



Facility Design Manual

Version 1.1

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This Facility Design Manual was prepared by

**Rowan-Cabarrus Community College
Department of Planning & Capital Projects**

Acknowledgements

Appalachian State College Facility Design Manual

North Carolina Department of Administration, State Construction Manual
US DOE & US Green Building Council (USGBC) Sustainable Building Technical Manual

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Facility Design Manual Disclaimer:

This document is intended to provide general information only and is to be used as a reference in understanding Rowan-Cabarrus Community College's design standards. Drawings, design examples, and/or size/capacity standards included herein may not conform to local laws, codes or conditions. Therefore, particular items or suggestions are not to be considered professional, construction, engineering or design advice.

Designers, contractors, vendors, and suppliers are required to meet the more stringent requirement between this Manual and applicable laws, codes and standards.

Table of Contents: Policies and Procedures

Facility Design Manual.....	1-1
Rowan-Cabarrus Community College.....	1-2
Department of Planning & Capital Projects.....	1-2
Acknowledgements	1-2
REVISIONS AND UPDATES	1-4
Facility Design Manual General Revisions	1-4
Section Updates	1-4
1. POLICIES AND PROCEDURES	1-5
1.1. Administration.....	1-5
1.1.1. Designer's Relationship with the College.....	1-5
1.1.2. Contact with the College	1-5
1.1.3. Design Contracts	1-5
1.1.4. Project Delivery Schedule	1-7
1.1.5. Site and Existing Conditions Information	1-7
1.2. Project Reviews	1-9
1.2.1. Initial Planning Conference.....	1-9
1.2.2. Design Reviews	1-9
1.2.3. Agency Reviews	1-10
1.2.4. College Reviews.....	1-10
1.3. Design Phases	1-11
1.3.1. Formal Projects	1-11
1.3.2. Informal Projects.....	1-15
1.4. Bidding	1-15
1.5. Construction Administration	1-17
1.5.1. Pre-Construction Conference	1-17
1.5.2. Notice to Proceed	1-17
1.5.3. Field Inspections	1-18
1.5.4. Progress Meetings	1-18
1.5.5. Administration.....	1-18
1.5.6. Special Scheduling and Construction Constraints.....	1-18
1.6. Final Closeout	1-19

REVISIONS and UPDATES

Facility Design Manual General Revisions

This is the first printing of the Facility Design Manual. Any future revisions to the Facility Design Manual content will be described in detail in this section.

Issue	Date	Revision Description	Reviser
V1.0	6/10/2016	Initial Issue of Facility Design Manual	
Rev. 1	11/1/2020	1 st Revision	
Rev. 2			
Rev. 3			
Rev. 4			
Rev. 5			
Rev. 6			
Rev. 7			
Rev. 8			

Section Updates

This Facility Design Manual contains examples of the documents currently used between Rowan-Cabarrus Community College and its Consultants. If a document is replaced with a later version, the update will be described in detail in this section.

Issue	Date	Document Description	Reviser
V1.0	6/10/2016	Initial Issue of Facility Design Manual	
Rev. 1	11/1/2020	Updates to Policies and Procedures Section	
Rev. 2			
Rev. 3			
Rev. 4			
Rev. 5			
Rev. 6			
Rev. 7			
Rev. 8			

1. POLICIES AND PROCEDURES

1.1. Administration

This section outlines the administration requirements which are unique to capital projects at Rowan-Cabarrus Community College. These requirements supplement the most current edition of the State Construction Manual required by the North Carolina Department of Administration, State Construction Office (SCO). Although Community Colleges are not required to follow SCO procedures on Informal Projects (those under \$500,000 in construction value), the College voluntarily follows Formal Project (those over \$500,000 in construction value) administrative requirements for all projects (inc. Informal); however, the Designer is not required to make submittals to SCO. The College fully supports and encourages minority business participation in projects on the campus and the Designer should make sure that the latest guidelines from the SCO are followed during the preparation of the documents for bidding.

1.1.1. Designer's Relationship with the College

The Designer should understand that the College is the Owner and Client for the project, even though planning and design for the College is a cooperative procedure involving many persons within the College, the State Construction Office (SCO), and other reviewing agencies. Services performed by the Designer pursuant to this any agreement are solely for the benefit of the Owner and are not intended by either the Designer or the Owner to benefit any other person or entity.

The planning procedures related to the design and construction of capital improvement projects are outlined in Chapter 200 of the State Construction Manual. For Projects under \$500,000, the College has the authority to perform the duties and responsibilities of the Department of Administration and the Director of the State Construction Office. For projects of this size (informal Projects as described in this Manual), the College has the authority to require design and construction to comply with all, or a portion of, these procedures and to waive any of these requirements as it deems applicable.

1.1.2. Contact with the College

The Chief Officer of College Environment is the primary contact for all correspondence and transfer of information during the initial design phases. After award of the construction contract, the point of contact is transferred to the College's Project Manager for the duration of the construction process and final closeout. All documents and correspondence from the Designer shall include the North Carolina Community College System Office Project Number and, for Formal Projects, the State Construction Office ID number.

