C. Other system programming tasks required by the Owner. These additional programming requirements shall be coordinated between the Owner and the Contractor.

282300.14 Completion and Testing:

A. The Contractor shall test each new camera for proper operation. This includes network

connectivity, aim and focus of cameras, proper field of view, and proper performance of all camera features. Upon completion of testing, a request shall be submitted to the Director of AC&SS or designee for evaluation of system and to ensure devices meet standards and performance requirements and that no changes are necessary. Any device or system issue(s) found to be unacceptable shall be corrected or replaced until every device and system is functioning properly. Details of the resolution of any discrepancy shall be submitted for approval upon completion to the Director of AC&SS or designee for final approval and acceptance.

B. Hard-Copy System Printout: The Contractor shall submit both an electronic and a hard-copy system printout of all cameras and devices installed. This printout will include device names, model numbers, locations, all network information associated with each device to include IP and Mac addresses, cable numbers, patch panel numbers, and assigned switch ports.

282300.15 Commissioning: The Contractor shall certify completion in writing and schedule the commissioning walk-through. The Contractor shall provide all the tools and personnel needed to conduct an efficient commissioning process.

28 26 00 A/V DOOR INTERCOM SYSTEM

282600.1 Work Includes:

A. Door Stations
B. Master Stations
C. Central Exchange Unit
D. Power Supplies
E. Cabling

282600.2 Related Work Specified Elsewhere:

A. Technology General Provisions
B. Cabling Systems Administration
C. Technology Pathway Hardware
D. Structured Cabling System
E. Access Control System
F. Intrusion Detection System
G. IP Based CCTV System

282600.3 Description of Work:

A. The Door Intercom System consists of all Door Stations, Master Stations, Central Exchange Units, Power Supplies, and any other equipment to form a complete system. The Contractor shall provide and install any and all required devices to form a complete system, whether or not they are specifically mentioned in these specifications or shown on the contract drawings.
B. The Door Intercom System must be capable of integrating with the Access Control System and the IP Based CCTV System for control of doors and video monitoring.
C. Technology, Electrical, Architectural, HVAC Structural, Civil and all other Drawings as well as the Specifications for all the Divisions shall be defined as the Contract Documents. Contractor shall review entire set of Contract Documents prior to bidding.
D. Drawings and Specifications are to be considered as supplementing each other. Work specified but not shown, or shown, but not specified, shall be performed or furnished as though mentioned in both the Specifications and the Drawings.

E. Visit the site of the work and become familiar with the conditions affecting the installation. Submission of a proposal shall presuppose knowledge of such conditions and no additional compensation shall be allowed where extra labor or materials are required because of ignorance of these conditions.
F. Proposal shall include any special phasing requirements related to the construction work as described in the Division 1 Specifications.
G. Extra costs which might result from deviations from the Drawings, so as to avoid interferences, shall be considered a "Job Condition", and no additional compensation shall be considered applicable. In the event that such interferences occur in course of the Work, due to an error, omission, or oversight by the Contractor, no additional compensation shall be allowed.
H. Interferences that may occur during course of construction shall be brought to the immediate attention of the Architect and Engineer, and the Architect and Engineer's decision, confirmed in writing, shall be final.

282600.4 Submittals:

A. Drawings: Shop drawings to provide details of proposed system and the work to be provided. These include scaled plan drawings of device locations, cable routing and quantities, point-to-point drawings of systems and wiring and mounting diagrams of individual devices.
B. Specification Sheets: Submit equipment specification sheets for all materials specified.
C. Submit quantity breakdown of all proposed equipment.

282600.5 Contractor Qualifications:

A. The Contractor shall be fully qualified to perform installations as described on the Contract Drawings and within these Specifications.
B. The Contractor shall have been active in bidding, being awarded, and performing work consistent with that which is indicated on the Contract Documents for a period not less than five (5) years.

282600.6 Work Includes:

A. The Security Contractor is responsible for all work scope defined in the Security Contract Documents, unless otherwise indicated. Coordinate required systems rough-in work and equipment power requirements with the Electrical Contractor.
B. The Contractor shall review the Electrical and Technology Contract Documents to fully understand the scope of work requires. Any questions shall be submitted to the Engineer in writing prior to the bid submission. After this time, the Owner, Engineer and Architect shall not be liable for additional Work required due to the misunderstanding or misinterpretation of these requirements.
C. Include all labor, material, equipment, services and permits necessary for the proper completion of all work shown. Items omitted, but necessary, to make the Technology Systems complete and workable shall be understood to form part of the work.
D. Material for work required by the Contract Drawings and Specifications such as earthwork, concrete, masonry, and reinforcing steel patching and painting shall be provided as specified in other applicable Divisions covering such work.
E. It is the purpose of the Drawings to indicate the approximate location of all equipment and devices. Ascertain exact locations, and arrange work accordingly. The right is reserved by the Engineer to effect reasonable changes in the location of devices up to the time of roughing-in, without additional cost to the Owner. Changes in location of devices, or equipment necessitated by interference with the work of other trades shall be made only

with the consent of the Architect's or Owner's Representative, and at no additional cost. Changes in location of devices resulting from the Contractor's failure to comply with the Drawing or Specification requirements shall be made at no additional cost to the Owner.

282600.7 Codes and Standards: The installation shall comply with all applicable code requirements. Code requirements and their amendments will include, but are not limited to:

A. NEC, Article 800 Communication Circuits.
B. ANSI/EEE 241, Recommended Practice for Electric Power Systems in Commercial Buildings.
C. ANSI/NEMA 250, Enclosures for Electrical Equipment.
D. Safety Rules, U.S. Department of Health and Human Services.
E. CSU Environmental Health and Safety Rules

282600.8 Guarantee and Warranties:

A. Warrant that all equipment and work is installed in accordance with good engineering and installation practices. Furthermore, warrant that all equipment will meet the requirements specified, as well as other criteria which may not be explicitly documented in these Specification, but which are accepted as industry standards, as published by ANSI, EIA/TIA, IEEE and BICSI.
B. Any device or equipment failing to perform or function as specified shall be replaced with complying equipment without cost to the Owner.
C. Guarantee against defects in workmanship and materials: repair or replace any defective work, material or equipment within two (2) years from date of formal written acceptance by the Owner. An additional product warranty provided by individual equipment manufacturers shall supersede this two year workmanship and materials guarantee for installation of the appropriate equipment, as described in the individual section.
D. The Contractor, within ten (10) business days of project completion shall fully complete and submit all documentation to the manufacturer as required to implement the extended warranty period. Coordinate guarantee and warranty requirements with the Division 1 Specifications.

282600.9 System or Service Shutdowns:

A. The existing electrical, network, telephone, CATV and other technology systems, related to this work shall be maintained throughout the construction period. Any system or service shutdowns that may be required shall be scheduled through the Owner, and shall be done at a time as directed by the Owner. No additional compensation shall be allowed for these shutdown periods even though premium time work may be required. Provide temporary services to equipment or systems that cannot be shutdown, as determined by Owner.
B. Provide a minimum of one week's notice to the Owner before any system or service shutdown is scheduled

282600.10 Equivalent Products: Only products listed as approved shall be utilized. Substitutions, under normal circumstances, shall not be allowed. However, in unusual cases, substitutions may be unavoidable. All requests for product substitutions must be approved by the Engineer prior to the bid submission. Loss of certification by the Contractor, or unavailability of product to the Contactor that is not of a market wide nature, shall not be construed as an unavoidable circumstance. The request for product substitution and supporting documentation must be submitted, in writing, along with any samples requested by the Engineer. Written approval for product substitution must be submitted with the bid.

282600.11 Products:

A. Door Intercom Phone: Mircom TX3-200-4U-C
B. Modem: Mircom TX3-MDM
C. Network Cable: General GenSPEED 6500, CAT6, CMP Cable

282600.12 Installation:

A. Install all equipment and materials in accordance with current recommendations of the manufacturer. The work shall also be in accordance with:
    1. Installation criteria defined in these specifications and in the construction documents.
    2. Factory Representative's requirements.
    3. Approved submittals.
    4. Applicable requirements of referenced standards.
B. No CCTV cameras to be mounted or aimed without approval of Cleveland State University Director of Access Control and Security Systems. Failure to do so may result in rework and repairs to finishes at the CCTV contractor's expense.
C. No head-end security hardware is to be installed until location is physically marked by the Cleveland State University Director of Access Control and Security Systems.
D. Central Exchange Unit is to be located in a dedicated security equipment rack located in room 003 (UN-00)
E. Power supplies shall be connected to generator backed up, emergency power circuit dedicated solely to security systems equipment.
F. Connect the video outputs of the Aiphone door intercom system to the Pelco NET5404T H.264 for conversion of analog video signals from the Aiphone cameras to H.264 for connection to the Pelco NVR.
G. Connect the door release relay outputs of the central exchange unit to inputs on the Andover Continuum Access Control System for door release functions to be activated by the master station operator.
H. Card Readers mounted on the door intercom stations operate independently of the door intercom system and are to be cabled separately as are all other card readers in the Access Control System.

282600.13 Programming: Programming of the system shall include the following tasks:

A. Initial Programming of the system will have all door intercom stations routed to all intercom master stations.
B. Other system programming tasks required by the Owner. These additional programming requirements shall be coordinated between the Owner and the Contractor.

282600.14 Testing: The Contractor shall test each and every access control device for proper operation. The Contractor will also test each and every door for proper function and interoperability of associated components. A test report shall be prepared and submitted prior to system commissioning listing each component and system, the tests performed, and any discrepancies. Any device or system found to be unacceptable shall be corrected or replaced until every device and system is functioning properly. Details of the resolution of any discrepancy shall be provided as part of the test results.

282600.15 Training: The Contractor shall provide a minimum of (2) 4 hour in-service training session with this system. These sessions shall be broken into segments that will facilitate the training of individuals in the operation of this system. Operation manuals and user guides shall be provided at this time. Contractor to record training sessions and provide (2) copies on DVD to owner prior to completion.

282600.16 Commissioning: The Contractor shall certify completion in writing and schedule the commissioning walk-through. The Contractor shall provide all the tools and personnel needed to conduct an efficient commissioning process.

28 31 11 DIGITAL ADDRESSABLE FIRE ALARM SYSTEM

283111.1 The fire alarm system work is to be bid by the electrical contractor but the specifications and drawings are to be written such that the fire alarm system work is bid as three alternates. The Base Bid specification is to be written around a Simplex system. The first Alternate is for a Notifier system; the supplier of the Notifier system equipment shall be NESCO (Notifier Engineered System Company) certified. The second Alternate will be for an Edwards system. This will give the University the flexibility to pick any of the lowest bidders for any given Alternate.

283111.2 All fire alarm main panels shall annunciate at the CSU PD Dispatch Center and alternate location. This annunciation includes floor by floor graphics to be supplied and programmed by manufacturer's representative. Programmer shall confer with the University Fire Marshall for inclusion of specific CSU requirements, notably, "Fire Emergency" VENS verbiage, annunciation protocol, and a means of scrolling graphics floor by floor.

283111.4 All new fire alarm systems shall have voice capability and the A/E shall pay special attention to the latest audibility requirements; more audible notification devices at lower wattage taps.

283111.5 All fastening hardware shall be tamperproof.

283111.6 All devices shall be red with white lettering or white with red lettering. All initiating devices shall be labelled with the MapNet ID number of the device so as to be readily seen from four feet away.

283111.7 Manufacturer shall provide various adaptor skirts.

283111.8 The fire alarm control panels (FACP) shall be an addressable, microprocessor-based fire alarm system with initiating devices, notification appliances, and monitoring and control devices. The system shall be powered by a dedicated emergency power circuit. The system must have the ability to receive the University's VENS, Voice Emergency Notification System, and utilize the fire alarm system amplifier and speakers to transmit the message throughout the building.

283111.9 The fire alarm system shall allow for loading and editing instructions and operating sequences as necessary. The system must be capable of on-site programming to accommodate system expansion and facilitate changes in operation. All software operations shall be stored in a non-volatile programmable memory. Loss of primary and secondary power shall not erase the instructions stored in memory.

A. The system shall provide a means to recall alarms and trouble conditions in a chronological order for the purpose of recreating an event history.
B. Automatically route alarm, supervisory, and trouble signals to the University's central monitoring system. FACP shall be equipped with two Fiber Modems. Every monitored and controlled point to report to the University's central monitoring system.
C. When FACP is not able to be tied to the CSU Fire Network, FACP shall have the capability to provide remote access through a dial-up service modem using the public switched telephone system or a private switched telephone system.

283111.10 Drill Switch: a manual evacuation switch shall be provided to operate the notification appliances without causing other control circuits to be activated.

283111.11 Walk-Test: the system shall have the capability of (8) programmable passcode protected one-person testing groups, such that only a portion of the system need to be disable during testing. The actuation of the "enable one person test" program at the control unit shall activate the one-person testing mode as follows:

A. The city circuit connection and suppression release circuits shall be bypassed for the testing group.
B. Control relay functions associated to one of the (8) testing groups shall be bypassed.
C. The control unit shall indicate a trouble condition.
D. The alarm activation of any initiating device in the testing group shall cause the audible notification appliances to sound a voice announcement to identify the device.
E. The unit shall automatically reset itself after signaling is complete.
F. Any momentary opening of an initiating or notification appliance circuit wiring shall cause the audible signals to voice announce sound for 4 seconds indicating the trouble condition.

283111.12 Amplifier: FACP shall have voice capabilities with pre-recorded digital messages. The system shall be configured to allow voice paging. The operator shall be able to make announcements via a push-to-talk paging microphone over the pre-selected speakers.

A. The digital messages shall include a tornado/severe weather message.
B. FACP shall allow for silencing of audible notification devices while visual notification devices continue to run.
C. Amplifiers shall be sized for minimum 25 percent expansion.

283111.13 Pull Stations: all pull stations will be single action with "sound stoppers" installed over them where required and/or requested.

283111.14 Smoke Detectors: shall be individually monitored for calibration, sensitivity, and alarm condition. FACP shall maintain a moving average of the sensor's smoke chamber value to automatically compensate for dust, dirt, etc. Shall also indicate when a sensor needs cleaning.

283111.15 All residential room smoke detectors will have sounder bases.

283111.16 Battery: FACP system shall have battery backup sized to provide a minimum 24 hours of normal supervisory mode and then 15 minutes of alarm operation. Audio and visual circuits to be installed to 75 percent of maximum capacity to allow for future expansion.

283111.17 Visual notification devices shall be synchronized.

283111.18 All cabinets to be sized for 25 percent expansion.

283111.19 Wiring: system connections for initiating (signaling) circuits and notification appliance circuits shall be MapNet compatible.

283111.20 Circuit faults shall be indicated by trouble signal to the FACP.

283111.21 All duct detectors shall have a remote test station (RTS) with an alarm LED, reset capability, and a test switch. This RTS shall be located remote from the detector in an accessible location approved by the University's Fire Marshal. All duct detectors shall be programmed as Supervisory signals

only.

283111.22 The fire alarm system shall be tested in its entirety prior to the final acceptance test. This pre-test shall be scheduled and witnessed by the University's Fire Marshal. Once the University Fire Marshal OK's the system then the contractor shall schedule the final acceptance test with the State Fire Marshal. The fire alarm system manufacturer's technician, the electrical contractor, and the University Fire Marshal will be required to be present for both system tests. When testing is complete, the manufacturer shall turn over a copy of the FACP program along with the as-built device list AND as-built drawings to the University Fire Marshal.

END OF SECTION

DIVISION 32 – EXTERIOR IMPROVEMENTS

32 00 00 GENERAL REQUIREMENTS

320000.1 A/E shall consult OUA during the early planning stage of the project concerning site work, excavation, grading and landscaping, removal of obstructions, alterations of existing campus drives, parking areas and walkways, removal of trees and shrubs, and access to and from the site.

320000.2 A/E shall consult with OUA during early planning stage of the project to consider emergency vehicle access, service vehicle access, Student Disability Services vehicles, snow removal, public transportation, parking and pedestrian access, and construction staging areas.

320000.3 The site survey shall include information on underground utilities and structures (if required by the contract).

320000.4 A/E shall be responsible for preparing a subsurface investigation report which consists of test borings, laboratory testing, and engineering analysis.

320000.5 Existing utility locations shall be determined by A/E in the preparation of plans for boring locations. A/E shall locate borings to avoid these utilities. Notify OUA to schedule the work.

320000.6 Boring locations and sections showing all soil conditions shall be shown on the drawings. The specifications shall state that the information is for the contractor's use and shall hold the University harmless for the accuracy of the information.

320000.7 A/E shall indicate on drawings that the Ohio Utilities Protection Services (OUPS) does not locate utilities on campus nor does University personnel. Specifications should require contractor to hire utility location contractor services.

320000.8 Refer to Appendix K "CSU Mechanical & Plumbing Standards" for additional information.

320000.9 Outdoor Water Conservation:

A. Design and construct landscapes that require reduced irrigation by means of plant species selection and irrigation system efficiency.
B. Install permanent water meters that measure the total potable water use for the building and associated grounds.

320000.10 Stormwater Management: Building design shall seek to minimize the amount of stormwater that leaves the site through the following measures:

A. Appropriate landscaping and plant materials (e.g. trees, shrubs).
B. Use of permeable pavers with an appropriate base layer.
C. Installation of permanent infiltration or collection features (e.g. vegetated bioswales, rain gardens, rainwater cisterns, and other green infrastructures).

32 10 00 PAVING

321000.1 Reduce Heat Island Effect: Use paving materials with a three-year aged solar reflectance (SR) value of at least 0.28.

32 84 00 IRRIGATION SYSTEMS

328400.1 This Section includes the following:

A. Piping.
B. Sleeving for piping.
C. Automatic control valves.
D. Miscellaneous piping specialties.
E. Sprinklers.
F. Quick couplers.
G. Drip irrigation specialties.
H. Controllers.
I. Boxes for automatic control valves.

328400.2 Definitions:

A. Circuit Piping: Downstream from control valves to sprinklers during flow.
B. Main Piping: Downstream from point of connection to water distribution piping to, and including, control valves. Piping is under water-distribution-system pressure.
C. Low Voltage: As defined in NFPA 70 for circuits and equipment operating at less than 50 V or for remote-control, signaling power-limited circuits.

328400.3 Performance:

A. Irrigation zone control shall be automatic operation with controller and automatic control valves.
B. Retain one of first two paragraphs below. Retain first paragraph if complete system design and calculations are in the Contract Documents.
C. Location of Sprinklers and Specialties: Design location is approximate. Make minor adjustments necessary to avoid plantings and obstructions such as signs and light standards. Maintain 100 percent irrigation coverage of areas indicated.
D. This work includes all required permits and inspections. All plumbing and electrical work must comply with all local building code requirements. All associated interior and exterior plumbing and electrical work, including controller connections, must be finished to complete the system.
E. Contractor to include one (1) full day to review the operation of the irrigation system with the Owner's Representative once the system is one hundred percent (100%) operational.

328400.4 Submittals:

A. Product Data: Submit electronic copies of manufacturer's product data and installation instructions for each of the system components including all sprinkler heads, automatic valves, controllers, and quick coupling valves to be used on the project.
B. Shop Drawings: Submit to the Owner drawings showing all deviations from the plans, including layout of piping, heads, valves, zones, control systems, and wiring prior to installation.
C. Qualification Data: For qualified Installer.
D. Operation and Maintenance Data: Submit operation and maintenance manuals along with as-built drawings. Maintain record drawings current with actual construction on a daily basis during installation of system. Contractor shall provide an accurate, reproducible drawing of the entire irrigation system to the Owner prior to final payment.

328400.5 Quality Assurance:

A. Installer Qualifications: Minimum of five (5) years experience installing underground irrigation systems of comparable size. All work to be performed under the supervision of a qualified superintendent.
B. Obtain Owner's Representative's acceptance of installed and tested underground sprinkler system before installing backfill materials.
C. Construct the system to grade and in conformance to all areas and locations designated on the

drawings.

D. Irrigation products listed as a specific manufacturer's product are intended to establish the level All of quality and significant characteristics for the purposes of evaluating comparable products. The substitution of comparable products shall comply with Division 01 section "Substitution Requirements" and with the Division 00 Standard Subcontract Form.
E. Coordinate this work with that of all other trades on the Project.
F. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

328400.6 Delivery, Storage, and Handling

A. Deliver all system components in manufacturer's original undamaged and unopened containers with labels intact and legible.
B. Provide secure locked storage for valves, sprinkler heads and similar components that cannot be immediately replaced to prevent installation delays.
C. Store plastic piping protected from direct sunlight. Support to prevent sagging and bending.

328400.7 Products:

A. Pipes, Tubes, and Fittings:
    1. Comply with requirements in the piping schedule for applications of pipe, tube, and fitting materials, and for joining methods for specific services, service locations, and pipe sizes.
    2. PE Pipe: ASTM D2239, SDR 11.5, PE23 rated at 100 psi, NSF approved. Polyethylene pipe is not to be used.
    3. PVC Pipe, Mainline: PVC pipe three (3") inch in diameter and larger shall be ASTM D 2241, Schedule 40 PVC ring-tite (gasket) pipe.
        a. Fittings: Ductile iron fittings with gasket joints required on 3" or larger mainline. Use Harco or approved equal.
    4. PVC Pipe, Laterals: PVC pipe two and one-half (2 ½") inches in diameter and smaller shall be ASTM D 2241, Schedule 40 PVC solvent weld.
        a. Fittings: Schedule 40 PVC, ASTM D2466 molded fittings suitable for solvent weld.
    5. Drip Irrigation: As shown on plans.
B. Piping Joining Materials
    1. Solvent Cements for Joining PVC Piping: ASTM D 2564. Include primer according to ASTM F 656. Primer to be purple in color. Solvent to be appropriate for pipe and fitting type and weather conditions.
    2. Plastic, Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer unless otherwise indicated.
C. Plastic, Automatic Control Valves:
    1. Manufacturers: Subject to compliance with requirements, see drawings.
    2. Description: Molded-plastic body, normally closed, diaphragm type with manual-flow adjustment, and operated by 24-V ac solenoid.
D. Sprinklers: Designed for uniform coverage over entire spray area indicated at available water pressure. See drawing legend for each type required.
E. Quick Couplers: Manufacturers: Subject to compliance with requirements, provide products as noted on drawings, including lock feature.
F. Drip Irrigation Specialties: Manufacturers: Subject to compliance with requirements, see plans.
G. Controllers:
    1. Manufacturers: Subject to compliance with requirements, see plans.
    2. Wiring: UL approved for direct burial.
        a. Splicing Materials: Low voltage wire connectors to be made using wire nuts

and 3M DBY/DBR connectors or equal; suitable for direct burial. One hundred and twenty (120) volt or heavier splices made underground to use wire nuts and 3M brand DBY.

328400.8 Boxes for Automatic Control Valves:

A. Plastic Boxes:
   1. Manufacturers: Subject to compliance with requirements, provide products by the following, or approved equal: Carson Industries LLC
   2. Description: Box and cover, with open bottom and openings for piping; designed for installing flush with grade.
   3. Size: Single valves shall be installed using a ten (10) inch round box. Two valves shall be installed using an eighteen (18) inch by twelve (12) inch rectangular box. Three valves shall be installed using a Jumbo Valve box.

B. Drainage Backfill: Cleaned gravel or crushed stone, graded from 3/4 inch minimum to 3 inches maximum.

328400.9 Execution:

A. Preparation:
   1. Examine final grades and installation conditions. Do not start underground sprinkler system work until finished grades are established and unsatisfactory conditions have been corrected.
   2. Layout and stake the location of each pipe runs and all sprinkler heads and sprinkler valves. Obtain Owner's Representative's acceptance of layout before excavating.

B. Earthwork:
   1. Excavating, trenching, and backfilling are specified in Division 31 Section "Earth Moving."
   2. Excavating shall be considered unclassified and shall include all materials encountered, except materials that cannot be excavated by normal mechanical means. Excavate trenches of sufficient depth and width to permit proper handling and installation of pipe and fittings. Excavate to depths required to provide two (2") inch depth of earth fill or sand bedding for piping when rock or other unsuitable bearing material is encountered.
   3. All mainline and continuously pressurized pipe is to be installed using open trenches. Lateral pipe may be installed by "plowing" if soil conditions permit and soils do not contain gravel, rock, construction debris or other potentially damaging material.
   4. The top ten (10") inches of backfill shall be topsoil, free of rocks, subsoil or trash. Any special soil mixture shall be replaced to the original condition it was prior to irrigation installation.
   5. Fill to within six (6") inches of final grade with approved excavated or borrows fill materials free of lumps or rocks larger than two (2") inches in any dimension.
   6. Provide approved fine grained earth fill or sand to a point four (4") inches above the top of pipe, where soil conditions are rocky or otherwise objectionable.
   7. Fill to match adjacent grade elevation with approved earth fill material. Place and compact fill in layers not greater than eight (8") inches in depth.

C. Piping Installation:
   1. All mainline and contiguously pressurized pipes are to be installed using open trenches.
   2. Install PVC piping in dry weather when temperature is above 40 degrees Fahrenheit. Allow glued joints to set at least twenty-four (24) hours at temperatures above 40 degrees Fahrenheit before pressure is applied to the system.
   3. Store pipe such that it is protected from oil and grease and from prolonged exposure to sunlight and excessive heat.

4. Minimum depth of cover over lateral pipe shall be twelve (12”) inches and over mainline pipe shall be twenty-four (24”) inches for 3” & larger main. (18”) depth is sufficient for 2.5” or less.
5. Install plastic pipe in accordance with manufacturer’s installation instructions.
6. Where mainline pipe crosses piping related to the subgrade system drainage, the mainline piping shall go over the subgrade drainage, provided the mainline pipe is not installed with less than eighteen (18”) inches of cover. Otherwise install mainline pipe at twenty-four (24”) inches buried depth, beneath drainage system.
7. Option in first paragraph below may be withdrawn. If selecting, verify availability.
8. Revise first two paragraphs below to suit Project; delete if not required.
9. Install piping in sleeves under parking lots, roadways, and sidewalks.
10. Install sleeves made of ASTM D 2241, Schedule 40 PVC pipe and socket fittings, and solvent-cemented joints. Minimum size of sleeves to be three (3) inches; all sleeves shall be minimum of two times the size of the pipe being sleeved.

D. Joint Construction:
1. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
2. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
3. PE Piping Fastener Joints: Join with insert fittings and bands or fasteners according to piping manufacturer's written instructions.
4. PVC Piping Solvent-Cemented Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:
    a. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements.
    b. PVC Pressure Piping: Join schedule number, ASTM D 1785, PVC pipe and PVC socket fittings according to ASTM D 2672. Join other-than-schedule-number PVC pipe and socket fittings according to ASTM D 2855.

E. Valve Installation:
1. Electric valve installation shall be as indicated on the drawings. All electrical and manual valves shall be enclosed in a minimum ten (10”) inch width valve box. Add extensions as required to prevent soil settlement around the valve. Set box flush with finish grade and aligned with adjacent boxes and/or adjoining site work.
2. Install valve access boxes on a suitable base of gravel to provide a level foundation at proper grade and to provide drainage of the access box. Support box with block or notch box to protect pipe under box.

F. Sprinkler Installation:
1. Install fittings and sprinkler heads in accordance with manufacturer’s instructions, except as otherwise indicated.
2. Provide pop-up spray heads and three-quarter (3/4”) inch with the “funny pipe” flexible swing pipe or equivalent.
3. Provide all quick coupling valves and one (1”) inch IPS sprinklers with three (3) elbow swing joints. Use Lasco one (1”) pre-fabricated ‘O’ Ring joints as detailed on the drawings.
4. Set sprinkler heads perpendicular to finished grades, except as otherwise indicated and positioned to prevent contact with grounds maintenance equipment. Locate sprinkler heads to assure proper coverage of indicated areas. Do not exceed sprinkler head spacing distances indicated.

G. Automatic Irrigation Control System Installation:
1. Equipment Mounting: Install controller as directed, location approved by General Contractor.
    a. Place and secure anchorage devices. Use setting drawings, templates,

diagrams, instructions, and directions furnished with items to be embedded.
b. Install anchor bolts to elevations required for proper attachment to supported equipment.

2. Install control cable in same trench as irrigation piping and at least 2 inches below or beside piping. Provide conductors of size not smaller than recommended by controller manufacturer. Install cable in separate sleeve under paved areas. (wire sleeve not shown on drawings)

H. Field Quality Control:
1. Perform tests and inspections. Inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
2. Flushing and Testing:
a. The sprinkler main shall be tested under normal water pressure for a period of twelve (12) hours.
b. If leaks occur, repair and repeat the test. Give the Owner's Representative twenty-four (24) hours notice prior to testing.
c. Adjustment of the sprinkler heads and automatic equipment shall be done by the contractor upon completion of installation to provide optimum performance. The contractor shall make minor adjustment during the guarantee period.
d. After all new sprinkler piping are in place and connected for a given section and all necessary division work has been completed, and prior to the installation of sprinkler heads, all control valves shall be opened and a full head of water used to flush out the system.
e. Testing of the system shall be performed after completion of each section or completion of the entire installation. Any necessary repairs shall be made, at the contractor's expense, to put the system in good working order before the owner shall make final payment.

I. Startup Service: Irrigation contractor to perform (1) Spring startup and (1) Fall winterization service.

J. Guarantee:
1. Guarantee underground sprinkler system against defects in workmanship and materials for one (1) year from date of substantial completion.
2. Guarantee includes contractor returning to the site for Fall winterization and Spring start-up service.
3. Guarantee that all trenches and other disturbed areas shall be free from heaving and/or settling by more than one-quarter (1/4"). If necessary, adjust the grade, re-grade the trench, and re-seed. This no settlement guarantee shall extend over the entire one-(1) year guarantee from date of acceptance.

K. Cleaning: Flush dirt and debris from piping before installing sprinklers and other devices.

32 92 00 LAWNS

329200.1 Schedule:

A. If the project completion date falls outside of the specified planting times, OUA may require extending the landscaping portion of the contract to allow for optimum planting conditions and plant health. The dates for this "extension" shall be specified by A/E in the contract documents.

B. For lawn areas, the contractor shall be required to fine grade the area and install temporary mulch to prevent the tracking of dirt into the new project. After the planting season arrives, the contractor shall remove the straw, seed the area, and mulch.

C. For planting beds, the contractor shall fine grade the area and install the mulch specified for

that area. After the planting season arrives, the contractor shall remove the mulch, plant the landscaping, and mulch.

329200.2 Fine grading of areas to receive lawn:

A. Lawn areas to include 6 inches topsoil. Soil below topsoil shall be rototilled to 6 inch depth prior to placement of topsoil.
B. Contractor shall rake the top layer of lawn areas prior to seeding to remove all rocks over 1/2 inch diameter.
C. All lawn areas abutting curbs shall be properly compacted and prepared to prevent settlement of lawns behind curbs. A/E shall inspect this situation with OUA during punch list.

329200.3 Reconditioning lawns:

A. Soil compaction by construction equipment, staging, or storing shall be pulverized to a depth of 12 inches by disking or plowing prior to placing topsoil.
B. Soil contamination by oil drippings, sand, stone, gravel, or other contaminants into the topsoil shall be removed to a depth of 12 inches, disposed of off-site, and replaced with new planting soil.
C. Remove diseased or unsatisfactory lawns; do not bury into soil.
D. Where substantial but thin lawn remains, rate, serrate if compacted, and cultivate soil; fertilize and seed.
E. Water newly seeded areas. Maintain adequate moisture until new grass is established.

329200.4 Preparation of soil and beds prior to planting:

A. Contractor shall locate all existing utilities. Any damage shall be repaired at the contractor's expense.
B. Contractor shall lay out planting locations, mark with stakes, adjust locations if requested, and obtain A/E and OUA approval before proceeding.
C. Planting areas to include a minimum 12 inches of topsoil. Soil below topsoil shall be rototilled to 12 inch depth prior to placement of topsoil.

329200.5 Soils:

A. Topsoil for lawns:
    1. Topsoil shall be fertile agricultural-type soil, free of subsoil, rocks larger than 1/2 inch in diameter, clay, toxic matter, plants, weeds, and roots.
    2. Topsoil shall contain at least 6 percent organic matter and have an acidic reaction between 5.5 and 7.0 – inclusive. It shall have the following mechanical analysis:

Sieve Size	Percent by Weight
1"	99-100
1/4"	97-99
No. 100 mesh	40-60
No. 200 mesh	20-40

B. Bed mix soil shall have a minimum of at least 8 percent organic matter. Mixture shall be approximately 1/3 topsoil, 1/3 decomposed leaf humus, and 1/3 coarse sand.

329200.6 Soil amendments: shall be specified per project conditions and approved by Grounds Dept.

329200.7 Seeding of lawn:

A. Contractor shall submit seed vendor's certification of required seed mixture, indicating percentage by weight and percentages of purity, germination, and weed seed for each grass species. Contractor shall also submit evidence of State certification. Contractor shall submit certification to A/E and A/E shall submit to OUA for review prior to returning to the contractor.

B. Contractor shall notify A/E at least seven working days prior to start of seeding operations.
C. Planting time for seed shall be April 1 to May 15 for spring and August 15 to October 1 for fall.
D. Contractor shall restrict traffic from lawn areas until grass is established. This will include signs and barriers (blunt safety top 30 inch posts with rope between).
E. A/E shall review seed mix locations with OUA.
F. Sun/part sun seed mix shall be specified per project conditions and approved by Grounds Dept.
G. Shady area seed mix shall be specified per project conditions and approved by Grounds Dept.
H. Hydro-seeding may be used at contractor's option. A/E to verify with OUA. Wood cellulose fiber mulch shall be dyed green to facilitate visual inspection for uniformity of seed distribution.
I. Seed shall be delivered to the site in sealed containers bearing the producer's name and required formula. Seed shall be fresh stock, labeled in accordance with U.S. Department of Agriculture Rules and Regulations under the Federal Seed Act and with the State of Ohio Department of Agriculture.
J. Wet or moldy seed shall be rejected.
K. Before construction begins, precautionary measures shall be taken by the contractor to protect all existing lawn areas that are to be trucked over or staged upon. This may include stripping and stockpiling of topsoil. Any existing lawn areas that have been damaged by the contractor shall be restored to the satisfaction of OUA at no additional cost.
L. Seed shall be placed at a rate of 6 pounds per 1,000 square feet or per manufacturer's recommendation. Seeding out of season may require heavier seeding or multiple seedings.
M. When seeding occurs after acceptable seeding dates, over-winter protection shall consist of applying 5 bales of clean straw per 1,000 square feet. Anchor mulch by commercial mulch netting or 20 pounds per 1,000 square feet cellulose fiber. Contractor shall remove netting when directed by OUA.
N. Provide commercial mulch netting on slopes as required to prevent rain washout of seed.

329200.8 Sod:

A. Sod shall only be utilized in the bottom of drainage ditches where establishing lawn is difficult due to water flow and in areas as directed by the University.
B. Sod shall be specified per project conditions and approved by Grounds Dept. containing a growth of not more than 10 percent of other grasses and clovers, free of obnoxious weeds, and cut below the root line. Grounds Dept. to approve compatibility of soils.
C. Deliver to the site within 24 hours after cutting and install the same day as delivered to the site.
D. Areas to receive sod shall not be fertilized less than 48 hours prior to installation.
E. Place sod smoothly, edge to edge, with staggered end joints. Lay sod on slopes with long dimension running parallel to contour lines, starting at the bottom. Stake in alternating rows with stakes staggered. Water sod and tamp to eliminate air pockets.

32 93 00 PLANTS

329300.1 Planting of trees and shrubs:

A. According to the kind of trees, planting time for trees and shrubs shall be March 15 to May 15 for spring and October 15 to November 30 for fall.
B. Plants shall be typical of their species and variety, have normal growth habits, well developed branches, densely foliated and vigorous fibrous root systems.
C. Plants shall be free from defects, injuries, plant diseases, and insect infestations.
D. All plants of each particular variety shall be reasonably uniform in size and configuration.
E. Plants shall be freshly dug and nursery grown, have been transplanted and root pruned at least once in the past 2 years, and been grown under similar climatic conditions to those of the project locality.
F. All trees shall be balled and burlapped while shrubs may be container grown or balled and

burlapped. Burlap shall be unwrapped and laid back prior to backfilling the soil.

G. All new trees shall have straight trunks with full symmetrical crowns.
H. Form a watering basin of mulch around trunk holding at least 5 gallons of water for trees and 2-1/2 gallons for shrubs.
I. Prune dead or broken branches with sharp instruments.

329300.2 Planting of ground cover, plants, and perennials:

A. Planting time for ground cover, plants, and perennials shall be March 15 to May 15 for spring and October 15 to November 30 for fall.
B. Ground cover, plants, and perennials shall be typical of their species and variety, have normal growth habits, well-developed branches, densely foliated, and vigorous fibrous root systems.
C. Ground cover, plants, and perennials shall be free from defects, injuries, plant diseases, and insect infestations.
D. All ground cover, plants, and perennials of each particular variety shall be reasonably uniform in size and configuration.
E. Ground cover, plants, and perennials may be container grown or balled and burlapped. Burlap shall be unwrapped and laid back prior to backfilling the soil.
F. Space plants as indicated on drawings.
G. Excavate holes to accommodate roots, place plants at proper elevation, and backfill with planting soil, working carefully to avoid damage to roots and leave no voids.
H. Water thoroughly immediate after planting. Do not wash soil into crowns of plants.