1.1.3. Design Contracts

Design Contracts or Agreement will be issued in accordance with the provisions set forth in Chapter 100 of the State Construction Manual and shall be coordinated with the College. For Formal Construction Projects (those over \$500,00 in constructed value), the State of North Carolina Standard Form of Agreement will for the form of agreement. For Informal Construction Projects the College's Professional Design Services Agreement will be utilized. Regardless of the form of agreement, the following will apply:

1.1.3.1. All work upon which the design hinges shall be the responsibility of the Designer, and shall be performed as defined in this Design Manual. As a minimum, this will include the following as Basic Services of the Designer:

- 1.1.3.1.1.** Space/Site Investigation
- 1.1.3.1.2.** Space Programming
- 1.1.3.1.3.** Biddable Drawings sets including:
 - 1.1.3.1.3.1.** Civil Design
 - 1.1.3.1.3.2.** Structural Design
 - 1.1.3.1.3.3.** Architectural Design

- 1.1.3.1.3.4.** Plumbing Design
- 1.1.3.1.3.5.** Mechanical Design
- 1.1.3.1.3.6.** Electrical Design
- 1.1.3.1.3.7.** Life Safety and Security Systems Design
- 1.1.3.1.3.8.** Data/Telecommunications Design
- 1.1.3.1.4.** Administration of Bids, including requalification of all bidders
- 1.1.3.1.5.** Construction Administration
- 1.1.3.1.6.** Project Close Out and As Built Documentation

1.1.3.2. As Additional Services to the Designer, the Contract may include, but not be limited to, boundary, topographic, soil, materials, special inspections, and HAZMAT surveys and testing Design Services for specification and layout of furnishings and selection and placement of artwork may also be a requested additional service.

1.1.3.3. All designs, sketches, renderings, drawings, specifications, design calculations, notes, and other works developed in the performance of this contract shall become the sole property of the Owner and may be used on any other design or construction without additional compensation to the Designer. This includes printed copy and electronic files. The use of the design, by any person or entity, for the purpose other than the Project as set forth in the Agreement, shall be at full risk of such person or entity and the Designer shall be relieved of any liability whatsoever, including claims for personal injury, property damage, or death, as a result of such other use.

1.1.3.4. During the Programming/Advanced Planning Phase, the Designer shall perform necessary space and/or site inspections and develop “As-Built” Drawings of existing conditions from which all subsequent design efforts will be based as a part of the Basic Services of the Designer. The Owner shall provide available record drawings, surveys, soils reports, HAZMAT surveys, etc. The available Record Drawings are not guaranteed to be an accurate representation of the Work in place and the Designer will be required to field verify the observable existing conditions. Lack of available Record Drawings, surveys, reports, etc., will not relieve the Designer of the obligation to seek out information necessary for the complete design of the project. Before contracting for additional services of outside consultants, obtain approval from the Owner. The Designer will need approval from the College prior to destructive testing of hidden or concealed conditions.

1.1.3.5. During the Design Development Phase, the Designer shall develop photo realistic renderings of each project and submit to the Owner for the Owner’s unrestricted use. As a minimum, for new buildings and additions, or major renovations of existing buildings, there shall be a rendering of the exterior of the building from the predominant access point (the “front” of the building) from a perspective that could be reproduced with actual photographs; or, for interior projects of significance, an interior rendering from the most impactful perspective. Projects of larger scope may include requirement for other perspectives as Additional Services to the Designer.

1.1.3.6. Bidding of the Project, as defined in the Design Manual, shall be performed by the Designer under the Basic Services of the Contract. All bidding will include prequalification of bidders to ensure only contractors capable of adequately performing the identified work are contracted.

1.1.3.7. Construction Administration of the Project, as defined in this Design Manual, will be performed by the Designer under the Basic Services of the Contract. During the Construction Phase, The Designer shall administer the Change Order Process very closely, maintaining focus on its obligation to always represent the Owner’s interest. Although Change Orders may include groupings of subordinate changes, each discreet change shall be identified in the change order breakdown with

adequate description to effectively analyze the cost and time impact. All Change Orders will identify the reason, or cause, for the requested change. Allowable causes are:

- 1.1.3.7.1.** Owner Directed Change of Scope
- 1.1.3.7.2.** Code Official Directed Change
- 1.1.3.7.3.** Designer Error
- 1.1.3.7.4.** Designer Omission
- 1.1.3.7.5.** Concealed or Unforeseen Condition
- 1.1.3.7.6.** Value Engineering

1.1.3.8. During the Post Construction Phase, the Designer shall develop electronic Record Drawings and Specifications in delineated/vector format to be submitted to the Owner. Specifications shall be annotated to reflect the specific manufacturer, model, color, etc. installed on the Project. Record Drawings will incorporate the Contractor's "red lined" As-Built Drawings and will include not only updated pages for each of the Construction Drawings, but shall also incorporate Fire Protection, Fire Alarm, and other drawings developed by the Contractor's Team and submitted as part of the Submittal Process.

1.1.4. Project Delivery Schedule

The Designer shall prepare and submit a proposed Project Schedule in Gantt Chart format with Critical Path to the College for approval. This schedule shall be developed in a version of Microsoft Project, acceptable to the Owner, with all linkages, dependencies, and constraints active. This schedule shall be submitted in both paper (minimum 11" x 17") and delineated electronic format within twenty-one (21) calendar days of the date of the design contract, and it shall incorporate the end-of-phase milestone dates stipulated in the design contract. In addition, this schedule shall include:

- 1.1.4.1.** The start dates and durations of each major phase of design, including Programming, Schematic Design, Design Development, Construction Documents, and Bidding.
- 1.1.4.2.** The durations and completion dates of each design review period required to maintain the project schedule. For typical projects, the normal review time by the College is approximately two (2) weeks for Conceptual, Schematic, and Design Development submittals and four (4) weeks for Construction Document reviews. State Construction Office Design Review Periods for Formal Projects will follow their requirements for duration and should be included as separate activities, but will be concurrent with College reviews.
- 1.1.4.3.** The projected durations and completion dates of other project-related activities, such as funding decisions, surveys, sub-surface investigations, and all regulatory approvals, including zoning shall be included.
- 1.1.4.4.** The estimated durations of the construction contract award process and the construction period.
- 1.1.4.5.** The estimated durations of construction, broken into phases, if that is anticipated.
- 1.1.4.6.** The Project Development Schedule shall be updated and resubmitted with each end-of-phase submittal described in Section 1.3 Design Phases. The schedule shall be updated and submitted with every design submittal and shall capture re-submittals, delays, and actual durations of activities.

1.1.5. Site and Existing Conditions Information

Accuracy of site and existing conditions upon which any design is based shall be the responsibility of the Designer, and shall be considered as integral to the Basic Services within their Contract. The College will, upon request, furnish existing information for new construction or renovations, as well as, available record drawings for remodeling and renovation projects. The College does not in any way warrant that this information is complete, accurate, or correct. The Designer shall supplement this information with field surveys, measurements, and testing. No structure, equipment or systems will be permitted to be abandoned in place and, to the greatest extent possible, as-built surveys of existing facilities should identify and direct the removal of items which may have been abandoned in place prior to the design of any new project. The Designer is responsible for the accuracy of all information shown on the resulting existing conditions drawings prepared by the Designer.

1.1.5.1. The Designer shall develop “As-Built” drawings which capture the starting conditions from which all subsequent design efforts are based. As a minimum, these “As-Built” will include:

- 1.1.5.1.1.** Cover Sheet
- 1.1.5.1.2.** Code & Summary Sheet, with identified deficiencies from current or triggered Code.
- 1.1.5.1.3.** Life Safety Plan, with identified deficiencies from current or triggered Code.
- 1.1.5.1.4.** Security Plan with identified deficiencies from College Standards.
- 1.1.5.1.5.** Site Utility Plan, including an assessment of the observable condition of existing systems, with identified deficiencies from current or triggered Code and College Standards.
- 1.1.5.1.6.** Grading, Drainage, and Paving Plan, including an assessment of the condition of existing drainage systems, paving and curbing, with identified deficiencies from current or triggered Code and College Standards.
- 1.1.5.1.7.** Site Lighting Plan, including an assessment of the condition of existing systems, with identified deficiencies from current or triggered Code and College Lighting Standards. Site Lighting Plan to also include an assessment of the photometric conditions.
- 1.1.5.1.8.** Landscaping Plan with existing trees and plantings (size and species) and an evaluation of their condition.
- 1.1.5.1.9.** Architectural Floor Plans, with identified deficiencies from current or triggered Code and College Standards.
- 1.1.5.1.10.** Reflected Ceiling Plans, with identified deficiencies from College Standards.
- 1.1.5.1.11.** Roof Plans, including annotations from thermographic survey and evaluation of fall protection, with identified deficiencies from College Standards.
- 1.1.5.1.12.** Structural Plans, with identified concerns (including seismic).
- 1.1.5.1.13.** Electrical Power Plans with Panel Schedules, including age of panels and annotations from thermographic survey of existing panels, with identified deficiencies from College Standards.
- 1.1.5.1.14.** Lighting Plans with Panel Schedules, including age of panels and annotation of actual lighting levels and annotations from thermographic survey of existing panels, with identified deficiencies from College Standards.
- 1.1.5.1.15.** Plumbing Plans with identified deficiencies from current or triggered Code and College Standards.
- 1.1.5.1.16.** Mechanical Plans with identified deficiencies from current or triggered Code and College Standards.
- 1.1.5.1.17.** Fire Protection Plans with identified deficiencies from current or triggered Code and College Standards.
- 1.1.5.1.18.** Furniture and Equipment Plans

1.1.5.1.19. Low Voltage and Data Terminations Plans

1.1.5.2. Property Surveys: All project's site plans shall be developed from a new topographical map developed specifically for that project; not from "as built" information or previous project grading plans. Accurate information is critical and special conditions such as underground utilities and tanks shall be addressed. This work shall be performed by the Designer as Additional Services of the Designer. All surveys shall be performed by a land surveyor licensed in the State of North Carolina.

1.1.5.3. HAZMAT Surveys: All renovation projects should include a review and incorporation of any existing HAZMAT surveys. If no HAZMAT Survey exists on any building constructed before 1980, there are concerns about missed items or contamination subsequent to the last inspection, that work should be performed by the Designer as Additional Services of the Designer.

1.1.5.4. Geotechnical Surveys: The Designer shall direct and provide subsurface investigation judged necessary for the design of the project. This work shall be performed by the Designer as Additional Services of the Designer.

1.2. Project Reviews

This section outlines the review procedure requirements which are unique to capital projects at Rowan-Cabarrus Community College. These requirements supplement the most current edition of the State Construction Manual required by the North Carolina Department of Administration, State Construction Office (SCO).

1.2.1. Initial Planning Conference

An initial planning conference will be scheduled by the College to include representatives of the stakeholding departments and other appropriate participants to discuss general requirements of the program and procedures for facilitating the Designer's work. This conference should also include discussion of the College's Goals/Expectations for Sustainable Design. This conference will be held as soon as possible after selection of a Designer for the project. It is recommended that the Designer's professional consultants for plumbing, HVAC, electrical, and telecommunications design attend this conference.