329300.3 Decorative mulch:

A. Shredded hardwood mulch for planting areas and tree rings shall be free of deleterious material and suitable for top dressing of plants.
B. Apply mulch 2-4 inches thick in planting beds and tree rings.

329300.4 Initial maintenance of lawn areas:

A. Lawns shall be maintained by the contractor after final planting until final acceptance by A/E.
B. Contractor shall water regularly for healthy plant growth. The University will provide a water source when available. A/E to verify.
C. Contractor shall mow a minimum of 2 times prior to acceptance by OUA.
D. Contractor shall apply 1 application of fertilizer per manufacturer's recommendations.
E. Re-grade and re-sod areas if necessary to correct rutted or damaged or improperly graded areas.

329300.5 Initial maintenance of trees and shrubs:

A. Trees and shrubs shall be maintained by the contractor after final planting until final acceptance by A/E.
B. Contractor shall water regularly for healthy plant growth. The University will provide a water source when available. A/E to verify.
C. Contractor shall remove weeds, replace mulch, and restore eroded watering basins around trunks if needed.
D. Contractor shall remove all plant identification tags and labels.
E. Contractor shall apply insecticides and fungicides if necessary to prevent or correct insect infestation or disease.
F. Contractor shall dig up and correct any trees that are not plumb.

329300.6 Initial maintenance of ground cover and plants:

A. Ground cover and plants shall be maintained by the contractor after final planting until final acceptance by A/E.

B. Contractor shall water regularly for healthy plant growth. The University will provide a water source when available. A/E to verify.
C. Contractor shall remove weeds and replace mulch as directed by A/E.
D. Contractor shall remove all plant identification tags and labels.
E. Contractor shall apply insecticides or fungicides if necessary to prevent or correct insect infestation and disease.

329300.7 Inspection for acceptance:

A. Inspection of planting to determine completion of contract work shall be made by A/E and shall include representatives from OUA. A/E shall confirm that all landscaping conforms to quantities and sizes listed in the planting schedule.
B. Contractor shall give at least 7 days notice requesting the inspection.
C. A/E will prepare a punch list and work found not in accordance with plans and specifications shall be subject to re-inspection.
D. Basis of lawn acceptance shall consist of lawns uniform in texture, density, and color; substantially weed free; without gaps or bare spots; and with vigorous growth of proper species and variety. Scattered bare spots up to 6 inches in diameter will be accepted up to a maximum of 3 percent of the lawn area.

329300.8 Warranties:

A. New trees, shrubs, perennials and ground covers shall be guaranteed for 1 year from the date of substantial completion.
B. Warranty shall cover death and improper planting, unsatisfactory growth, neglect or damage by others excluded.
C. Contractor shall replace unsatisfactory plant materials with healthy, vigorous materials, planted only during the next specified planting season.
D. Borderline plants shall be replaced.

END OF SECTION

DIVISION 33 – UTILITIES

33 11 00 SITE WATER SERVICE PIPING

331100.1 Water service piping from 5 feet outside the building to utility connection shall be installed by site contractor and coordinated with all prime contractors.

331100.2 The building water service piping starting at 5 feet outside the building shall be installed by the plumbing contractor.

331100.3 When combination water/fire services are installed, the fire protection contractor shall install from water purveyor to inside of the building to subdivision between fire and potable water system. Use of Post indicator valves shall be reviewed with OUA and local fire department having jurisdiction. Plumbing contractor shall connect at subdivision within the building complex. All deviations from this shall be coordinated with OUA.

331100.4 General Installation Requirements:

A. Whenever possible, the water service connection shall be bade to University's master meter system. When not possible, A/E shall comply with local codes and requirements.
B. Water meters with BAS communication are required on all systems to allow water conservation efforts. Sub-meter all cooling tower makeup or outdoor water features to allow sewer rate deduct billing. Coordinate meter types and options required for communication with the Johnson Controls Metasys Automation System. Typically Neptune turbine temperature compensated to read in cubic feet with TRI-CON E3 reader.
C. A standard clockwise-to-close curb stop shall be provided at the connection to the street main.
D. Plans shall include a grade profile of the water line to insure adequate coverage (5 feet minimum). Design shall consider sloping for air and water drainage; coordinate with city or local authority.
E. City or other local authority's standard requirements shall be followed whenever possible. A meeting shall be arranged by A/E with the city or local authority.

331100.5 Plans and specifications shall be submitted to the City of Cleveland building department or local authority for review when system is connected to city or local authorities main piping. Provide reference set of drawings if connected to the University's main distribution system. Reference set shall be sent to the city or local authority at the same time as final approvals are submitted to the State of Ohio industrial compliance division.

331100.6 Contractor shall pay for all tap-in fees and contact the city or local authorities for inspections of the water service line.

331100.7 Utilization fees, excavation permits, etc. associated with the water service piping shall be paid for within the project budget.

331100.8 Chlorination of domestic water mains on campus is by the City of Cleveland water department. Coordination and cleaning shall meet city or local authority's requirements. Chlorination taps are provided by the City of Cleveland with a minimum 2 week time duration.

33 30 00 SANITARY SEWER PIPING

33 40 00 STORM SEWER PIPING

334000.1 Site storm and sewer service piping from 5 feet outside the building to utility connection shall be installed by the site contractor and coordinated with all prime contractors.

334000.2 The building storm and sanitary sewer systems shall be install by the plumbing contractor.

334000.3 General Installation Requirements:

A. Wherever possible, the storm or sanitary service connection shall be made to the University storm and sanitary sewer systems. When not possible, A/E shall comply with the local codes and requirements. Storm systems shall use EPA – National Pollution Discharge Elimination System (NPDES) best management practices where possible. Review with OUA for additional requirements.
B. Plans shall include a grade profile of the storm and sanitary line to insure adequate coverage and sloping for air and water drainage. (Minimum 3 feet cover required unless otherwise approved by OUA.)
C. City of Cleveland or local authority's standard requirements shall be followed whenever possible. A meeting shall be arranged by A/E between the city or local authority building department and OUA as soon as the preliminary plans are complete. The purpose of the meeting will be to familiarize A/E with the requirements as well as informing them of the project scope.

334000.4 Plans and specifications shall be submitted to the City of Cleveland building department or local authorities for review only when connection is to a county or city main. Submit reference set to the city if connecting to the University's distribution system. The submission to the city or county shall occur at the same time as final approvals are submitted to the State of Ohio industrial compliance division. All correspondence shall be reviewed with OUA prior to submission.

334000.5 Contractor shall pay for all tap-in fees and contact the city or county for inspections of the storm or sanitary service line.

334000.6 Utilization fees, excavation permits, etc. associated with the storm and sanitary piping shall be paid for within the project budget.

END OF SECTION

CLEVELAND STATE UNIVERSITY
Pipe Line Identification

PIPELINE	COLOR	ICI/Glidden NUMBER
Chill & Tower Water	Light Green	DC 5574
Domestic Water	Safety Green	DC 9700
Hot Water	Safety Yellow	DC 9400
Steam	Aluminum	DC 9020
Compressed Air	Cobalt Blue	DC 4752
Vacuum	Violet	DC 4752
Fire	Safety Red	DC 9000
Conduit (below 600V)	Black	DC 9990
Drain	Medium Gray	DC 2534
Cen-Vac	International Orange	DC 6900
A/C Units 1,2,3,4	White	DC 1000
Water Holding Tank	Safety Green	DC 9700
Pumps & Motors	Medium Gray	DC 2534
High Voltage (600V and up)	International Orange	DC 6900
Condensate	Aluminum	DC 9020
Acid & Chlorine	International Orange	DC 6900
Pool Water	Light Blue	DC 4100

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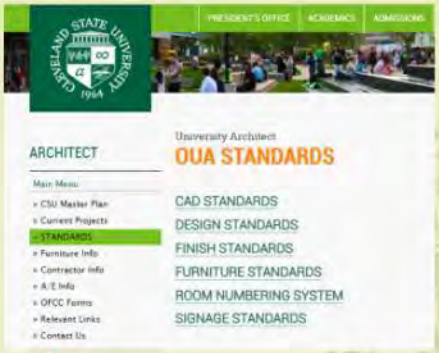
Contractor Orientation Basics

- Know your **CSU Point of Contact.**
- Keep your Contractor Badge on you and visible at all times.
- Refer to the back of your Contractor Badge for important phone numbers and the link for **CSU's list of standards**.



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Contractor Orientation Basics

Out of respect for others and the environment, Cleveland State University has adopted a tobacco free campus policy that went into effect at the start of the 2013 fall semester.

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Parking at CSU

All vehicles on University property must adhere to CSU Parking regulations.

Campus Location
Euclid Commons, Room 160
2402 Euclid Avenue
Phone: 216.687.2023
Fax: 216.687.5505
parking@csuohio.edu

Contractors parking on campus can:

- Park at a meter
- Obtain a Parking pass with an expiration date for $50 per week
- Obtain daily parking passes to fit parking needs

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Parking Prohibitions

- Under the overhang of the Berkman Hall building
- Sidewalks / Plazas
- Loading Docks
- Aisle ways / Driveways
- East 24th Street in front of Fenn Tower
- The "No Parking" area on north side of Fenn Tower
- Pedestrian sidewalks in front of Rhodes Tower
- Any grass area
- Police, Parking, or CSU Service Vehicle designated spaces
- Along curbs
- Any other areas not marked as a parking space

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Dashboard Passes

- Contractors who must park in any prohibited location may request an official dashboard pass.
- The request must be accompanied by details regarding the specific nature of their duties.
- Dashboard passes must be displayed in tandem with a valid CSU parking pass and are intended for short-term use related to the defined duties.

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Access Control & Security Systems

Access Control must first approve all work in areas that contain:
Fire/Electronic Access Control/Intrusion Detection/ or CCTV equipment
These areas include:

- Automatic sprinkler work
- Fire pumps
- Fiber optic loop
- Hot Works/Electrical live work
- Tar/kettle pots
- All panels and wiring
- Heat/Smoke/Motion detectors
- Putting fire system into TEST MODE
- Cameras and recorders
- Audible and visual fire devices
- Key boxes
- CSU cores
- Electronic access readers
- Keypads
- Panic buttons
- Area of rescue assistance
- Servers
- Fire Extinguishers

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Access to Buildings

Your work on campus may require access to areas:

- outside of normal business hours
- during closures or University holidays, or
- that are kept secure

If access is needed, your **CSU Point of Contact** can request access for you via the Keybox Access Request Form found on the Access Control webpage.

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FACILITIES

- Prior to beginning work, written authorization must be obtained from CSU Facilities Director or a Facilities Manager/Supervisor for following purposes:

1. Use of CSU-owned equipment and tools.
2. Use or Modification of Existing Building Computer Systems such as Johnson Controls, PowerLogic, Foreseer.
3. Use or Modification of Existing Building Infrastructure i.e. Electrical, Mechanical, Plumbing or Structure.

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FACILITIES

- During Construction, all materials and tools shall only be stored in a designated area as determined for the project. Materials and Tools found outside of these approved areas shall be deemed CSU property and will be handled accordingly.
- After Construction, all materials and tools shall be removed from CSU property. Items left behind will be considered abandoned and will become CSU property.
- Attic Stock shall be delivered to Plant Services Loading Dock with prior approval from Facilities Director.

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FACILITIES (Electrical)

- Appropriate codes and safety standards shall be followed with respect to electrical work on campus. These include but are not limited to NEC, NFPA 70E, OSHA.
- No "Energized Work' shall be performed on CSU campus. Under special circumstances, if it is determined that "Energized Work" is required, proper authorization and paper work will be approved only by the CSU Facilities Electrical Engineer. Appropriate Advance Notice and plan of action will be required.

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Accidents

In the event of a work related accident or illness, you must:

- Seek medical attention
- Notify your employer/supervisor
- Notify CSU's Office of Environmental Health and Safety (216)-687-9306

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Hazardous Material on Campus

- Asbestos
- Mercury
- Chemicals
- Paints and Solvents

Report emergencies involving hazardous materials to Campus Police by dialing 9-1-1 (ask for CSU police) or by dialing 216-687-2020.

- Applicable standards and codes including but not limited to OSHA, NFPA, NEC, and other local codes defined by Authority Having Jurisdiction (AHJ) should be followed and adhered to.
- All renovations or demolitions involving hazardous material have to be approved by the Project Manager.

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Emergencies on Campus

- On-campus Police Department
- Cell phone users dial 9-1-1 and ask for CSU Police
- For non-emergency or to file a police report or obtain a copy of a police report - dial 216-687-2020

Campus Location
Campus Safety Building
1840 Chester Avenue
Cleveland, Ohio 44114
Phone: (216) 687-2020
Fax: (216) 687-5144
police@csuohio.edu

- Do not leave property unattended
- See Something Say Something 9-1-1

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ALL contractors working on campus must obtain a CSU-issued Contractor Identification (ID) badge. Contractor IDs must be shown when requested by CSU personnel while the contractor is on campus. Any contractor working on campus without a CSU-issued ID may be escorted from the premises by CSU Police and will not be permitted to return to campus without first obtaining a badge through the process detailed below.

Step 1 | Contractor Orientation Safety Video

ALL construction personnel, furniture vendor installers, Architects/ Engineers, or other Consultants must watch the Contractor Orientation Safety Video.

Click here for link to online form:
CONTRACTOR ORIENTATION SAFETY VIDEO

Step 2 | Contractor / Vendor Onboarding | Project Start and Campus Access Request

ALL Construction Managers (CMR), General Contractors (GC) and/or Lead Contractors on Planning, Design & Construction projects must complete and submit this form prior to any work starting on campus.
NOTE: Sub-Contractors should NOT submit this form - all Sub-Contractors must go through their respective CMR | GC | Lead Contractor. Only the Contractors/ Vendors holding a contract directly with CSU should complete this form.

ALL furniture vendors working for Planning, Design & Construction projects are required to submit this form prior to scheduling furniture deliveries and/or installations.

ALL Contractors working on IS&T, Facilities/ FAST (Building Maintenance, Mechanical Operations, Electrical, Plumbing) or the Center for Instructional Technology (CIT) projects must review with the respective group for specific requirements and submit a request as required.

Requests must be submitted 3-5 business days prior to the requested start date. Once reviewed, an approval notification will be sent via email to the requester and the primary project contact for the contractor. Included in this notification with be an electronic permit which needs to be printed and posted outside or adjacent to the project site/ work area.
NOTE: Approval is project, contractor and building specific.

PREREQUISITE / INFORMATION REQUIRED PRIOR TO PROCEEDING*

- Anticipated Project Completion or Approximate Duration "End Date" work will be occurring on Campus
- CSU Project Name
- CSU Project Number
- CSU Building/s in which you will be working
- CSU Contact / Project Manager for the project
- CMR | GC Lead Contractor Company Information (Primary & Secondary contact information)

**If you do not have the above information, please request it from your supervisor and/ or the CSU Contact/ Project Manager for the respective project.*

Click here for link to online form:
CONTRACTOR / VENDOR ONBOARDING | Project Start and Campus Access Request - Form

Step 3 | Construction / Vendor Personnel | ID Badge & Certification

ALL Contractors working on Planning, Design & Construction projects
ALL Architects/ Engineers or other Consultants
ALL Furniture Vendors working on Planning, Design & Construction projects
ALL Contractors/ Vendors working on IS&T, Facilities, or the Center for Instructional Technology (CIT) projects

must complete and submit this form prior to starting work on the CSU campus. Upon receipt, an approval notification will be sent via email with electronic Contractor ID badge/ certification credentials. The badge/ certification is valid for the noted time frame only (typically the duration of the project).
NOTE: IDs are project, contractor and building specific

PREREQUISITE / INFORMATION REQUIRED PRIOR TO PROCEEDING*

- Anticipated Project Completion or Approximate Duration "End Date" work will be occurring on Campus
- CSU Project Name
- CSU Project Number
- CSU Building/s in which you will be working
- CSU Contact / Project Manager for the project
- CMR | GC Lead Contractor Company Information (Primary & Secondary contact information)
- Your employer information

**If you do not have the above information, please request it from your supervisor and/ or the CSU Contact/ Project Manager for the respective project.*

Click here for link to online form:
CONSTRUCTION / VENDOR PERSONNEL | ID Badge & Certification - Request Form

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Step 4 | Contractor | Keybox Access Request Form

If keybox access is required, the contractor must complete a Keybox Access Request Form. The contractor(s) must sign the form acknowledging the keybox rules and regulations and submit to the CSU Contact / PM for approval. Once the completed form is processed by ACSS, the contractor and their CSU Contact / PM will receive an email with relevant keybox access information. This includes the contractor's 5-digit PIN, deactivation date, and keybox location(s).

Click here for link to online form:
KEYBOX ACCESS REQUEST FORM

IMPORTANT PHONE NUMBERS:

DIAL 911 for Fire or a Life-Threatening Emergency

For a non-life-threatening emergency contact Campus Safety (Police) | 24/7
(216) 687-2020

All other concerns contact FAST Coordination Center | M-F 8am – 5pm
(216) 687-2500

Facilities Operations
Facilities Maintenance
Environmental Health & Safety
University Architect / Planning, Design & Construction

REFERENCE LINKS:

CONTRACTOR GENERAL INFO

CONSTRUCTION/ VENDOR PERSONNEL BADGING & CERTIFICATION

CONTRACTOR ORIENTATION SAFETY VIDEO

KEYBOX ACCESS REQUEST FORM

MEP & FIRE SHUTDOWN REQUEST FORM

BUILDING HOURS

BUILDING ADDRESSES

PARKING SERVICES

COVID NOTICE:

ALL contractors, construction personnel, A/E's, consultants, furniture installers and or on-campus guests/visitors MUST wear cloth facial coverings / or equivalent PPE when entering ANY CSU building. Facial coverings or PPE are mandatory in ALL public areas within CSU buildings. Additionally, personnel are to maintain 6-feet social distancing whenever possible while working in or traveling through public areas. Public areas include entries, lobbies, corridors, elevators, stairs, restrooms, and any common area shared by CSU staff, faculty, or campus visitors outside of the designated project construction work area.

Construction personnel are to comply with their companies and or the GC's/ CMR's respective pandemic response plans while working within the designated project construction work area. If a clearly defined/ separated construction work area does not exist, then it should be considered a public area and the above policy shall apply.

Failure to comply with the above policy may result in the removal of the offending personnel from campus.
Refer to the CDC and or State of Ohio Department of Health for additional information.

FULL OR PARTIAL CAMPUS LOCK-DOWN BUILDING ACCESS PROCEDURE:

NOTE: Only the persons designated from the CMR, General, GC and/or Lead Contractors should be contacting Campus Safety. Sub-Contractors should NOT contact Campus Safety for any building access, nor will they be granted access. Building specific access is project specific.

THE DESIGNATED PERSON/S are to contact Campus Safety at (216) 687-2020 when they arrive for the day. They can coordinate with Campus Safety and the CSU Contact/ PM what door will be the designated entry for all contractors. With the campus on full lock down multiple points of entry are not possible. Contact Campus Safety at the end of the day, they will be over to ensure the building and site are secure.

Issues to address/ coordinate with your CSU Contact/PM:

Deliveries will need to be coordinated with the CSU Contact/ PM and Campus Safety. BH and SI/ SR garage may be closed so keybox access may be needed to open the coiling doors This may be a key ring you currently do not have access to.

Contractors entering and exiting the building should be monitored and restricted to the designed entry point. Limit in and out when possible. Under no circumstance should exterior doors be propped open, or have the latches taped over. If this occurs by any of the contractors working on campus access will be immediately revoked.

Under no circumstance should contractors be outside of the designated work area, nor should they access any areas/rooms that do not directly involve the work being completed.

ALL contractors should show their CSU issued contractor badge. Campus Safety will be checking and will escort anyone without a badge off campus.

ALL Contactors working on campus must still abide by the restricted parking areas noted on Parking Services website. Contractors may not park on sidewalks, in front of building entry's or block loading docks etc. Parking Services will be ticketing.

not used

not used

KEYBOX ACCESS RULES & REGULATIONS

Department of Access Control & Security Systems
1802 E. 25th Street, PS243
Phone: (216) 687-5386 FAX: (216) 802-3383
access.security@csuohio.edu

The University has a serious stance on providing a safe environment to the campus community. A high investment in controlled access (key systems, access cards systems and electronic keyboxes) is part of the University's commitment to help ensure the safety of individuals, notable assets, and priceless research that occurs at Cleveland State University.

Electronic keyboxes are located throughout campus to assist you in gaining access to areas you need. We want you to be able to get where you need to go.

Having access to a University keybox is a privilege that comes with significant responsibilities and penalties for misuse. If you are unable or unwilling to abide by all of the following, it would be in your best interest and the University's that you decline participation.

- A *Keybox Access Request Form* must be signed by you, your CSU Point-of-Contact, and approved by the AC&SS department during processing before you will be given access to a keybox.
- You may not loan, transfer, give possession of, misuse, modify, or alter CSU keys or the keyring
- You may not allow others to use your PIN (code), nor may you use another's PIN/code
- Upon noticing any damage to a key, keyring, or box, you must report it to AC&SS (x5386) immediately
- You may not cause, allow, or contribute to the making of a copy/duplicate of any CSU key; as a state entity, it is a crime to do so.
- Loss of a key can be a significant financial responsibility for you, ranging from $58 to $500,000. You (and/or your company, if a contractor) are responsible for costs associated with replacing all locks/keys affected by your loss. For the type/level of keys in the keyboxes, the typical value of a keyring ranges from approximately $10,000 to $50,000. You are encouraged to ask the value of your particular key(s) before you sign the *Keybox Access Request Form* so that you are aware of your liability.
- You must abide by the CSU *Access Control Regulations*, found at: http://www.csuohio.edu/offices/accesssecurity/ It is important that you return the keyring to the assigned slot within the allotted time period or else an alarm will be broadcasted with notifications sent to AC&SS, your POC, and Police.

The following must be reported to CSU Police immediately (216-687-2020):

- Loss or theft of a CSU key(s) or keyring (s)
- Compromise of your PIN
- Compromise or breakage of the sealed keyring
- Damage or malfunction of the keybox

Lost keys require a Police report from CSU Police. Falsification of a police report is a criminal offense.

As a state entity pursuing missing property (keys), we have the right to turn-over collections to the State Attorney General for restitution. Not returning state property can be the subject of theft charges with criminal prosecution or civil recovery.

As a key-holder to CSU property, if you notice a suspicious person in an area, contact CSU Police (x2020 or 911) before a problem may develop in an area you are responsible for.
Notice to Contractors; Violations of these rules/regulations or the CSU *Access Control Regulations* by any one person of the company may jeopardize access for the entire company

If you have any questions or concerns, please contact the *Manager of Access Control and Security Systems* at (216) 687-5238.

Access Control & Security Systems | January 22, 2016

KEYBOX ACCESS REQUEST FORM

Department of Access Control & Security Systems
1802 E. 25th Street, PS 243
Ph. (216) 687-5386 | Web: http://csuohio.edu/access-security

Name: _____ _____ _____
Last First CSU ID

E-mail: _____ Phone: _____

◯ Student ◯ Faculty ◯ Staff ◯ Contractor ◯ Temp/Affiliate Department: _____

Project Name (if applicable): _____

CSU Point-of-Contact (POC) approval: _____ _____ _____
Print Signature Date

Building	Floors/Rooms	Keybox/Ring (Office Use)

Access Valid: ☐ Mon-Fri ☐ Saturday ☐ Sunday

Deactivation Date: _____
(Required for Students, Contractors, and Affiliate)

It is important that you return the keyring to the assigned slot within the allotted time period or an alarm will be broadcasted with notifications sent to you, AC&SS, and your CSU POC.

- You will receive an email from AC&SS informing you of your five-digit keybox PIN code. If at any time you would like a PIN change, please contact Access Control & Security Systems at the above listed email or phone number.
- You are responsible for reading the "Keybox Access Rules & Regulations" attached to this form or on the Access Control & Security Systems website (http://www.csuohio.edu/access-security)
- Inter-office, deliver or scan/e-mail this completed/approved form to the office above.
- Your PIN code will be active in your authorized keybox within five (5) days after receipt of this form to AC&SS.

Your signature confirms reading and agreement with the "Keybox Access Rules & Regulations".

_____ _____
User's Signature Date

CSU Standard Panelboard Schedule

PANEL - _____

BUILDING: _____ FED FROM: _____
ROOM #: _____
VOLTAGE: _____ MOUNTING: SURFACE ☐ RECESSED ☐
PHASE: _____ ENCLOSURE: NEMA-1
WIRE: _____ CABLE ENTRY: TOP ☐ BOTTOM ☐ SIDE ☐
AMPS: _____ MCB
_____ MLO

KEY: H - HACR BREAKER
X - MISC. LOAD
R - RECEPTACLE LOAD
L - LIGHTING LOAD
E - EMERGENCY LOAD
S - SHUNT TRIP
M - LOCKING TYPE

CKT NO	LOAD DESCRIPTION	LOAD TYPE	VOLT-AMPS ØA	VOLT-AMPS ØB	VOLT-AMPS ØC	AMP	POLE	A	B	C	AMP	POLE	VOLT-AMPS ØA	VOLT-AMPS ØB	VOLT-AMPS ØC	LOAD TYPE	LOAD DESCRIPTION	CKT NO
1	Spare																Spare	2
3	Spare																Spare	4
5	Spare																Spare	6
7	Spare																Spare	8
9	Spare																Spare	10
11	Spare																Spare	12
13	Spare																Spare	14
15	Spare																Spare	16
17	Spare																Spare	18
19	Spare																Spare	20
21	Spare																Spare	22
23	Spare																Spare	24
25	Spare																Spare	26
27	Spare																Spare	28
29	Spare																Spare	30
31	Space																Space	32
33	Space																Space	34
35	Space																Space	36
SUB TOTAL VOLT-AMPS			0	0	0								0	0	0		SUB TOTAL VOLT-AMPS	

SUBTOTAL LOAD 'H': 0 VA
SUBTOTAL LOAD 'X': 0 VA
SUBTOTAL LOAD 'L': 0 VA
SUBTOTAL LOAD 'R': 0 VA
SUBTOTAL LOAD 'E': 0 VA

SUBTOTAL LOAD PHASE 'A': 0 VA
SUBTOTAL LOAD PHASE 'B': 0 VA
SUBTOTAL LOAD PHASE 'C': 0 VA

Note: Verified/Actual information in **BOLD**

TOTAL LOAD VOLT-AMPS: 0 VA
TOTAL LOAD AMPS: #DIV/0! A

This schedule is available in an editable Excel document from the Facilities electrical department.

CSU PHOTOMETRICS

Light Levels for Parking Garage Designs

Area		Minimum Horizontal Illuminance[2] (fc)	Minimum Max-to-Min Ratio	Minimum Vertical Illuminance[3] (fc)
Basic[1]		5	5:1	3
Ramps[4]	Day[5]	10	5:1	5
	Night	10	5:1	5
Entrance Areas	Day[5]	35		20
	Night	20	5:1	10
Stairways		20		10

1 = Typical conditions
2 = Measured on the parking surface without any shadowing effects.
3 = Measured 1.5m above parking surface at point of lowest horizontal illuminance (not including points on the boundaries facing outward.)
4 = Applies to clearway ramps (no adjacent parking) but not to sloping floor designs.
5 = Daylight/Photocell/Time Clocks, shall be considered in the design calculation.

Light Levels for Walkways

Area	Minimum Horizontal Illuminance[2] (fc)	Minimum Max-to-Min Ratio Horizontal	Minimum Vertical Illuminance[3] (fc)	Minimum Max-to-Min Ratio Vertical
Basic[1]	2	5:1	3	3:1

1 = Typical conditions
2 = Measured on the walking surface without any shadowing effects.
3 = Measured 1.5m above walking surface at point of lowest horizontal illuminance.
4 = Daylight/Photocell/Time Clock, shall be considered in the design calculation.

CSU MECHANICAL & PLUMBING STANDARDS

1. DISTRICT STEAM SYSTEM

   A. If a Cleveland Thermal district steam line crosses under a main electrical duct bank, the duct bank needs to use steel conduit in lieu of PVC at the crossing. CSU has had problems where the heat from the steam main melts the conduit.
   B. The steam main is low pressure, typically between 15 and 25 psig.
   C. The main steam valve at the mechanical room wall is to be coordinated with Cleveland Thermal.
   D. Install a pressure reducing station to reduce pressure to design pressure (15 psi or as required).

2. CHILLED WATER SYSTEM (CWS)

   A. Chilled water pumping system consists of primary-secondary pumps in the central plant with variable speed tertiary pumps in the buildings.
   B. CWS temperature from plant is 41 deg. F and typically arrives at building at 43 deg. F. Coils should be sized for 45 deg. F entering water temperature with a 10 degree rise.
   C. Each building should have a flow meter tied into the Building Automated System (BAS) to measure flow (gpm).
   D. Chilled water pipe and fittings need to be rated for 300 psi.
   E. Use a triple offset butterfly valve for the main chilled water shut-off valves just inside the mechanical room wall. Local shut-off valves can be a standard high performance type.
   F. All pipe branches/stems to vents, drains, and gauges on chilled water system must be stainless steel pipe.
   G. Use stainless steel pipe for the threaded connections to the cooling coils or red brass, typically the last length of pipe between the shut-off valve and coil.
   H. For underground chilled water mains, use pre-insulated steel piping system. Add anodes for protection. Perma-Pipe as a standard.
   I. The connection to the mains must occur between November 1 and March 1 of any given year. This is when the system is drained. Local buried shut-off valves are not required at the mains. Valves may be required if the construction sequence/schedule requires an early connection to the mains.
   J. Do not use a vault at the connection to the mains. Use a direct buried connection.
   K. Connect to top of chilled water mains. Do not connect to bottom due to sediment on bottom of pipe.
   L. The following equipment is typically NOT required for the CWS in a new building: expansion tank, chemical treatment, make-up-water. All of this equipment is in the central plant.
   M. Provide a fill connection in the mechanical room for each new building.
   N. Provide a small relief valve, 3/4”, set to the maximum rating of the pipe/fittings in the mechanical room.
   O. Due to Rhodes Tower, the static head on the system will be approximately 155 psi.

3. PIPE AND FITTINGS

   A. Mechanical fittings (similar to Victaulic) are not acceptable for chilled water and heating hot water system piping. Mechanical fittings are acceptable for sprinkler piping and domestic water piping.
   B. Pro-Press fittings are acceptable for domestic water piping.
   C. Provide air vents on risers in accessible locations. If possible, run drain line from air vent discharge to drain.

4. PUMPS

   A. Do not use packaged pumping systems.
   B. Pump casings must be rated for 300 psi for chilled water pumps.

C. Pumps for chilled water and heating water shall be sized for 100% stand-by.
D. Do not use vertical split case (VSC) pumps. Split coupled vertical in-line pumps may be used.
E. Specify either laser alignment of pump couplings or require vibration readings to check pump alignment.
F. Include OSHA guards on pump shafts.
G. Do not use suction diffusers as a strainer on pumps. Use an in-line wye type strainer. Suction diffusers are acceptable for use for flow straightening.
H. Pumps must have isolation valves for service.

5. VALVES

A. Do not use triple duty valves (combination balancing/shut-off valve) on equipment. Use a separate balancing valve and shut-off valve.
B. Only use gate valve at main District steam entry valve. All other steam valves to be globe valves.

6. PIPE PAINTING / LABELING

A. Chilled water piping to be painted prior to insulation being installed. This paint is below the insulation and is in addition to the insulation painting.
B. All pipe insulation to be painted per CSU standard in mechanical rooms. Painting not required above ceiling or in exposed areas in public spaces.
C. Pipes to be labeled per CSU standard. Notify OUA/FM if a standard is required other than ANSI.
D. See Appendix A “CSU Pipe Line Identification”.

7. AIR DISTRIBUTION

A. Acoustic duct lining is not allowed. For VAV terminals, use terminals with fiber-free lining. Consider the use of dual wall insulated ducts for sound attenuation.
B. Duct pressure rating: the seal class and pressure rating of the ductwork shall be a step above the minimal requirement. It is preferred that the ductwork will be rated for the maximum “dead head” pressure of the supply fan.
C. Insulate the sheet metal collar/duct connection on the VAV terminals – this usually does not get insulated and “sweats”.
D. Use stainless steel ductwork for locker-room exhaust.
E. All cooling coils must be coated with heresite or equivalent. Electro-fin is an accepted alternative.

8. PLUMBING

A. Do not use PVC underground sanitary pipe. On another project the PVC pipe melted due to discharge of hot steam condensate.
B. Provide floor drains in toilet rooms.
C. Do not use electric heat trace for HW temperature maintenance. Use recirculating HW loop where required.
D. Water fountains to be ELKAY EZ H20 series bottle filler/cooler combo #LZSG8WSSK, stainless steel, wall mount, with filter. CSU decals to be provided and installed by Sustainability Department.
E. Restroom sink faucets to be Chicago Faucet #420-E2805ABCP, or approved equal, of solid brass construction, single lever, low flow design, made for heavy commercial use.

9. HUMIDIFICATION

A. If humidification is used, do not use direct steam from the District system.

B. Do not use “steam kettles” as used in the Law Library – too much calcium buildup and cleaning.
C. Consider using R.O. water.

10. AIR HANDLING UNITS

A. For AHU’s, use steam IFB (integral face and by-pass) coils. Select a high quality IFB coil to minimize leakage of air through dampers.
B. Use run-around heat recovery coil in lieu of energy recovery wheels. The wheels require too much maintenance. Use a coil with a wide fin spacing (in the range of 4 fpi) and max 4 rows. This will minimize clogging of the coil.
C. Place filters on inlet side run-around coil (exhaust and intake air streams).
D. Size the AHU coils as if the heat recovery was not operating.
E. Do not use UV lights in AHUs. Specify stainless steel drain pans.
F. Do not use vane axial fans.
G. Use a high quality AHU. The standard modular AHUs are not of acceptable quality. CSU has no preference for manufacturers as long as the quality level is high. Do not use McQuay AHUs.
H. All filters to be standard 24” x 24”. Partial sizes are not acceptable.
I. Final filters to be bag filters, synthetic 90-95% efficiency. 10-12 pockets no longer than 15”.
J. Liner to be solid, not perforated. Liner to be stainless steel.
K. If exterior casing is galvanized steel, then casing must be painted. Consider aluminum.
L. Blow-thru design is preferred due to CSU’s experience with draw-thru designs and excess leakage upstream of the cooling coil.
M. Use of an air blender is preferred.
N. Fans to be Class II minimum.
O. Access doors to be hinged with handles. Latches that require a hex-type key are not acceptable.
P. Be sure the AHU is high enough off the ground to allow for the proper trap size to be installed.
Q. All packaged units hung above the ceiling must be in a drop ceiling location and not a hard ceiling situation. A minimum of six (6) feet away from any ledge.
R. Specify fully drainable coils, not just coils with drainable headers.
S. All AHU coils to have a coating of heresite or electro-fin.
T. Specify coil tube wall thickness of .028”-.035”

11. SNOW MELT SYSTEM

A. Use Wirsbo design as a standard.
B. Tubing not encased in concrete must be secured or fastened every 8 feet horizontally or vertically.
C. Snow melt areas must be located such that grounds crews would be able to treat unconnected areas by mechanical tools and not rely on hand held shovels.
D. Each zone must have valves on both supply and return for isolation.
E. Use snow melt controls but provide an on and off signal to Johnson’s BAS.
F. Use condensate as the primary source for the snow melt system. Use steam as a backup.
G. No control valves are to be located more than 8 feet off the ground.
H. Glycol must be polypropylene and contain the appropriate inhibitors. No-burst and Dowtherm are good manufacturers.
I. Relief valve must be connected to the appropriately sized tank.
J. Sensors must be for both slab temperature and moisture.

12. HEAT PUMPS

A. Do not use heat pumps – they are labor intensive.
B. If you do use heat pumps, place them on the ground in a closet with full access to repair, maintain and

replace.

C. Cooling tower must be sized to 100% load even if geothermal is used.
D. Air filters must be common to all heat pumps used in the project. Use 24x24x2 pleated filters.
E. Local rep must be within four house of the CSU campus.
F. Isolation valves must be provided to make maintenance easy. Each floor must also have its own isolation valve to prevent the need for draining the entire system.
G. The unit's reset must be tied into the BAS.