1.2.2. Design Reviews

The Designer is required to make submittals and presentations, and to participate in review conferences at various stages of the project design process. It is recommended to the Designer that the number of reviews required for the project be determined prior to executing a form of agreement.

The Designer will be expected to record the content of all conferences and, within seven days, to provide meeting minutes containing a complete summary of the decisions and actions which affect the project. The Designer will issue these meeting minutes to all meeting participants and other interested parties for the Project.

1.2.2.1. Presentation and Review Conferences: During the design process, the Designer will be expected to make presentations to various groups who must review and approve the proposed project designs. These groups might include stakeholding divisions and departments, other Consultants to the College, the President, the Board of Trustees (BOT) and Student, Faculty and Staff Associations. All conferences and presentations will be scheduled by, or with approval of, the College.

1.2.2.2. Schematic Design Conference: Normally, several conferences precede the approval of the architectural program and, subsequently, the Schematic Design documents.

Conferences may be required to clarify the program requirements, to review and discuss the Designer's design proposals, to discuss the Designer's evaluation of the achievability of the program requirements within budget constraints, and to assist in the definition of alternates which will become an important component of the Construction Documents.

1.2.2.3. Presentations to the College Administration & Board of Trustees: The Designer will be expected to make presentations of the project design to appropriate Rowan-Cabarrus Community College Divisions and Departments, the President, and to the Board of Trustees, as necessary. The following exhibits are typically required for these presentations: floor plans, exterior elevations, and renderings, as necessary, to communicate the extent of design. When required, these presentations may be scheduled to occur as early as possible in the Design Development Phase of the project.

1.2.2.4. End-of-Phase Reviews: At least one conference in each phase will be devoted to the end-of-phase review of the Design Development and Construction Documents, and will be for the purpose of discussing any areas of concern that arise during the review process. The Designer and the Designer's primary consultants will be expected to attend these review conferences. It should be noted that the College reviews projects to ensure that they are developed in conformance with its criteria and that they will be suitable for College purposes, but does not provide a checking or quality control service for the Designer.

1.2.3. Agency Reviews

The Designer is to take the lead role in determining and advising the Owner of the required permits, through consulting with the various permit agencies through pre-application meetings to document both applicability and specific permitting criteria. The Architect is to prepare the applications for Owner's signature, along with all supporting documents, transmit permitting agency invoices of fees to the Owner for payment, submit the application(s) on behalf of the Owner and respond to any agency inquiries. See Chapter 200 of the State Construction Manual for additional information. The Designer will work with the College to coordinate each submittal to the governing organization, which may include, but not be limited to, the following:

- 1.2.3.1.** The local county and/or city having jurisdiction
- 1.2.3.2.** State Construction Office (SCO)
- 1.2.3.3.** North Carolina Department of Environmental Quality (NCDEQ)
- 1.2.3.4.** North Carolina Department of Transportation (NCDOT)
- 1.2.3.5.** County and/or State Department of Health

Approaching completion of the project, the Architect is to prepare and submit Certificates of Completion, coordinate permitting agency inspections, and assure that clearance letters are received prior to the placement of new systems into service, and prior to Certificate of Substantial Completion.

1.2.4. College Reviews

In addition to the various State and local agencies reviews required for the project, design submittals may also be reviewed by various stakeholding divisions and departments (user groups) within the College. The College will coordinate the End-of-Phase Reviews outlined in Item 1.2.2. The Designer shall not proceed to the next phase before receiving written approval of the previous phase from the Chief Officer, College Environment.

1.2.5. Other Reviews

The Designer is to take the lead role in determining and advising the Owner of any other required approvals, through consulting with the various entities that may have approval authority over the

project. The Architect is to prepare the applications for Owner's signature, along with all supporting documents, transmit permitting agency invoices of fees to the Owner for payment, submit the application(s) on behalf of the Owner and respond to any agency inquiries. The Designer will work with the College to coordinate each submittal to the governing organization, which may include, but not be limited to, the following:

- 1.2.5.1. Developers;
- 1.2.5.2. Community Associations

1.3. Design Phases

This section outlines the design phase requirements which are unique to capital projects at Rowan-Cabarrus Community College. These requirements supplement the most current edition of the State Construction Manual, required by the North Carolina Department of Administration, State Construction Office (SCO). Formal Projects and Informal Projects (with their associated dollar values) are as defined in this Chapter 400 of this Manual. The Guidelines are developed based on two project types which include:

- Design Phases for Formal Projects (over \$500,000 in constructed value)
- Design Phases for Informal Projects (under \$500,000 in constructed value)

1.3.1. Formal Projects

1.3.1.1. General: The Designer shall comply with Chapter 300 of the State Construction Manual regarding design phases and submittal requirements. At the beginning of the Design Phase, the Designer will meet with the Capital Projects Coordinator to establish an aggressive project delivery schedule and confirm which stakeholder group(s) will be involved in the project. Primary contacts shall be established to ensure the Designer receives the necessary information and approvals in a timely manner. The design phases outlined below describe supplementary requirements of the College for a "typical" project process.