13. MISCELLANEOUS

A. Heat exchangers to be shell and tube type and have stainless steel tubes. All stainless steel construction is preferred. Type 304 S.S.
B. Flat spec Johnson Controls or any BacNet that could be tied to BAS. No pneumatic controls allowed. All new buildings and/or renovated areas must be compatible and tied to the BAS.
C. VFDs: all with manual by-pass. Line reactors or isolation transformers to be per mechanical engineer's recommendation. Acceptable VFD manufacturers are: ABB, Reliance, Robicon.
D. Thermometers: do not use bi-metal type. Use red alcohol type.
E. Mechanical code must be complied with. Access and space must be adequate to maintain and operate all mechanical equipment.
F. If access doors are used in ceilings, they must be 2' square at minimum.
G. When a sprinkler system is required in an area subject to freezing, a glycol sprinkler system is preferred over a dry pipe system. The dry pipe system with valves and compressors is more maintenance. Specify a glycol solution with the proper inhibitors to minimize corrosion.
H. Use heat exchangers with waste condensate for snow melt system with steam as a backup.
I. Use radiation for heating wherever possible. This will allow the air systems to be shutdown during off hours and heating can still be provided. This may not be practical for large open spaces.
J. Heating hot water system: use 2 shell and tube heat exchangers, each sized at 100% load.
K. Main mechanical rooms must be located on the lowest level of the building.

END OF SECTION

not used

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Cleveland State University

OFFICE OF THE UNIVERSITY ARCHITECT
1802 EAST 25TH STREET
CLEVELAND, OHIO 44114-4496
(216) 687-5121
FAX (216) 687-9227

ARCHITECT / ENGINEER CLOSEOUT CHECKLIST

Project No. / Name: _____

A/E's Name: _____

- ☐ Letter by A/E of Record acknowledging design intent has been met
- ☐ Letter by A/E of Record stating that all punch list items have been completed to their satisfaction
- ☐ Certificate of Substantial Completion – approved by A/E of Record
- ☐ Final Inspection of Contractor's Work – approved by A/E of Record
- ☐ 1 set of electronic Record Documents (Drawings and Specifications) in BIM, CAD and PDF formats
- ☐ 1 set of paper Record Documents (Drawings and Specifications) with laminated covers
- ☐ 1 electronic set of **approved** shop drawings and submittals
- ☐ 1 binder to include as-built finish information: finish schedule, legend/ product specifications, and physical samples (finish binder provided with Bid Set must be updated with As-Built info)
- ☐ Written approvals/permission to release retention funds from end user, AC&SS, EHS, FM, IS&T
- ☐ Final payment request (including any outstanding change orders)
- ☐ Site Observation photos, if applicable
- ☐ Misc. items noted below:

_____

_____

_____

The above named Architect or Engineer (A/E) has submitted the necessary forms to be in compliance with Construction and Closeout of the General Conditions in the Contract Manual and Specifications. This section specifies documents to be submitted by the A/E as a condition precedent to execution of the Certificate of Contract Completion, release of retainage, and final payment.

Project Manager: _____ Date: _____

Rev. 3/1/16

Cleveland State University

OFFICE OF THE UNIVERSITY ARCHITECT
1802 EAST 25TH STREET
CLEVELAND, OHIO 44114-4496
(216) 687-5121
FAX (216) 687-9227

CONTRACTOR CLOSEOUT CHECKLIST

Project No. / Name: _____

Contractor's Name: _____

- ☐ Certification of Contract Completion (F390-01) + Contractor's Punch List
- ☐ Letter stating that all punch list items have been completed
- ☐ Certification of Warranty Commencement (F390-02)
- ☐ Certification of Equipment Demonstration (F390-03) with a copy of all training session sign-in sheets, videos, and training manuals
- ☐ Inspection certificates issued by the Department of Commerce (GC 6.25)
- ☐ Letter of Approval from the local or State Fire Marshall (GC 6.25)
- ☐ 3 hard copies + PDF of Operation and Maintenance Manuals (GC 6.25)
- ☐ Construction Site Documentation including Daily Reports and Digital Photographs
- ☐ Marked up as-built drawings and/or BIM coordination model sent to A/E (GC 6.25)
- ☐ HVAC Testing and Balance Report
- ☐ Certificate of Occupancy issued by the Department of Commerce, Division of Industrial Compliance - **Mailed directly to CSU after all inspections are complete**
- ☐ Payment Release Affidavit (F390-04)
- ☐ Final certified payroll reports (GC 6.25) + Affidavit of Compliance Prevailing Wages
- ☐ MBE/EDGE subcontractor payment confirmation (last page of pay app)
- ☐ Final payment request (including any outstanding change orders)
- ☐ Attic stock materials submitted to FM – Labels on each item
- ☐ CSU contractor/subcontractor ID badges and keys returned
- ☐ Keys, construction cores and/or other hardware turned over to FM

The above forms listed as (F390-X) may be obtained electronically at http://ofcc.ohio.gov/Documents.aspx

The above named Contractor has submitted the necessary forms to be in compliance with Closeout of the General Conditions in the Contract Manual and Specifications. This section specifies documents to be submitted by the Contractor as a condition precedent to execution of the Certificate of Contract Completion, release of retainage, and final payment.

Project Manager: _____ Date: _____

Rev. 3/1/16

Standard Trash / Recycling Receptacles

Outdoor Trash & Recycling Unit, 2-bin:

Indoor Trash & Recycling Unit, 3-bin:

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Introduction

The purpose of this document is to provide additional guidance for the standardization and installation of the Data and Telecommunications cabling, and wireless installations within the Cleveland State University (CSU) campus spaces. These requirements shall apply to all contractors and individuals performing low voltage cabling and equipment installations within the CSU campus facilities. Please refer any questions regarding these specifications to CSU's Information Services and Technology (IS&T) department.

The Data/Telecommunications contractor shall be fully capable and experienced in the Information transport system specified. A full time Building Industry Consulting Services International (BICSI) Registered Communications Distribution Designer (RCDD) shall be assigned to supervise the project in its entirety. All installers shall be BICSI certified as at least a level two installer or manufacturer certified for the products they are installing. To insure the system has continued support, CSU will only execute a contract with Contractors who have a successful history of sales, installation, and follow-on support.

All members of the installation team must be certified by the manufacturer as having completed all necessary training to complete their part of the installation. All personnel shall be adequately trained in the use of all tools and equipment required to successfully complete their respective work.

NOTE:

THESE GUIDELINES ARE THE MINIMUM ACCEPTABLE GENERAL REQUIREMENTS AND ARE MEANT FOR ADDITIONAL INFORMATIONAL PURPOSES. THESE REQUIREMENTS DO NOT REPLACE BID SPECIFICATIONS, DESIGN, AND/OR ENGINEERING DOCUMENTS.

Larry Rufener
IS&T Infrastructure Specialist, RCDD
L.Rufener@CSUOhio.edu
(Rhodes Tower Suite 1003)
Business: 1860 East 22nd Street
Mailing: 2121 Euclid Avenue
Cleveland, Ohio 44115-2214
Office: 216-875-9627
Fax: 216-687-9200

IS&T-SPEC-20190826

Table of Contents

1. Contractor Requirements

Any deviations from the products, policies, or procedures contained in this specification shall be sent in writing to CSU's IS&T department for approval. Payment for deviations in work from these requirements without authorization may be held until the deviations are satisfactorily resolved and signed off by IS&T.

Contractor shall notify CSU's IS&T department in writing before removing any existing data and/or telecom jacks. Notification must include as a minimum: building ID, Room, Number, Cable ID, Telecom Closet ID.

Any discrepancies shall be brought to the immediate attention of CSU contact person before proceeding with the installation.

2. Codes and Standards Compliancy

Contractor shall comply with NFPA 70; IEEE, ANSI, EIA, TIA, and all applicable National, State, and Local codes; wiring methods, construction, and installation of low voltage cabling systems. Furthermore, all contractors shall comply with the most current (at time of contract award) BICSI Telecommunications Distribution Methods Manual (TDMM) best practices, codes, and standards contained therein.

Listing of applicable codes and standards includes but is not limited to:

1) ANSI/TIA-568.0-D-2015 and addenda
   "Generic Telecommunications cabling for Customer Premises"
2) ANSI/TIA-568.1-D-2015 and addenda
   "Commercial Building Telecommunications Cabling Standard"
3) ANSI/TIA-568-C.2-2009 and addenda
   "Balanced Twisted-Pair Telecommunications Cabling & Component Standard"
4) ANSI/TIA-569-D-2015 and addenda
   " Telecommunications Pathways and Spaces"
5) ANSI/TIA-606-B-2012 and addenda
   " Administration Standard for the Telecommunications Infrastructure"
6) ANSI/TIA-607-C-2015 and addenda
   " Generic Telecommunications Bonding and Grounding (Earthing) for Customer Premises"
7) ANSI/TIA-862-A-2011 and addenda
   "Building Automation Systems Cabling Standard"
8) ANSI/TIA TSB-162-A-2013
   "Telecommunications Cabling Guideline for Wireless Access Points"
9) IEC 60512-99-001
   "Connectors for electronic equipment - Tests and measurements - Part 99-001: Test schedule for engaging and separating connectors under electrical load - Test 99a: Connectors used in twisted pair communication cabling with remote power"
10) NFPA 70-2014
    "National Electrical Code®"
11) BICSI Install cabling in accordance with the most recent edition of BICSI® TDMMs:
12) ANSI/ASHRAE/IES - most recent edition of applicable standards 90.1-XX

3. Telecommunications Rooms

a. Electrical

Each rack shall have a dedicated a 208VAC twist-lock receptacle (NEMA L6-30R unless otherwise specified) on emergency power and between every 2 racks there shall be a double gang 4-receptical 110VAC 20amp (Vertical power strips may be utilized providing they do not interfere with mounting of equipment or access to the rear of patch panels.

An electric sub-panel that supplies only these equipment receptacles shall be inside each equipment room and be readily accessible by CSU's electrical department. Twenty-ampere general purpose receptacles (convenience outlets) fed from an alternate source must be located every 6ft around the perimeter of the Telecommunications Rooms. All receptacle circuits shall have dedicated neutrals and a supplemental equipment grounding conductor sized per NEC 70.

b. Grounding and Bonding

Ground systems design shall be as specified by the NEC and other applicable codes and standards (ANSI/TIA/EIA 607-A, NECA/BICSI-568-2001). Although most fiber optic cables are not conductive, any metallic hardware used (such as wall-mounted termination boxes, racks, and patch panels) shall be grounded.

An equipment bonding system shall be installed per ANSI/TIA/EIA 607 (JSTD607) in all Telecommunications Rooms.

The grounding and bonding system shall include the following as a minimum:

- Bonding of all equipment racks, enclosures, and pathways (including conduits and cable tray).
- Rack grounding strips or equal for grounding of active electronics
- Circa wall or rack mount primary and secondary protectors or equivalent shall be used where the code requires them.

All products shall be submitted in a cutsheet for the project before proceeding with installation.

c. Cooling

Telecommunications Rooms (TRs) containing active electronic equipment shall have a cooling/humidity control system that is independent in operation from the building occupancy HVAC system. This system shall be on emergency power and controllable from within the TR. All TRs shall have environmental remote monitoring systems installed to notify CSU's FAST department directly in the event the system is not functioning properly; coordination and approval of the system shall be with CSU Facilities. Additionally, each TR will have an environmental monitor installed to notify CSU's IS&T department if the temperature is not within the proper range for the longevity of the Telecomm systems installed; this shall be coordinated with the IS&T Networks group and may be a separate IP based system.

d. Access Control and Security

Telecommunications Rooms (TRs) containing active electronic equipment shall have an access control system and a security system installed. This system will be approved and managed by CSU's Access and Control department.

e. Racks and Equipment

All Racks shall be Hubbell "I Frame" series and include the following as a minimum:

- Columns for new construction shall be the 8.75" width; IS70920 or equivalent
- Horizontal wire managers shall be provided above and below copper patch panels
  - Hubbell Premise Wiring HM27C Horizontal Cable Management, M-Series,2-Unit, 7" Extension, With Cover, Black
- Hubbell kit (ICKC) Top and side ladder style cable runway shall be provided
- Rittall or equivalent bottom spacers may be utilized with prior approval

In situations where a 4 post rack is needed for additional stability or mounting a 2 post frame would be an issue

- Hubbell Premise Wiring SF841929T Cabinets, Equipment Frame, 19" X 84" X 29"
- 2 each Hubbell Premise Wiring VS76H 6" Wide vertical cable manager
- Horizontal wire managers shall be provided above and below copper patch panels
  - Hubbell Premise Wiring HM27C Horizontal Cable Management, M-Series,2-Unit, 7" Extension, With Cover, Black

All newly installed Copper Patch Panels shall be Category-6 or Category-6A with proper cable management included. The following is a list of pre-approved patch panels (flat patch panels are preferred). Any substitutions require pre-approval from IS&T:

- Hubbell HP6(A)4U / 24 Port flat patch panel
- Hubbell HP6(A)48U / 48 Port flat patch panel
- Hubbell HP6(A)24AU / 24 Port angled patch panel
- Hubbell HP6(A)48AU / 48 Port angled patch panel
- Hubbell CMBR / Rear Cable Management Bars

4. Telephones and Intercoms

All telephones and intercoms shall meet the following specifications unless otherwise approved:

a. Elevator Phones

- Shall be GAI-TRONICS Smart Phone Series: P/N 397-001

b. Emergency Phones

- Free standing stanchions: GAI-TRONICS 234-500 CAM; 397-001 flush mount stainless phone; Model 540-001 series Beacon
- Phone wall stanchions: GAI-TRONICS 234WM 397.001 Emergency Phone with Model 540 series Beacon

c. Analog Campus Phones

- Mounted on one of the following six conductors stainless steel wall plate
  - Suttle SE-6:30A6
  - Allen Tel AT-630A6

d. Intercoms

Intercoms are utilized if a remote entry door system is required. The Mircom Intercom system is the CSU IS&T standard for this function. The Intercom System shall meet the following minimum requirements:

- Main system: Mircom TX3-200-4U (slim-line)

- All units: have a Mircom TX3-MDM modem installed

5. Digital Signage Systems (Currently RISE System)

Digital signage / Visual communications for CSU is standardized on the Rise platform. By having a single centralized platform of Rise across the campus it enables our users to create, publish, control, and broadcast their own content.

The minimum acceptable requirements for the system shall be as follows unless otherwise approved:

- RISE Players: Latest approved model to be verified with IS&T prior to purchase
- HDMI Transmitters: Extron transmitters. Model numbers is dependent on design
  - Single-port transmitter for each channel player supporting a single display
    - Only used if Rise player cannot be mounted at the display location
  - Multi-port transmitter for each channel player supporting multiple displays
  - Models shall be comparable to: Extron DTP HDMI 4K 330 Tx
- HDMI Receivers: Extron 60-1331-13, DTP HDMI 4K 330Rx HDMI Rx – 330 feet
- Monitors: Type, size, and layout will be defined by the design requirements and the needs of the department, and coordinated with the &T Classroom Technology department

Cabling for the digital signage system shall meet the following requirements:

- Minimum 1 Category-6 (or Cat-6A depending on the building) UTP cable drop for each display
- Maximum backbone length of 100 meters or 330 feet
- If possible, all drops should be run to the same closet regardless of the floor it is on
- 1 each (4 conductor 22 AWG CMP) cable shall be run from each display to the closest security panel for installation of security tabs on the Rise player and on the monitor
- Coordinated with Telecommunications department.

6. Outside Plant Cabling

All cable shall be either Outside Plant (OSP) or Inside & Outside Plant rated cabling. OSP rated cabling shall be transitioned to Inside Plant (ISP) rated cabling within 50 cable feet of the entrance to the facility. All Cabling must be supported by either manufacturer's recommended method, approved cable tray, Caddy Fasteners or equivalent channel hangers.

The Contractor shall install bushings, conduit sleeves, and/or grommets for locations where cables pass through metal studs, knock-outs, or areas where damage may reasonably occur.

All pathways must remain accessible for MOVES, ADDS, & CHANGES without any cutting or unusual construction after the building finishes are complete.

7. Backbone Cabling

a. Pathways and Spaces

All pathways and spaces shall follow manufacturer recommendations and ANSI TIA/EIA 569 for installation as appropriate. A permanent identifying placard must be placed at the ends and entry points to of the duct. Digitally photograph and document each of pathway entrance and submit with "as-built documentation". All pathway entrances must remain accessible for the life of the structure.

Installations shall meet the following minimum requirements:

- Conduits

- All OSP 4" conduits shall have 2-1 1/2" and 1- 1" inner ducts, depending on the cable to be installed
- A permanent identifying placard placed at the ends and entry points to the duct
- All pathways must remain accessible for MOVES, ADDS, & CHANGES without any cutting or unusual construction after the building finishes are complete
- All conduits installed shall have a pull cord or mule tape installed

- Cable Tray
  - Any cable tray spanning any hard ceiling space shall have solid sidewalls and a solid tray liner installed
  - Any cable tray transitioning through a firewall shall be designed and installed for minimum 40-percent growth or the maximum capacity of the cable tray; whichever is smaller
  - All cable tray and conduits installed shall have a pull cord or mule tape installed in a manner to facilitate future cable runs

The Contractor shall install bushings, conduit sleeves, and/or grommets for locations where cables pass through metal studs, knock-outs, or areas where damage may reasonably be expected to occur.

b. Fiber

Multi-mode fiber shall be 50-micron OM4 or better.
Single Mode fiber shall be Corning glass or OCC indoor/outdoor rated fiber; armored cable may be run in versus running innerduct to install the fiber if additional protection is deemed necessary

Fiber installations shall meet the following minimum requirements:

- All fiber must be new and free from defects
- All fiber connectivity components shall be Hubbell brand or approved
- Follow all appropriate recommendations from the Manufacturer
- All fiber optic cable shall have a Plenum rated jacket inside any facility
- All fiber shall be terminated with LC connectors; unless specifically noted otherwise
- All fiber ends shall be factory ends or fusion spliced pigtails with a maximum loss of .3 db per connector pair

Check with engineer regarding size and fiber optimization for each segment installed.

8. Horizontal Data Cabling

NOTE: All cabling which is to be terminated in the IS&T Telecommunications racks regardless of the end system it is servicing (i.e. Security cameras, Audio Visual systems, digital signage, etc.) shall be installed to the standards in this document.

NOTE: Only IS&T equipment physically located within an IS&T rack may be directly patched to a switch port. Equipment not specifically in the racks regardless of whether or not that are in the Telecommunications Room (TR) shall be connected through a WAO or biscuit jack port and connected via the patch panels within the IS&T equipment racks.

a. Cabling

Unless otherwise approved for all New Construction cabling shall be Category-6A, 4-pair, Unshielded Twisted Pair (UTP), Plenum Rated and comply with ANSI/TIA-568-C.0, ANSI/TIA-568-C.1 and

ANSI/TIA/EIA-568-C.2.Specifications for Category-6A cables. All cabling systems, pathways and spaces, and distribution facilities shall adhere to manufacturer's instructions, contract drawings', and specifications.