1.3.1.2. Programming / Advance Planning: The Designer shall facilitate an integrated design approach utilizing the designated representatives of the College and user group(s) to establish the design criteria for the project. The Designer shall define the program, space needs, site considerations, and project budget in this phase. The Designer shall comply with the College's Standards for space planning and furniture. At completion of this phase of the project, the Designer will summarize all programmatic and advance planning criteria in written format to include the following Programming/Advance Planning Submittals:

- 1.3.1.2.1. Project Budget
- 1.3.1.2.2. Site Analysis
- 1.3.1.2.3. Sustainable Design Criteria
- 1.3.1.2.4. Detailed Space Program
- 1.3.1.2.5. Classroom Occupancy and Office Counts
- 1.3.1.2.6. Code Summary
- 1.3.1.2.7. Life Safety and Security Concept
- 1.3.1.2.8. Project Delivery Schedule
- 1.3.1.2.9. Special Requirements
- 1.3.1.2.10. "As-Built" Drawings (on Remodel/Renovation Projects)

1.3.1.3. Schematic Design: Prior to the beginning of the Schematic Design Phase, the Designer shall finalize the program, budget, and project scope with the designated user group(s) and the College's Project Manager. A written summary shall be provided to the College. Based on an approved summary of the project requirements, the Designer shall prepare a Schematic Design package illustrating the recommended implementation of the program and project requirements.

The Designer is expected to involve the College, the stakeholding division/departments, and appropriate tenant groups within the College (and, possibly, the community) during the development of the schematic design. A number of studies may be required to satisfactorily explore the range of alternatives possible. Schematic Design Submittals: In addition to those copies required by the various State agencies, the Schematic Design Phase Submittal to the College shall consist of one (1) hard copy and one (1) electronic copy of the following documents:

- 1.3.1.3.1.** A general description of the project indicating the construction materials, structural systems, and mechanical, electrical, and plumbing systems.
- 1.3.1.3.2.** A line rendering of the project showing proposed massing, fenestration, and roof type.
- 1.3.1.3.3.** Site plans showing the size of the facility, adjacent buildings, generalized topography, roads, walks, and utility service.
 - 1.1.1.3.3.1.** For new projects: Show analysis of sight lines, and consideration of solar orientation and site specific climactic conditions. Pedestrian flow through and within the buildings should be considered;
 - 1.1.1.3.3.2.** For existing buildings: Consider modifications that will address solar heat loads. Consider modification that will improve pedestrian flow through and within the building.
- 1.3.1.3.4.** Floor plans for all affected floor levels, including mechanical, electrical, and telephone/IT rooms and service areas. Identify each room or space by functional name, room number following the College's Room Numbering Scheme (integrating into existing Building Numbering Scheme on minor renovations/ remodels), rough square footage, and functional occupancy.
- 1.3.1.3.5.** An evaluation of Mechanical, Electrical, Data, and other systems to ensure that layout of those systems within the building and the site maximize the efficiency, access, and maintainability of the systems.
- 1.3.1.3.6.** A Life Safety and Security Scheme for site and each floor of the building incorporating emergency management and Crime Prevention Through Environmental Design (CPTED) principles and best practices. These plans shall identify all elements of the Life Safety and Security Concept for the building, including:
 - 1.3.1.3.6.1.** Flood prevention and mitigation;
 - 1.3.1.3.6.2.** Emergency Sheltering;
 - 1.3.1.3.6.3.** Security Officer Post;
 - 1.3.1.3.6.4.** Video Surveillance;
 - 1.3.1.3.6.5.** Access Controlled Doors;
 - 1.3.1.3.6.6.** Emergency Phones;
 - 1.3.1.3.6.7.** Mass Notification, including exterior devices, speakers, digital message boards.
- 1.3.1.3.7.** A Responsibility Matrix identifying Contractor, Owner, or other Third Party responsibility for performing any element of the work required to provide a fully functioning building or space. This includes furnishing and installing Furniture, Fixtures and Equipment.
- 1.3.1.3.8.** A tabulation of the floor areas.
- 1.3.1.3.9.** A statement of probable construction cost under an OC-25 Summary Sheet. (Estimates shall include separate items for site work, utility extensions, and other items outside the structure.) Show estimated cost per square foot. Indicate new construction costs and/or remodeling costs, including major and minor areas of remodeling, with approximate areas.
- 1.3.1.3.10.** An updated Project Delivery Schedule.
- 1.3.1.3.11.** An updated Sustainable Design Criteria.
- 1.3.1.3.12.** Annotated written response to all previously received review comments either indicating that they are incorporated or justifying their proposed rejection.

1.3.1.3.13. Building modelling and administrative work necessary to submit the project to Duke Energy for consideration in the Smart Energy Advantage incentive program.

1.3.1.4. Design Development: Prior to proceeding to the Design Development Phase, the Designer shall obtain written approval from the Chief Officer, College Environment and SCO (on Formal Construction Projects) on the Schematic Design submittal. The Designer shall prepare the Design Development documents which set forth in detail all of the basic elements, systems, and materials to be used in the project. During the Design Development process, the Designer is expected to involve the Executive Director of Planning and Capital Projects and, through his representative, the department user group(s), and appropriate members of the College. A number of studies may be required to satisfactorily explore the range of alternatives possible; for example, two or more structural, electrical, and mechanical systems that are feasible for the project shall be evaluated and the Designer shall select the systems that are best suited to the project. In addition to those copies required by the various State agencies, the Design Development Phase Submittal to the College shall consist of one (1) hard copy and one (1) electronic copy of the following documents:

1.3.1.4.1. Site drawing(s) showing adjacent buildings, significant existing features, proposed limits of construction, proposed site improvements, existing and proposed contours, horizontal and vertical control points, general elements of drainage and sedimentation control, utility requirements, established easements, and other site data furnished on the previous submittal.