NOTE: Zip cable ties shall not be utilized in any facility. Hook and loop tape are the preferred method for cable management with the pathways and spaces. No cable management system shall deform the cabling or contain any sharp edges. Cabling shall be installed in a uniform manner as to provide proper strain relief as well as ease of future access.

NOTE: All newly install wireless access points shall be cabled with 2) Category-6A data cables terminated in a 2-port biscuit.

NOTE: All newly installed patch panels shall be Category-6 or 6A depending on the facility it is in; all other components may match the cable type for the facility in which it is installed. In no event will new Category 5 or 5E panels be installed. Faceplate styles to be installed will be to match the existing building standard, or as directed from the architect's office.

NOTE: All new drops for the digital signage system displays must be verified with IS&T. Cabling is dependent on whether it is a stand-alone display or multiple displays from a single device.

Cabling installations shall meet the following minimum requirements:

- Wired to the EIA/TIAT568B wiring standard
- All cable must be new and free from defects
- Cable utilized shall be listed by Hubble as approved for the Hubble Critical Warranty. Provide the Hubble list highlighting the proposed cable for approval prior to purchasing.
    - Acceptable manufacturers are (any substitutions require prior approval from CSU IS&T along with a confirmation letter that the cable being provided is authorized by Hubbell for certification in their Mission Critical Warranty)
        - Berk-Tek
        - General Cable
        - Belden
        - Superior Essex
- Maximum horizontal distance not to exceed 90 cable meters (295 cable feet)
- Single continuous "home-run" from the Telecom Room patch panel to the end keystone
- Account for adequate protection against Electro-Magnetic Interference (EMI) sources
    - Recommended separation from EMI sources
        - Power Lines 2KV or less 6-inches
        - Power Lines 5KV or greater 40-inches
        - Electric Motors 40-inches
        - Fluorescent or H.I.D lighting 20-inches
- All 4- pairs of each UTP cable shall terminate in a single 8-position 8-connector (8P8C) modular jack.
- Follow the appropriate recommendations from the Manufacturer
- Supported by either manufacturer's recommended method, approved cable tray, Caddy Fasteners or equivalent channel hangers; cable shall not be supported by anything not designed for that purpose
- Maximum spacing of Cat-Cable Hangers or "J" hooks shall be 48"

- All pathways must remain accessible for MOVES, ADDS, & CHANGES without any cutting or unusual construction after the building finishes are complete

Cable jacket shall be colored as follows:

- White: For all general data and voice jacks
- Blue: Utilized only in the Rhodes Tower Data Center
- Green: Security cameras
- Yellow: For energy management and building automation data jacks
- Red: Only for patch cords to identify POE links

The Contractor shall install bushings, conduit sleeves, and/or grommets for locations where cables pass through metal studs, knock-outs, or areas where damage may reasonably be expected to occur.

i. Renovations: Buildings with Mixed Category-5E and Category-3

Currently CSU utilizes a mix of Category-5E and Category-3 in some of the older campus buildings. The Category-3 cabling is limited to delivery of analog voice service only. In the buildings identified below Category-5E cabling keystones may be utilized for new data installations and Category-3 cabling and keystones may be utilized for analog voice installations only; however, if the entire suite or floor of the building is being renovated or has already been renovated Category-6 cabling shall be utilized. All other standards and specifications within this document shall still apply.

NOTE: All newly install wireless access points shall be cabled with 2) Category-6A data cables terminated in a 2-port biscuit. Buildings currently utilizing a mixture of Category-5E and Category-3 cabling:

- AM Advanced Manufacturing
- CG Central Garage
- CM Camp Magnet Building
- FH / SH Fenn Hall
- FS Field Services Building
- HS Health Sciences
- LB Law Building
- BH / MC Main Classroom 2nd, 3rd, 4th floor
- MM Mather Mansion
- MU Music & Communication
- PA Plant Annex Building
- PE Physical Education Building
- PS Plant Services
- RT James A. Rhodes Tower
- SI Science Building
- SR Science & Research Center
- WG West Garage
- WO /CC Wolstein Convocation Center

ii. Renovations: Buildings with Category-5E

Currently CSU Utilizes Category-5E in some of the older campus buildings. In the buildings identified below Category-5E cabling and Category-5E keystones may be utilized for new installations; however, if the entire suite or floor of the building is being renovated or has

already been renovated Category-6 cabling shall be utilized. All other standards and specifications within this document shall still apply.

NOTE: All newly install wireless access points shall be cabled with 2) Category-6A data cables terminated in a 2-port biscuit.

Buildings currently utilizing Category-5E cabling:

- BU Monte Ahuja College of Business
- CE Cole Center
- RW Rhodes Tower West
- LL Law Library
- UR Urban Building
- WC West Center

iii. Renovations: Buildings with Category-6

Currently CSU Utilizes Category-6 in some of the older campus buildings. In the buildings identified below Category-6 cabling and Category-6 keystones may be utilized for new installations. All other standards and specifications within this document shall still apply.

NOTE: All newly install wireless access points shall be cabled with 2) Category-6A data cables terminated in a 2-port biscuit.

Buildings currently utilizing Category-6 cabling:

- AC Administration Center
- AG / CH Art Gallery
- CS Campus Safety
- EC / R# Euclid Commons, Residents
- EC / R# Euclid Commons, Welcome Center
- EC / R# Euclid Commons, Campus Parking Office
- EC / R# Euclid Commons, University Marketing
- EG East Garage
- FT Fenn Tower
- JH / EB Julka Hall
- MB Middough Building
- BH / MC Main Classroom, 1st Floor
- PG / RG Prospect Garage
- PH Parker Hannifin Hall
- RC Recreation Center
- SC Student Center
- SG South Garage
- TC Trinity Commons
- TD Tennis Dome
- UN Union Building

iv. Renovations: Buildings with Category-6A

Currently CSU Utilizes Category-6A in all of the new campus buildings. In the buildings identified below are fully installed to the Category-6A standard and no deviations are authorized.

Buildings currently utilizing Category-6A cabling:

- IM Center for Medical Profession
- WH Donald E Washkewicz Hall of Engineering
- FM Film School and Media Arts

b. Work Area Outlets, Floor Boxes, and Faceplates

The Work Area Outlet (WAO) is the interface between the horizontal cabling and the work area telecommunications device. The faceplate is the cover of the WAO at each user endpoint. Each faceplate is capable of holding a single or multiple keystone (a standardized snap-in package for mounting a variety of low-voltage electrical jacks) modules.

Faceplate installations shall meet the following minimum requirements:

- For Cat-6A Cabling the faceplates shall be angled unless otherwise approved by IS&T
- All faceplate shall have a clear plastic window to cover the port(s) identifier label
- Color: “office white” one or two-gang unless otherwise specified by the Architects office
- Equipped with Black 8P8C keystones unless otherwise specified
- Affixed permanently to a fixed structure such as: building walls, utility poles or modular furniture
- Mounted on a 2-1/8 inch minimum depth double-gang box
- Clean in appearance and free of blemishes
- Mounting hardware not be visible on the faceplate
- All unused slots will have a blank insert installed matching the color of the faceplate, or keystone color for stainless steel faceplates
- Unpatched jacks in the work areas will have a matching dust cover installed
- Located within 1 meter (3 feet) and at the same height of an electrical outlet

Currently pre-approved parts list (any substitutions shall require prior approval):

- Angled Faceplates:
  - Hubbell AFPxxOW Series “Office White” unless otherwise specified
  - Hubbell AFPxxG Series “Gray”
- Flush Faceplate:
  - Hubbell IFPxxOW Series “Office White” to match pre-existing
  - Hubbell IFPxxG Series “Gray”
  - Hubbell IFPxxEI Series “Electric Ivory”
- Stainless Steel Faceplates:
  - Leviton QuickPort® 43080-series Angled Wall-plates With ID Windows
  - Leviton QuickPort® 43081-series Stainless Steel Wall-plate With ID Window
- 8P8C connectors: Hubbell HXJ6ABK
- Floor Boxes: Hubbell SCP3099A (with Hubbell FSL Gray Modular Frame for mounting modules)

i. Office Work Areas

Each single office shall have two (2) 4-position angled WAOs. The WAOs shall be located on opposite walls from each other where they are not likely to be blocked by furniture or otherwise made unusable after the area is furnished. Each WAO shall consisting of:

- In Facilities where Telephones are not feed from the data closets

- 1 dedicated voice jack with green icon
- 2 data jacks with blue icons
- 1 blank slot with matching cover

- Facilities where Telecom is co-located and terminated in the data racks
  - 3 data jacks with blue icons
  - The First data jack shall have a green icon if a telephone is to be placed
  - 1 blank slot with matching cover

ii. Other Occupant Work Area

Each occupant work shall have one (1) 4-position angled WAO. For work areas in which it may be difficult to install future additional telecommunications jacks a minimum of two WAOs (configured as specified above) should be provided and located to provide maximum flexibility in the space (i.e. on opposing walls). Each WAO shall consisting of:

- In Facilities where Telephones are not feed from the data closets
  - 1 dedicated voice jack with green icon
  - 2 data jacks with blue icons
  - 1 blank slot with matching cover
- Facilities where Telecom is co-located and terminated in the data racks
  - 3 data jacks with blue icons
  - The First data jack shall have a green icon if a telephone is to be placed
  - 1 blank slot with matching cover

iii. Classrooms

Unless otherwise specified each classroom shall have a minimum of one (1) WAO at the front of the room consisting of:

- In Facilities where Telephones are not feed from the data closets
  - 1 dedicated voice jack with green icon
  - 2 data jacks with blue icons
  - 1 blank slot with matching cover
- Facilities where Telecom is co-located and terminated in the data racks
  - 3 data jacks with blue icons
  - The First data jack shall have a green icon if a telephone is to be placed
  - 1 blank slot with matching cover

NOTE: Additionally, each classroom will have a minimum of 1 WAO and for classrooms in which it may be difficult to install future additional telecommunications jacks a second WAO shall be provided and located to provide maximum flexibility in the space (i.e. on opposing walls).

iv. Audio Visual (A/V) Equipment Racks and Lecterns

All data cabling originating from the IS&T telecommunications racks and terminating in any A/V equipment Rack or Lectern shall be terminated on a single rack unit unloaded modular panel affixed within.

- Hubbell HPJ24 is preapproved for use
- Moveable A/V equipment racks and Lecterns shall have the cabling from the patch panel to the room penetration wrapped with a snake or cable wrap; Wrap color should be white or match any existing in the location.
- Cabling entering the rack or lectern shall be physically attached to alleviate stress and pull of the cabling.

- Any variances must be authorized prior to being accepted

v. Outdoor Green Spaces

Any new facilities that have outdoor green space for public use directly adjoining the building shall have a weather rated lockable box on the exterior wall. The box shall contain:

- 2) 110VAC outlets with GFCI protection
- 2) data drops for network connectivity
- Sealable cable pass-through to run temporary cabling out of the box

c. Surface Mounted Boxes and Raceways

In areas requiring data and/or telecommunications on a non-fishable wall (i.e. concrete wall) a single or double gang deep (1-7/8" minimum) surface mounted box, office white in color, shall be utilized unless otherwise specified or prior approval has been received. In spaces for equipment connection only (i.e. above the ceiling for wireless access points or within mechanical or electrical equipment cabinets) a standard single or dual position wall mount box or biscuit may be utilized.

Surface mounted box and raceway installations shall meet the following minimum requirements:

- Utilize matching Office White faceplates as specified above, unless otherwise specified
- Coordinate the box, raceway, associated couplings and fittings
- No exposed openings or rough edges present
- Must be mechanically fastened to the building surface; adhesive tapes shall not be the sole means of attachment for any boxes or raceways.
- Raceway designed to house the data outlets
    - Should be ordered with openings to attach a standard faceplate if available
    - If faceplate opening is not available the plate should contain a clear plastic covered window to cover the data identifier label
    - If neither of the above options are available labels must be a permanent weather proof style and not easily removable (such as Polyester Label, White, 1-49/64"W x 19/32" THTEP-172-593-.5)
        - Submit label sample to IS&T for approval prior to installation

d. Wireless Access Points & Security Cameras:

The installation contractor shall provide a 15-foot service loop at each jack location identified as a Wireless Access Point and/or security camera. Only jacks for a single WAP or security camera may reside in the same biscuit housing. It is the responsibility of the installation contractor to coordinate the locations of the WAPs with CSU's IS&T department and the location of the security cameras with the CSU Access Control and Security department.

NOTE: Any design that requires moving existing Wireless Access Points (WAPs); or requires new WAPs based on room configuration (size, occupancy capacity or interferes being added in) shall be approved though IS&T by Logicalis prior to any work being approved or products purchased. Similarly, the contractor may directly sub Logicalis to preform the design and final audit when completed.

e. Modular Furniture

Cabling Contractor shall coordinate the location of all modular partition, and modular workstation outlets with the CSU Architectural furniture layouts as well as a point of contact to be identified by

the CSU Architectural department. Any discrepancies or perceived issues in coordination shall be brought to the immediate attention of the CSU Architectural department and resolved before proceeding with the installation.

9. Coaxial Cabling

Coaxial cabling shall meet the following minimum requirements:

- White Plenum-rated RG6 quad shielded for each end point drop unless otherwise specified
- White Plenum-rated cable of the appropriate size for backbone cabling
- All cable must be new and free from defects.
- End point drops utilize a keystone style adaptor to fit a standard faceplate as defined in Section 3.b.
- Adaptors and splitters shall be wall or rack mounted and as specified by the design document drawings

10. Labeling and ICON – Color Designation

All components of voice, video, and data equipment, including cables and their respective Faceplates and biscuits shall be labeled. New data jack number assignments will be provided by CSU IS&T. ANSI/EIA/TIA 606 shall be used as the labeling guide where any item is not addressed in this document. These labels must withstand the requirements of UL 969. The contractor shall submit samples of all labels for approval before installation.

All labels shall meet the following requirements:

- Typed/Printed
  - Hand written labels are not acceptable
  - P-Touch devices are not authorized for final labeling
- 12 point Sanserif (or equal) type font
- Cable labels
  - Self-laminated format with white printable zone and translucent over-laminating area to protect text
  - Cable ID is printed on minimum of 2 rows (for cables)
  - cables shall be labeled 2 to 3 inches from each end
  - Neatly installed; cables requiring a new label shall have any prior labels removed
- Faceplates / Biscuits
  - Level to the floor
  - Located in the manufacturer designated label location
  - Cable ID printed on a single row (for faceplates and biscuits)
  - Properly aligned to the faceplate
  - Neatly installed
  - For biscuits a permanent weather proof style and not easily removable (such as Polyester Label, White, 1-49/64"W x 19/32" THTEP-172-593-.5)

Note: Additional labeling may be required at intermediate locations such as conduit ends, and pull boxes. Cables incorrectly labeled or not matching its respective faceplate termination will not be accepted.

Color Coded Icons shall be affixed to each jack at the WAO. For a typical office area WAO: the first Jack shall be Green with a phone symbol for voice, and the remaining jacks shall be blue with a

computer symbol for data. For other locations; the jacks shall be identified as per their intended usage utilizing the following colors:

- Green with a phone symbol for voice
- Blue with a computer symbol for data
- Purple/Violet for Audio/Visual use only
- Orange is a special use in the IM building designating the B-Line training system

a. Backbone fiber cable (Inside and Outside plant)

Labels should be as follows: Building and TR (local side) – Building and TR (distant end) and strand count

- Example of a 48 strand running from Donald E Washkewicz Hall of Engineering (WH) lower level TR to the Main Classroom (MC) 4th floor South TR:
  - Label in MC: MC-4S to WH-LL 01-48
  - Label in WH: WH-LL to MC-4S 01-48

A graphic legend shall be located on the Light Distribution Shelf (LDS) Door with the legend facing out when the door is closed. The rows and columns shall be a direct representation of the insert panels within the LDS. Each insert panel shall have the cable identifier for the strands in the panel (i.e. for a 6 strand panel it would be: MC-4s to WH-LL 01-06).

b. Backbone fiber cable Inside Plant

Labeling for all inside plant fiber will utilize the following format based on the room the patch panel is located within: Building and TR (local side) – Building and TR (distant end) and strand count

- Example of a 48 strand running from Donald E Washkewicz Hall of Engineering (WH) lower level TR to the 4th floor TR:
  - Label in WH lower level: WH-LL to WH-04 01-48
  - Label in WH 4th floor: WH-04 to WH-LL 01-48

c. Backbone copper cable

Labeling will be provided by CSU's IS&T department as each site will have a unique number identifier provided.

d. Horizontal cable

Horizontal cabling will utilize the telecom rack and patch panel port number the cable is connected to as the identifier. Some older facilities the number is just a numerical incremental and is not based off the telecom rack and port numbers. The contractor shall verify with CSU IS&T department whether to utilize the current or old cable identification scheme prior to labeling any cables. The following is an example of the CSU IS&T cable identification standard:

Buildings Utilizing Old Cable Standard	
AM	Advanced Manufacturing
BH / MC	Main Classroom 2nd, 3rd, 4th floor
BU	Monte Ahuja College of Business
CE	Cole Center
CG	Central Garage
CM	Camp Magnet Building
EG	East Garage

Buildings Utilizing New Cable Standard	
AC	Administration Center
AG / CH	Art Gallery
BH / MC	Main Classroom, 1st Floor
CS	Campus Safety
JH / EB	Julka Hall
FH	Field Locker Building
FM	Film School and Media Arts

SH / FH	Fenn Hall
HS	Health Sciences
LB	Law Building
LL	Law Library
MM	Mather Mansion
MU	Music & Communication
PA	Plant Annex Building
PE	Physical Education Building
PS	Plant Services
RT	James A. Rhodes Tower
RW	Rhodes Tower West
SI	Science Building
SR	Science & Research Center
UR	Urban Building
WG	West Garage
WO / CC	Wolstein Convocation Center

FT	Fenn Tower
FS	Field Services Building
IM	Center for Medical Profession
MB	Middough Building
RG / PG	Prospect Garage
PH	Parker Hannifin Hall
EC / R#	Euclid Commons, Residents
EC / R#	Euclid Commons, Welcome Center
EC / R#	Euclid Commons, Parking Office
EC / R#	Euclid Commons, University Marketing
RC	Recreation Center
SC	Student Center
SG	South Garage
TD	Tennis Dome
TC	Trinity Commons
UN	Union Building
WH	Washkewicz Hall of Engineering

Current Cable Identifier: WH-02-01-201-A

WH	02	01	201		A
Building	TR Floor	Floor Wall Plate is located on	Patch Panel 2	Port 01	Rack A

Old Cable Identifier: RT-GG-01-156-C

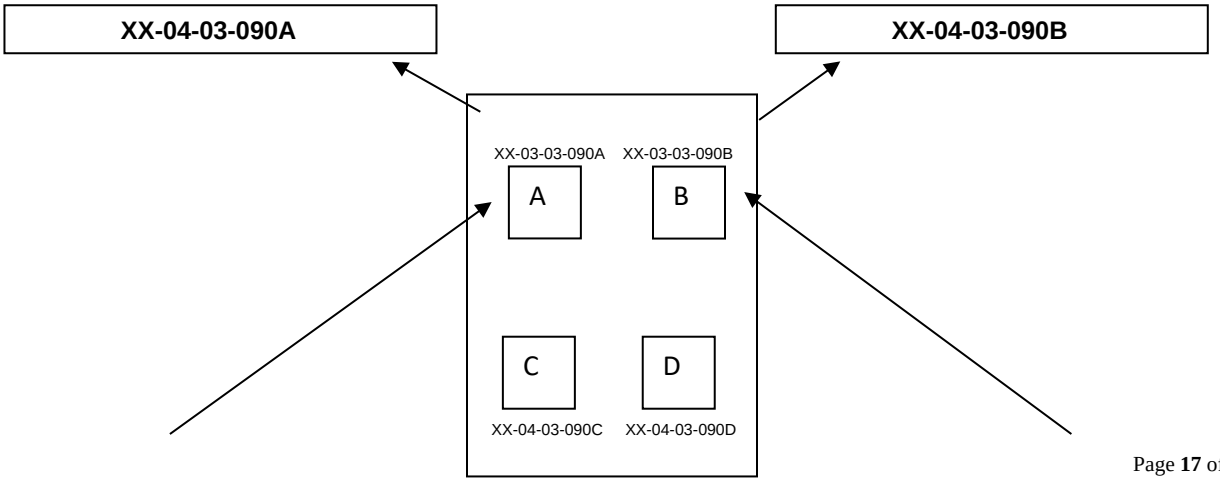
RT	GG	01	156	C
Building	TR Floor	Floor Wall Plate is located on	Faceplate number Identifier	3rd Cable in Faceplate

Note: Patch Panels Numbering starts at the top of rack down (i.e. the top / first patch panel is "0"). Racks are alphabetical and start with "A" typically as the rack closest to the wall in a row.

e. Typical faceplate layouts

TYPICAL FACEPLATE LABEL (4-Position)

XX = Building Name, **04** = Data Closet Floor, **03** = Faceplate Floor, **090** = Faceplate Number



A = First Cable at Location **B** = Second Cable at Location, etc

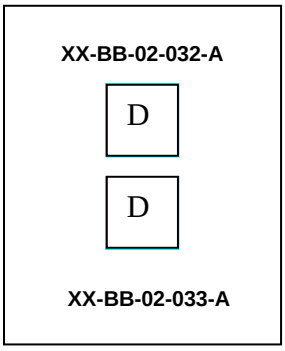
Typical four position wall faceplate.

The first jack of two position faceplate is typically reserved for voice. (position "A")

SAMPLE WORK AREA 2 JACK TYPE FACEPLATE LABELS

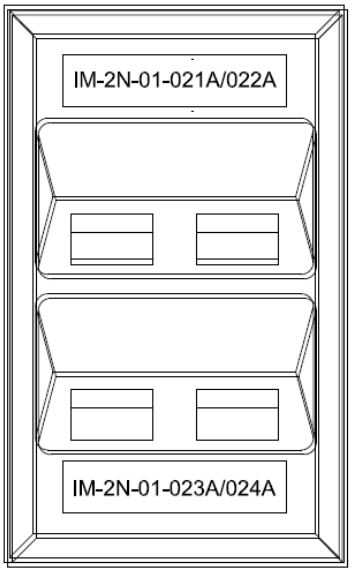
XX-BB-02-032-A	XX-BB-02-033-A

XX = Building Name, **BB** = Telecommunications Closet ID, **03** = Faceplate Floor, **0** = Patch panel on rack **(NUMBER 0 TO 9 then if needed A to Z) 32** = Panel port, rack letter, (A TO Z FROM Wall side of racks)



Typical two position wall Faceplate.

Four Position Angled Faceplate

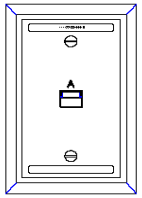


IM = Building Name, 2N = Telecommunications Closet ID, 01 = Faceplate Floor, 0 = Patch panel on rack (NUMBER 0 TO 9 then if needed A to Z) 21A = Patch Panel port, rack letter, (A TO Z FROM Wall side of racks) /022A =second port on faceplate (same as above)

NOTE: Patch panel placards shall be lamented or metal engraved plates permanently attached to patch panel. No hand written or plastic "P" Touch type labels will be accepted. Example from above - the patch panel will be labeled 0 the rack will be labeled A.

2021 IS&T CONTRUCTION & CABLING REQUIREMENTS

f. Standard CSU IS&T Faceplates

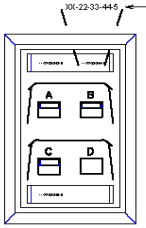


W

TYPE "W" FACEPLATE DETAIL — SCALE: NONE — 1

* PROVIDE HUBBELL #NSTZ39S

POSITION	JACK TYPE	JACK COLOR	ICON TYPE	ICON COLOR	CABLE TYPE	CABLE COLOR
A	CAT-3 6P6C	BLACK	VOICE	GREEN	CAT-6A	WHITE



THE CONTRACTOR SHALL VERIFY EXISTING BUILDING FACEPLATE LABELS - THE FOLLOWING EXAMPLES SHOWN FOR REFERENCE ONLY.

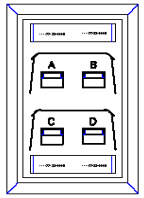
11 = 2 LETTER BUILDING DESIGNATION
22 = TELECOMMUNICATIONS CLOSET ID.
33 = REPRESENTS THE FLOOR THE OUTLET IS LOCATED.
X = PATCH PANEL ON RACK (NUMBER 0-9).
32 = PORT NUMBER ON THE PATCH PANEL.
5 = REPRESENTS THE RACK ID (A TO Z FROM THE WALL SIDE OF RACKS.

* THE TC SHALL PROVIDE LABELING SAMPLE TO THE OWNER FOR APPROVAL PRIOR TO LABELING OUTLETS. THE EXAMPLE SHOWN IS TYPICAL PER PORT

B

TYPE "B" FACEPLATE DETAIL — SCALE: NONE — 2

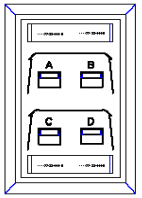
POSITION	JACK TYPE	JACK COLOR	ICON TYPE	ICON COLOR	CABLE TYPE	CABLE COLOR
A	CAT-6A SPSC	BLACK	VOICE	GREEN	CAT-6A	WHITE
B	CAT-6A SPSC	BLACK	DATA	BLUE	CAT-6A	WHITE
C	CAT-6A SPSC	BLACK	DATA	BLUE	CAT-6A	WHITE
D	BLANK	-	-	-	-	-



C

TYPE "C" FACEPLATE DETAIL — SCALE: NONE — 3

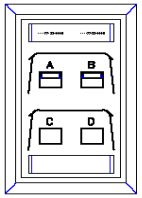
POSITION	JACK TYPE	JACK COLOR	ICON TYPE	ICON COLOR	CABLE TYPE	CABLE COLOR
A	CAT-6A SPSC	BLACK	VOICE	GREEN	CAT-6A	WHITE
B	CAT-6A SPSC	BLACK	DATA	BLUE	CAT-6A	WHITE
C	BLANK	-	-	-	-	-
D	BLANK	-	-	-	-	-



D

TYPE "D" FACEPLATE DETAIL — SCALE: NONE — 4

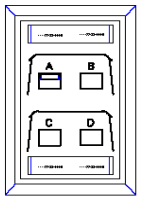
POSITION	JACK TYPE	JACK COLOR	ICON TYPE	ICON COLOR	CABLE TYPE	CABLE COLOR
A	CAT-6A SPSC	BLACK	VOICE	GREEN	CAT-6A	WHITE
B	CAT-6A SPSC	BLACK	DATA	BLUE	CAT-6A	WHITE
C	CAT-6A SPSC	BLACK	DATA	BLUE	CAT-6A	WHITE
D	CAT-6A SPSC	BLACK	DATA	BLUE	CAT-6A	WHITE



E

TYPE "E" FACEPLATE DETAIL — SCALE: NONE — 5

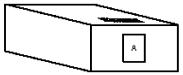
POSITION	JACK TYPE	JACK COLOR	ICON TYPE	ICON COLOR	CABLE TYPE	CABLE COLOR
A	CAT-6A SPSC	BLACK	DATA	BLUE	CAT-6A	WHITE
B	CAT-6A SPSC	BLACK	DATA	BLUE	CAT-6A	WHITE
C	BLANK	-	-	-	-	-
D	BLANK	-	-	-	-	-



F

TYPE "F" FACEPLATE DETAIL — SCALE: NONE — 6

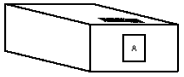
POSITION	JACK TYPE	JACK COLOR	ICON TYPE	ICON COLOR	CABLE TYPE	CABLE COLOR
A	CAT-6A SPSC	BLACK	DATA	BLUE	CAT-6A	WHITE
B	BLANK	-	-	-	-	-
C	BLANK	-	-	-	-	-
D	BLANK	-	-	-	-	-



CCTV FACEPLATE DETAIL — SCALE: NONE — 7

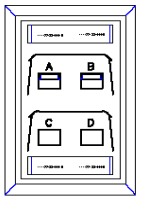
POSITION	JACK TYPE	JACK COLOR	ICON TYPE	ICON COLOR	CABLE TYPE	CABLE COLOR
A	CAT-6A SPSC	BLACK	DATA	BLUE	CAT-6A	GREEN

* TERMINATE BISCUIT JACK IN CEILING, COIL SERVICE LOOP AND SUPPORT WITH J-HOOK. PROVIDE PATCH CORD TO CAMERA.



WAP FACEPLATE DETAIL — SCALE: NONE — 8

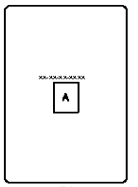
POSITION	JACK TYPE	JACK COLOR	ICON TYPE	ICON COLOR	CABLE TYPE	CABLE COLOR
A	CAT-6A SPSC	BLACK	DATA	BLUE	CAT-6A	WHITE



BAS EN

TYPE "BAS" OR "EN" FACEPLATE DETAIL — SCALE: NONE — 9

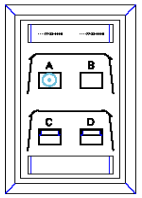
POSITION	JACK TYPE	JACK COLOR	ICON TYPE	ICON COLOR	CABLE TYPE	CABLE COLOR
A	CAT-6A SPSC	BLACK	DATA	YELLOW	CAT-6A	YELLOW
B	CAT-6A SPSC	BLACK	DATA	YELLOW	CAT-6A	YELLOW
C	BLANK	-	-	-	-	-
D	BLANK	-	-	-	-	-



EM

TYPE "EM" FACEPLATE DETAIL — SCALE: NONE — 10

POSITION	JACK TYPE	JACK COLOR	ICON TYPE	ICON COLOR	CABLE TYPE	CABLE COLOR
A	CAT-6A SPSC	BLACK	VOICE	GREEN	CAT-6A	WHITE

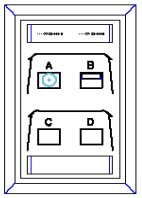


1

TYPE "V1" FACEPLATE DETAIL — SCALE: NONE — 11

POSITION	JACK TYPE	JACK COLOR	ICON TYPE	ICON COLOR	CABLE TYPE	CABLE COLOR
A	F-TYPE	N/A	N/A	N/A	COAX*	WHITE
B	BLANK	-	-	-	-	-
C	CAT-6A SPSC	ORANGE	VIDEO	ORANGE	CAT-6A	BLACK**
D	CAT-6A SPSC	ORANGE	VIDEO	ORANGE	CAT-6A	BLACK**

* COAX HOMERUNS TO THE TELECOM ROOM SERVING THE AREA OF WORK - RUNS 100' OR LESS SHALL BE RG-6 QUAD SHIELD WHERE AS RUNS GREATER THAN 100' SHALL BE RG-11 QUAD SHIELD.
** BLACK CAT-6A CABLING SHALL TERMINATE ON PATCH PANEL IN A/V RACK WITHIN TELECOM ROOM.

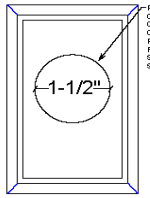


2

TYPE "V2" FACEPLATE DETAIL — SCALE: NONE — 12

POSITION	JACK TYPE	JACK COLOR	ICON TYPE	ICON COLOR	CABLE TYPE	CABLE COLOR
A	F-TYPE	N/A	N/A	N/A	COAX*	WHITE
B	CAT-6A SPSC	BLACK	DATA	BLUE	CAT-6A	WHITE
C	BLANK	-	-	-	-	-
D	BLANK	-	-	-	-	-

* COAX HOMERUNS TO THE TELECOM ROOM SERVING THE AREA OF WORK - RUNS 100' OR LESS SHALL BE RG-6 QUAD SHIELD WHERE AS RUNS GREATER THAN 100' SHALL BE RG-11 QUAD SHIELD.



PROVIDE GROMMETTED OPENING FOR CABLE PASSAGE. FACEPLATE SHALL BE STAINLESS.

D1, D2, D3

TYPE "V D1, D2, D3" FACEPLATE DETAIL — SCALE: NONE — 13

*REFER TO THE AUDIO/VISUAL DIAGRAMS AND DETAILS FOR MORE INFORMATION ON THE CABLING THAT WILL BE PROVIDED FOR THIS DEVICE.

11. Test and Acceptance

All test equipment utilized for final testing and turn-over of the cabling plant shall have a current Certificate of Calibration. The Contractor shall provide the test equipment Certificate of Calibration, along with complete cable test reports in electronic form for all installed cables.

NOTE: Full test results shall be delivered in electronic format; one copy in the native format of the tester being utilized (contractor must provide software to read the files if it does not utilize the Fluke Linkware) and one copy in a PDF format.

a. Copper Testing

Requirements that shall be meet for testing:

- An ETL approved Cable Tester shall be utilized for certification testing
- all tests shall be conducted with all connectors installed in its final configuration
- Category-5E, 6, and 6A tests shall all be completed in accordance with EIA/TIA-568

Upon completion of the cable installation, the Contractor shall perform complete copper cable certification tests, including but not limited to:

- Continuity checks on each cable, checking for opens and shorts.
- Cable length
- Correct pair polarity
- As a minimum, the Cable Certification report shall include:
    - Cable/Faceplate Number
        - Must match face plate number on patch panel and faceplate
    - Wire-Map
    - Network Test
    - Worst Case Near End Crosstalk (NEXT)
    - PowerSum Near End Crosstalk (PSNEXT)
    - Attenuation to Cross Talk Ratio
    - PowerSum Attenuation to Cross Talk Ratio (PSACR)
    - Equal line Far End Cross Talk (ELFEXT)
    - PowerSum Equal Line Far End Cross Talk (PSELFEXT)
    - Attenuation
    - Signal to Noise Ratio
    - Return Loss
    - PowerSum Alien Crosstalk (PSANEXT)
    - PowerSum Alien Attenuation to Cross Talk Ratio (PSAACR)
    - Cable Length
    - Test Date
    - Pass/Fail Marker
- Certain may require additional testing for 10Gig compatibility (Drops will be identified as needing this if required)

After the horizontal cable tests have been performed, the Contractor shall install the faceplate labels and modular jack dust covers. Install the appropriate jack Icon if it is known.

b. Coaxial Cabling System Testing

Requirements that shall be meet for testing:

- An approved Cable Tester shall be utilized for certification testing
- all tests shall be conducted with all connectors installed
- Tests shall all be completed in accordance with EIA/TIA-568 –C.4

Upon completion of the coaxial installation, the Contractor shall perform complete cable certification tests, including but not limited to:

- Continuity checks on each cable, checking for opens and shorts.
- Cable length
- As a minimum, the Cable Certification report shall include:
    - Cable/Faceplate Number
    - Cable Length
    - Test Date
    - Pass/Fail Marker

c. Fiber Optic Testing

Requirements that shall be meet for testing:

- An approved Cable Tester shall be utilized for certification testing
- All tests shall be conducted with all connectors installed
- Tests shall all be completed in accordance with EIA/TIA-568.3

Upon completion of the coaxial installation, the Contractor shall perform complete cable certification tests, including but not limited to:

- Continuity checks on each cable, checking for opens and shorts.
- Cable length
- As a minimum, the Cable Certification report shall include:
    - Cable/Termination Number (Patch Panel / Port ID)
    - Cable Length
    - Continuity Testing
    - Insertion Loss
        - Test multimode fiber at 850 and 1300 nm
        - single- mode fiber at 1310 and 1550 nm
    - OTDR Trace
        - Measurements should follow procedures in TIA/EIA-455-59, -60 and -61
    - Test Date
    - Pass/Fail Marker

12. Patching; Cross Connections; and Closet Wiring

NOTE: Patching of User drops and equipment is the responsibility of the contractor and shall be coordinated with IS&T Networks.

NOTE: The contractor shall be responsible for removal and documentation of all cables demoed or damaged during the project. The contractor is also responsible for fully removing and documenting the patch cables at the network switch side as well. Under no circumstances will damaged cables be spliced, the contractor assumes responsibility to fully replace any damaged cables.

a. Responsibilities: CSU's IS&T department

- Identify the ports to be cross-connected
- Program and activate switch ports
- Provide fixed IP addresses as required
- Provide a patch matrix The patching matrix will have columns for the Chassis, Slot, and Port of the switch. See below for examples of what each is referring to.