1.3.1.4.2. An update to the exterior rendering of the project, including textures, as well as renderings of significant interior spaces.

1.3.1.4.3. Scaled architectural plans of all floor levels. Identify each room or space by name and number.

1.3.1.4.4. Life Safety Plan with emergency shelter areas identified with their respective areas, shelter occupant counts, etc.

1.3.1.4.5. Building and Site Security Plans with identification of all the various security systems.

1.3.1.4.6. Elevation Drawings of every exterior side of each structure showing materials, features, openings, floor and roof lines, grade lines, footings, and everything exposed to view above eaves or parapets.

1.3.1.4.7. Section(s) through the entire building, selected to best show the relationships of architectural and engineering features.

1.3.1.4.8. A Room Finish Schedule showing the type of material to be used for floors, walls, and ceilings.

1.3.1.4.9. Equipment and furniture layouts for all rooms, when crucial in indicating the adequacy of the arrangement and configuration of such rooms.

1.3.1.4.10. The structural system design, including boring logs from the subsurface investigation report; the allowable soil bearing pressure; a foundation plan showing the basic elements of the foundation system; typical floor framing plan showing size, spacing, and type of principal members; a roof framing plan; and, the locations of shear walls and/or bracing, with such additional information as may be necessary to describe the method of lateral load resistance. Structural drawings shall show the design floor loadings of all areas.

1.3.1.4.11. The plumbing design showing the general development of the plumbing system, including source of supply and disposal of waste.

1.3.1.4.12. The mechanical design showing the basic layout and location of HVAC equipment, piping, and duct-work; a schematic of the temperature control systems; diagrams of air, hot water, and/or steam systems, chilled water and condenser water systems; and, major design calculations.

- 1.3.1.4.13.** The electrical system design showing an analysis of loads and the major design calculations; the basic fixtures and equipment; and, location of the electrical power distribution components, including primary service circuits, transformers, main switch-gear, motor control centers, power and branch circuits panels, lighting, and switching patterns.
- 1.3.1.4.14.** Single line drawings showing the basic elements of the fire alarm with mass notification, smoke/heat detection, telecommunications (telephone and data), Campus closed circuit TV, access control, emergency lighting, paging, or other systems in the project.
- 1.3.1.4.15.** An outline specification, indicating materials, types of construction, and equipment to be used. Include a description of each plumbing, HVAC, fire protection, telecommunications, and electrical system design concept. Include elevator characteristics and the names of proposed manufacturers and cut sheets of 'major' HVAC, plumbing, fire protection, special systems, data, electrical equipment, and fixed equipment.
- 1.3.1.4.16.** The reports of the required Life Cycle Cost & Energy Consumption analysis.
- 1.3.1.4.17.** A tabulation of building data, including square feet of floor area, roof deck "U" factor, heating load in BTUH, air conditioning in tons, plumbing load in drainage fixture units, water demand in peak GPM, electrical loads in KVA, the design live loads, and number of occupants.
- 1.3.1.4.18.** A statement of probable construction cost using, as a minimum, the requirements expressed in appropriate units, such as area, volume, linear feet, tons, BTUH, KW requirements, etc., taking into consideration the actual systems and materials proposed in the submittal. Site work, utility services, and other items outside of the structure shall be as shown as separate items. A complete tabulation showing the breakdown of appropriated and/or authorized funds shall be included.
- 1.3.1.4.19.** Updated Project Delivery Schedule
- 1.3.1.4.20.** Updated Sustainable Design Criteria
- 1.3.1.4.21.** Annotated written response to all previously received review comments either indicating that they are incorporated or justifying their proposed rejection.
- 1.3.1.4.22.** Develop and submit application for Duke Energy Smart Energy Advantage incentive program.
- 1.3.1.4.23.** For projects involving occupied spaces, provide narrative of impact on occupied spaces.
- 1.3.1.4.24.** Phasing Plan(s) for projects that require several phases to complete.

1.3.1.5. Construction Documents: Prior to proceeding to the Construction Documents Phase, the Designer shall obtain written approval from the Chief Officer, College Environment and SCO (on Formal Construction Projects). Based upon the approved Design Development submittal, the Designer shall prepare the Construction Documents and other materials required for the receipt of competitive bids on the project. These documents shall be prepared in compliance with the requirements outlined in the State Construction Manual. In addition to those copies required by the various State agencies, the Design Development Phase Submittal to the College shall consist of one (1) hard copy and one (1) electronic copy of the following documents:

- 1.3.1.5.1.** Completion of all drawings and specifications as outlined in the State Construction Manual and this Design Manual
- 1.3.1.5.2.** The Cover Sheet of the Construction Drawings shall include the following summary:
 - 1.3.1.5.2.1.** Floor area (square feet) tabulation
 - 1.3.1.5.2.2.** Volume of floor area (cubic feet) tabulation
 - 1.3.1.5.2.3.** Roof system "U" factor
 - 1.3.1.5.2.4.** Heating load in BTUH
 - 1.3.1.5.2.5.** Air conditioning in tons