Example of Patching Matrix:

Location	Sfx	Vlan	Macs	Speed	Duplex	Chassis	Slot	Port	Comment	Room Number
SI-02-02-101	A	academic	1	auto	auto	3	3	1		249

Location: Is the Cable identifier for the port being patched to the switch
SFX: Is the Cable Suffix (for new buildings this is the rack the patch panel port is located in
VLAN: This is the virtual LAN the service is being provided from off of the switch
MACs: This is the number of MACs allowed on the physical port, typically this is always 1
Speed: Typically set to auto for the switch to negotiate the connection with the end device
Duplex: Typically set to auto for the switch to negotiate the connection with the end device
Chassis: Each switch will have a P-Touch style label showing the chassis number
Typically it should look like SI-02-01 or SI-02-02 if it is the second switch in the SI closet
Slot: The slot that the line card (card that the cabling is patched into) is located in
Port: the physical port number that the cable is patched into on the line card
Comment: Any pertinent comments to the installation or patching
Room Number: This is the room Number the far end (user port or equipment) is located in

b. Responsibilities: Contractor

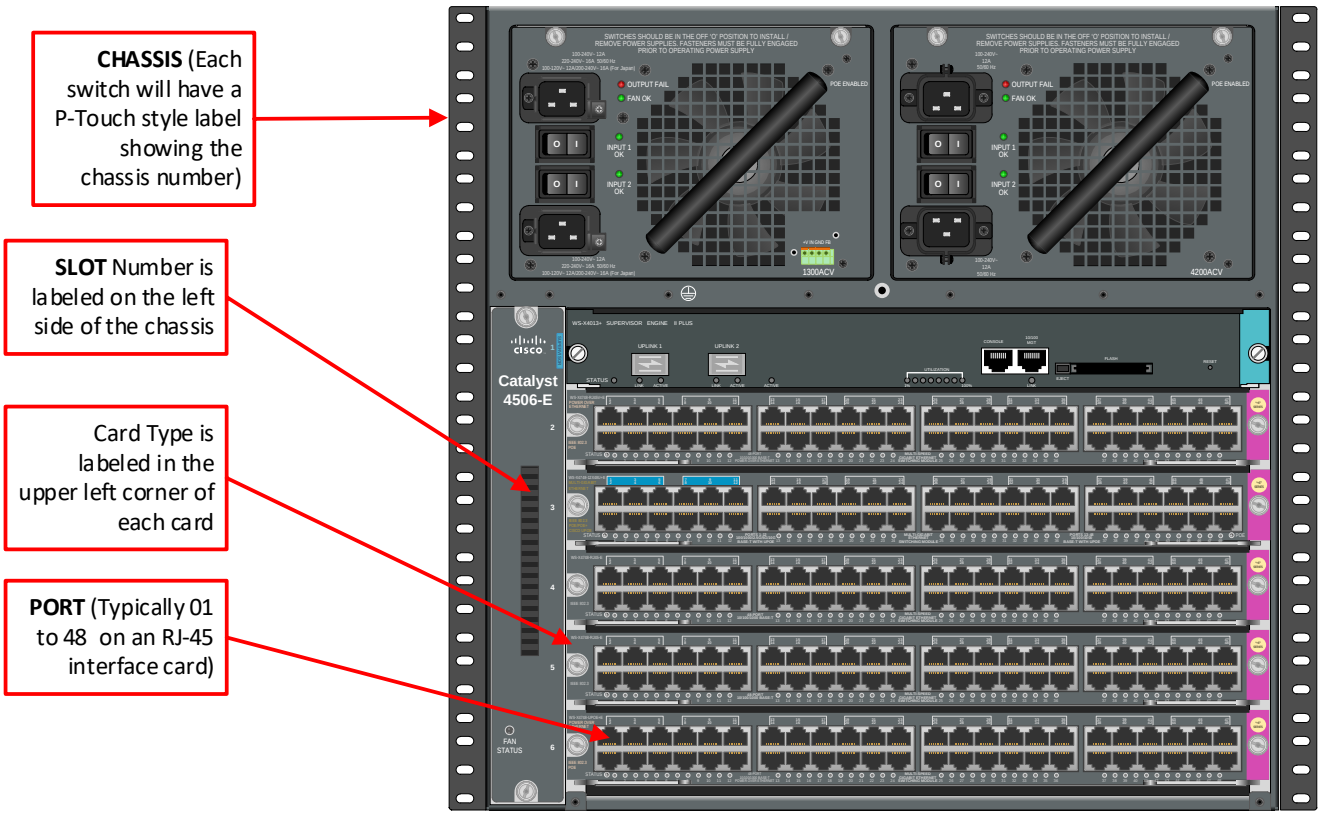
- Provide patch cords for both the user drop and patching within the Telecommunications rooms (TRs). Patch cords shall be provided for 100% of the Horizontal cabling infrastructure installed.
  - All TR and user drop patch cables will be Category-6 or Category 6A low diameter dictated by the infrastructure installed. Note: Category 5 patch cords are no longer acceptable for any new installations.
    - White patch cables shall be used for data
    - Green patch cables shall be used for analog voice
    - Red patch cables shall be used for Power Over Ethernet drops in older facilities, and for Wireless Access Points in newer facilities
    - Typical User drop patch cable is 3 meter or 10 feet
    - TR side patch cords shall be a mix of lengths in order to maintain neat and orderly cable management within the racks
  - Patching within the Rhodes Tower Data Center
    - All patch cables shall be Category-6A low diameter
    - White patch cables shall be used for the "A" position 1 gig switch ports
    - Blue patch cables shall be used for the "B" position 1 gig switch ports

- Pink patch cables shall be used for KVM Switches
- Physical patching of ports identified on the patching matrix provided by IS&T
- Installation of user drop patch cords for ports identified by IS&T
- Completion of the provided patch matrix and returning it to IS&T as soon as the patching is completed
- Identification of known devices requiring fixed IP address
- Identification of known devices requiring Power Over Ethernet
- Identification of known project equipment requiring data connectivity

NOTE: Patch Cables to be provided:

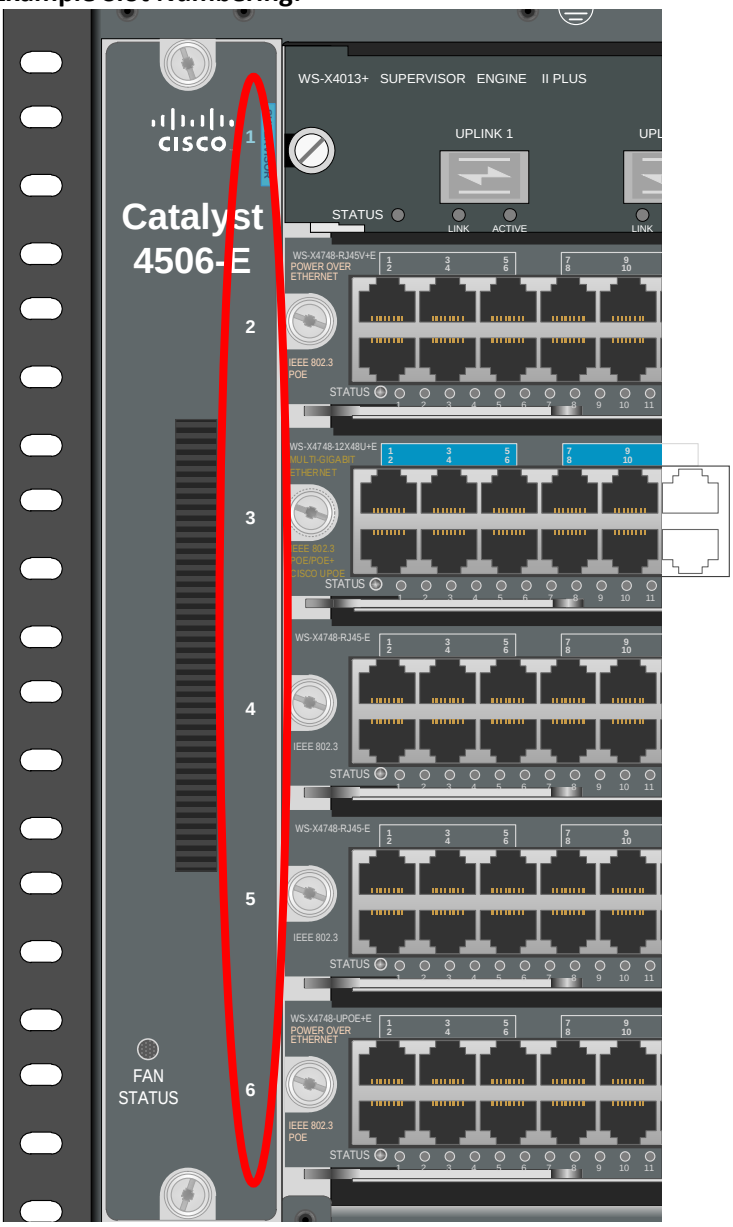
- User area: approximately 80 percent will be 3 meter or 10 feet cables
- User area: approximately 20 percent will be 5 meter or 15 feet cables
- TRs: patch cables shall be the appropriate length for all patching identified by CSU's IS&T
- TRs: unpatched cable shall be an appropriate mix of lengths for future patching (based off the sizes that have already been installed)

a. Examples of Switch Terminology and Ports

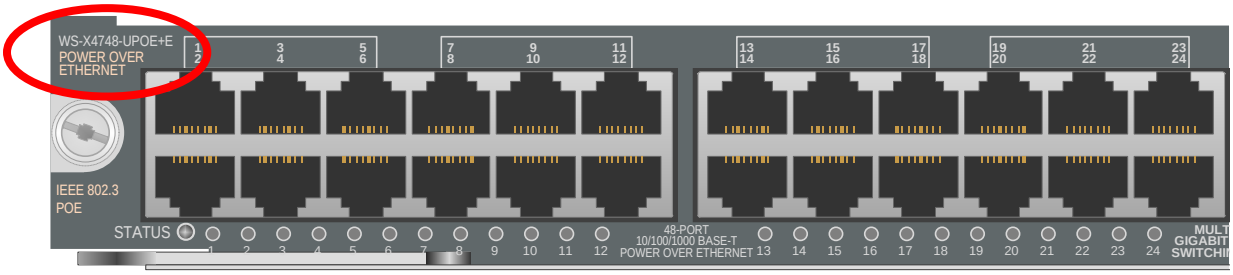


Example Cisco Switch with Line Cards

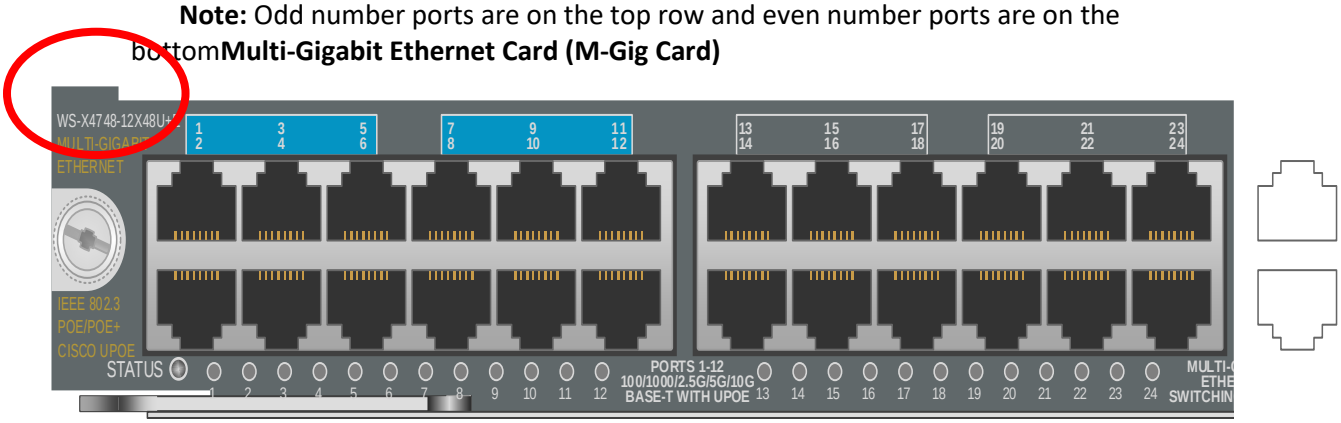
Example Slot Numbering:



Example of Line card type labeling:



Note: Odd number ports are on the top row and even number ports are on the bottom**Multi-Gigabit Ethernet Card (M-Gig Card)**



Ports 01 to 12: Connects at 100/1000/2.5G/5G/10G Base-T with Universal POE. These ports should be reserved for devices requiring data rates above 1Gig connectivity

Ports 13 to 48: Connects at 10/100/1000 Baser-T with Universal POE. These are typical 1 gig data ports and should be utilized before patching into ports 01 to 12 unless the drop requires 2.5Gigabit connectivity or higherTypical Port Layout for Cisco switches:

01	03	05	07	09	11
02	04	06	08	10	12

13	15	17	19	21	23
14	16	18	20	22	24

25	27	29	31	33	35
26	28	30	32	34	36

37	39	41	43	45	47
38	40	42	44	46	48

NOTE: When patching the switch to the patch panel ports, ports 01 to 24 shall be dressed to the left side of the switch and ports 25 to 48 shall be dressed to the right side of the switch. You must make sure not to use the POE ports unless it is connecting a POE device. POE ports are typically the first or first and second cards on the switch, but may be in any slot. All cards have the card type listed on the upper left corner; normally you will be able to tell which cards are POE by seeing which have red cables plugged into them.

13. Documentation

Note: *For larger projects where the work will be broken out into separate phases of completion Shop Drawings, Red-line / Field Drawings, Cable Documents, and Equipment Documentation will be delivered for each phase independently. As-Built drawings are desired for each phase however may be delivered at the end of the project as indicated.*

a. Shop Drawings

- Any drawings for proposed changes in layout or scope shall be submitted to CSU IS&T as soon as possible for review and approval.
    - Documents may be delivered in hard copy; as a PDF via e-mail, on CD-ROM or USB drive and readable in MS-Windows Windows 10

b. Red-lines / Field Drawings

- Red-line documentation (had written field drawings are acceptable) shall be provided within 2 days of completing all the cable runs prior to testing.
    - Red-lines may be delivered in hard copy; as a PDF via e-mail, as an image file (provided all details are viewable when zoomed in) on CD-ROM or USB drive and readable in MS-Windows Windows 10
    - Red-lines will indicate all drop locations and cable IDs for each location

c. As-built Drawings

- As-built documentation is required within 10 business days of completion and acceptance of all testing.
    - Provide modified floor plan drawings to reflect all as-built conditions of the voice, data and video backbone and horizontal cabling, including backbone cable routes, TO numbers for voice and data jacks, floor core locations, wall sleeve locations, etc.
- Provide one (1) hard-copy set of As-built documentation
    - Hard Copy drawings shall be in accordance with the CSU Architectural standards
- Provide one (1) electronic copy of documentation. All electronic documentation shall be provided on CD-ROM or USB drive and readable in MS-Windows Windows 10
    - As-built documentation should be in AutoCAD format and Adobe PDF format

d. Cable Documents

- Contractor shall provide the filled-out cable cutsheet within 1 day of completion of the patching to facilitate programing of the network; or with prior coordination fill in the sheet on the IS&T SharePoint site as the work is progressing. IP address will be assigned to devices and coordinated with contractors though this method.
- Contractor shall provide a cutsheet listing all cables removed during the project. At a minimum the cutsheet shall include:
    - Room number the cable was removed from
    - Full cable identification number
    - Physical patch panel and port location
    - If the cable was patched to a switch provide the switch port identifier
- Full test results shall be delivered in electronic format; one copy of the full test report for each cable in the native format of the tester being utilized (contractor must provide software to read the files if it does not utilize the Fluke Linkware) and one copy in a PDF format.
    - Include a copy of the tester(s) certification; if the tester(s) was certified during testing include a copy of the previous certification(s) as well
- Contractor shall provide upon project completion the signed warranty registration form and warranty certificate for the Hubbell Mission Critical Warranty

e. Equipment Documentation

- Provide Electronic or hard copy of all product data sheets and warranty certificates for equipment purchased as part of the installation.
- Include a master spreadsheet listing each item, the warranty start date, warranty termination date, and if options to extend the warranty are available

14. Warranties

All copper cabling installed shall be certified with a Hubbell 25-year MISSION CRITICAL® Warranty Program coverage.

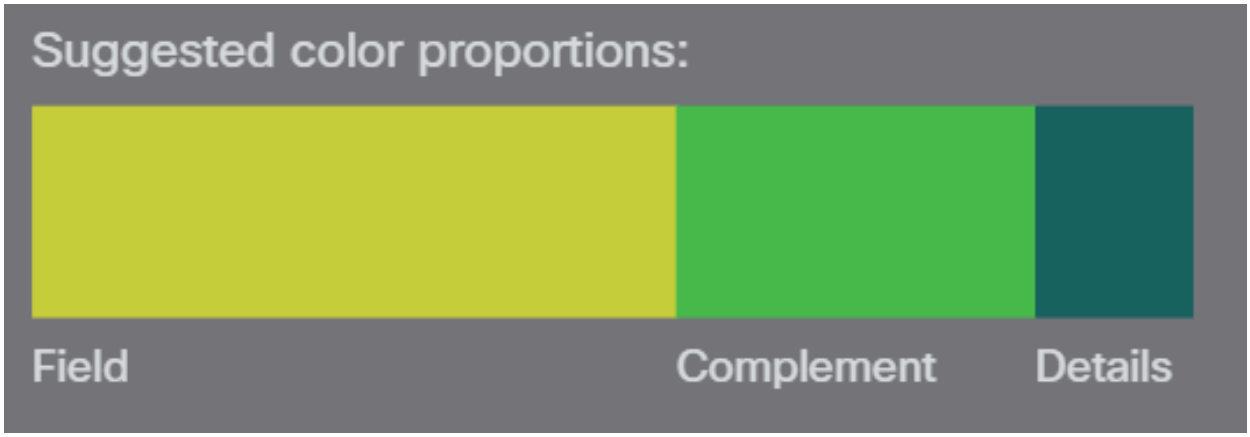
All cabling components as well as the installation must carry a manufacturer's 25-year warranty. Components not warranted by Hubbell shall be warranted by the wiring manufacturer (i.e. General Cable Corporation shall warrant the cabling installed at the Hubbell MISSION CRITICAL level as a minimum).

Electronic and electrical components for data (i.e. switches and uninterruptable power supplies) shall be supplied with 5-year manufacture warranty unless otherwise approved. Additionally, pricing options shall be provided for optional extension year(s) to the warranty.

<END>

CITDL ROOM PAINT GUIDE

Should follow Field, Complement, and Detail. The Field Color is the dominant color and should be present on most surfaces in the camera's field of view. The Complement Color is an optional secondary color that can be applied to walls, architectural features, upholstery, window coverings or other elements. The Detail Color is recommended for the trim elements, such as baseboards, door frames, moldings and ceilings. It should appear only marginally in the camera field.



Color//Paint should have a RV range of 18 to 20 percent.

https://www.benjaminmoore.com/en-us/paint-colors/color/af-555/montpelier

https://www.benjaminmoore.com/en-us/paint-colors/color/829/sunrise

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