- 1.3.1.5.2.6.** Plumbing load in drainage fixture units
- 1.3.1.5.2.7.** Water demand in peak GPM
- 1.3.1.5.2.8.** Electrical loads in KVA
- 1.3.1.5.2.9.** Structural design live loads
- 1.3.1.5.2.10.** Occupancy load summary
- 1.3.1.5.3.** Where interior or exterior colors, materials, or finishes are specified, a “color board” (one copy only) shall be provided, accurately depicting the materials, colors, and finishes to be used on the project and indicating their location(s) within the project. Large samples of the main or primary wall colors should be provided.
- 1.3.1.5.4.** A list of “Owner Preferred Alternates” should be clearly defined in the submittal.
- 1.3.1.5.5.** Update of Project Delivery Schedule.
- 1.3.1.5.6.** Provide one set of AutoCAD files and 11” x 17” drawings to the Executive Director of Planning and Capital Projects showing the architectural floor plan(s) with final approved room numbers as they will appear at the entrance of each space.
- 1.3.1.5.7.** Provide one set of AutoCAD files showing the site plan, exterior elevations and roof plan. This drawing information will be used to update the Campus Map and for planning purposes.
- 1.3.1.5.8.** Updated Sustainable Design Criteria
- 1.3.1.5.9.** Annotated written response to all previously received review comments either indicating that they are incorporated or justifying their proposed rejection.
- 1.3.1.5.10.** Report on the status of the Duke Energy Smart Energy Advantage incentive program.
- 1.3.1.5.11.** For projects involving occupied spaces, provide narrative of impact on occupied spaces.
- 1.3.1.5.12.** Phasing Plan(s) for projects that require several phases to complete.

After the initial submittal of completed Construction Documents, the Designer shall revise the Construction Documents in accordance with review comments. The Designer shall prepare a written response to the College’s comments and submit to the College within three (3) weeks of receipt of the review comments.

1.3.2. Informal Projects

1.3.2.1. General – The Designer shall comply with Chapter 300 of the North Carolina State Construction Manual regarding design phases and submittal requirements. The items outlined below describe supplementary requirements of the College for a process based on the anticipated project cost being less than \$500,000. These items may vary per project.

1.3.2.2. Programming - The criteria outlined in Item 1.3.1.2 of this Manual are applicable. If necessary, a review by the College will be performed to assure that the user’s needs are being met for the project.

1.3.2.3. Design - The criteria outlined in Items 1.3.1.3, 1.3.1.4, and 1.3.1.5 of this Manual are applicable for Informal Projects. The College will work with the Designer to consistently seek ways in which to improve the design/review process for Informal Projects. The Designer is responsible for obtaining review comments and agency approvals in accordance with the State Construction Manual. The College will review plans and specifications for usability, maintenance, and compatibility with existing conditions. The College is not expected to perform a complete technical review. The Designer will be expected to produce a technically accurate set of plans and specifications that shall be bid without alteration by the College. At the beginning of the Design Phase, the Designer will meet with the Capital Projects Coordinator to establish an aggressive project

delivery schedule and confirm which stakeholder group(s) will be involved in the project. Primary contacts shall be established to ensure the Designer receives the necessary information and approvals in a timely manner. Review times by the College should be kept to a minimum in an effort to maintain the project delivery schedule. The number of submittals required by the project shall be determined with the Designer, prior to final negotiation of the design contract or letter agreement. Submittal options may include:

- 1.3.2.3.1.** Combine Schematic Design and Design Development submittal; or,
- 1.3.2.3.2.** Eliminate all but Construction Document review with sit-down review at 50% completion; or,
- 1.3.2.3.3.** Some projects may only require a Construction Document review.

1.4. Bidding

This section outlines the bidding requirements which are unique to capital projects at Rowan-Cabarrus Community College. These requirements supplement the most current edition of the State Construction Manual required by the North Carolina Department of Administration, State Construction Office (SCO), and Executive Orders by the Office of the Governor.

1.4.1. Approval to Bid

Prior to proceeding to the Bidding Phase, the Designer shall obtain written approval from the Chief Officer, College Environment (and the SCO – for Formal Construction Projects).

1.4.1.1. The Designer shall comply with Chapter 400 of the State Construction Manual and applicable North Carolina General Statutes regarding bidding phase and submittal requirements.

1.4.1.2. Although it is desired by the College to maximize competition in the bidding process, the College recognizes the necessity of ensuring only contractors capable of adequately performing are contracted to perform construction at the College. The Designer shall develop Bidding Requirements which ensure that only firms with adequate relevant experience, staff, and financial stability are considered for award. As a minimum, the following must be ascertained during the review of bid packages:

- Organizational, individual staff and proposed subcontractor experience on projects of similar size, scope, and complexity.
- Organizational, individual staff and proposed subcontractor certifications and qualifications in particular specialties deemed necessary.
- On Formal Projects, experience on projects constructed under State Construction Office's purview.
- Former clients have been satisfied with the Contractor's performance on similar projects. Include contact information for referenced former clients.
- Satisfactory performance on previous State Construction Office administered projects, as documented with SCO.

1.4.1.3. Bidders who do not adequately meet the requirements set forth in the Pre-Qualification or Bidding Requirements must be deemed “unresponsive”.

1.4.1.4. The Designer shall coordinate all activities and information through the bidding process with the College’s Project Manager.

1.4.1.5. The date for receipt of bids shall be established by the Designer in consultation with the College and the SCO. A period of four (4) weeks is the typical duration between the publication of the Advertisement for Bids and the receipt of bids.

1.4.1.6. Bid Document Submittals: The Bid Document Submittal to the College shall consist of one (1) hard copy. These sets shall be in the possession of the Chief Officer of College Environment during bidding.

1.4.1.7. At the College’s discretion, a Bid Bond shall be included with all Bids; Designer to note specific requirements in the Bid Documents.

1.4.1.8. The College will actively solicit participation from Historically Underutilized Businesses (HUB) contractors to bid on projects.

1.5. Construction Administration

This section outlines the construction administration requirements which are unique to capital projects at Rowan-Cabarrus Community College. These requirements supplement the most current edition of the State Construction Manual required by the North Carolina Department of Administration, State Construction Office (SCO).

1.5.1. Prior to proceeding to the Construction Administration Phase, the Designer shall obtain written approval from the Chief Officer, College Environment and SCO (for Formal Construction Projects).

1.5.2. The Designer shall comply with Chapter 500 of the State Construction Manual regarding the construction phase and submittal requirements.

1.5.3. The Designer shall coordinate all activities and information throughout the construction phase with the College’s Project Manager.

1.5.4. The Construction Phase will begin with the Designer’s receipt of the fully executed copy of the construction contract(s).

1.5.5. Pre-Construction Conference

The Designer, in consultation with the College’s Project Manager and the State Construction Office, shall arrange for a Pre-Construction Conference. The purpose of this meeting is to review the requirements of the project and to provide a framework for the coordination of all construction activities. Required Attendees: College PM, Designer, Construction Administrator, Designer’s Consultants, General Contractor, all Major Sub-Contractors, Vendors providing service to the College for the project (i.e. A-V Vendor, IT Equipment, Furniture, etc.), and additional parties as appropriate for the scope of the work.

The Designer shall send copies of the minutes of this conference to all attending contractors, the College’s Project Manager, the Chief of College Environment, the State Construction Office, and any other interested parties.

1.5.6. Notice to Proceed

Upon approval of all regulatory agencies, the Designer will coordinate with the SCO and the College’s Project Manager to establish a date for each contract to proceed with Work. The Designer will then issue a “Notice to Proceed” according to the type of construction contract for the project. These letters shall establish the start date, duration, and completion date for the overall project, and for any discrete phases. Copies of each letter issued by the Designer shall be forwarded to the SCO and The College.

1.5.7. Field Inspections

The Designer shall provide necessary liaison and, as a minimum, weekly site visits to the project to determine compliance with plans and specifications. All site visits will be documented with Field Reports, with photos documenting progress and issues of concern, which shall be distributed to the project team and others as requested by the Owner.

The College's Operations and Maintenance staff will also observe work progress periodically and will provide comments to the Designer through the College's Project Manager. Included among these observations by the Physical Plant will be an above-the-ceiling inspection of all areas, before suspended ceilings are installed.

1.5.8. Progress Meetings

The Designer shall establish a schedule of progress meetings at the job site in accordance with Chapter 500 of the State Construction Manual. The frequency of meetings will have been set in the special conditions of the contract and may be revised by the College, depending on progress and nature of the work. Minutes of the meetings will be kept by the Designer and distributed to all parties.

1.5.9. Administration

The Designer shall provide other construction phase services for the project, including:

- 1.5.9.1. Prepare written weekly site inspection Field Reports.
- 1.5.9.2. Prepare written monthly construction progress reports, with copies of the weekly reports attached.
- 1.5.9.3. Review shop drawing submittals. The Designer shall provide the College Project Manager with an electronic copy of each approved submittal.
- 1.5.9.4. Provide general administration of the construction contract.
- 1.5.9.5. Review results of all field testing on the project and advise the Owner and Contractor of non-compliance.
- 1.5.9.6. Respond promptly to all Requests for Information (RFIs).
- 1.5.9.7. Review requested change orders from the Contractor and advise the Owner.
- 1.5.9.8. Conduct final inspections and review of punch list.
- 1.5.9.9. Review and certify contractor applications for payment.
- 1.5.9.10. Designer's Invoicing:
 - 1.5.9.10.1. Designer's Name and Address
 - 1.5.9.10.2. Project Name and NCCCS/College Project Number
 - 1.5.9.10.3. Within each phase of the Project, Labor, Subconsultants, Reimbursables, Fee and Taxes shall be broken out as separate line items
 - 1.5.9.10.4. For each line item, Contracted Amount, Earned to Date, Percentage to Date Previously Paid, Amount Due, Amount Remaining, Percentage Remaining shall be indicated.

1.5.10. Special Scheduling and Construction Constraints

The culture of "Students First" must be effectively communicated to the Contractor along with the understanding that any inconvenience to the students, faculty, and/or staff of the College must be mitigated to the greatest extent possible, planned in advance, and communicated broadly. This is particularly important when projects involve spaces in, or contiguous to, congested areas of the campus, or other critical activities. Special steps may be required to avoid or minimize interference with on-going campus operations. The Designer and Contractor(s) should determine those areas where impact is critical or cannot be avoided. Dealing with utility outages is the most common consideration, while the problems of noise, vibration, dust, and circulation must also be explored.

- 1.5.10.1. Phasing: The Designer will work with the Owner to understand, capture, and convey to the Contractor the constraints which will require phasing of a project. Because of the cost

implications of phasing any project, this impact to the project schedule must be clearly described by the Designer in developing the Construction Documents so that the implications of the phases are understood by all bidders on bid day.

1.5.10.2. College Schedule: Break periods should be captured in the initial Project Delivery Schedule as they not only impact the design of the project (employees of the College do not work during Winter and Spring Breaks), but also the construction (break periods often allow unfettered access to buildings). Conversely, the First Week of Classes and Finals Week will limit Designer and Contractor access to educational spaces and other areas of the campuses.

1.6. Final Closeout

This section outlines the final closeout requirements which are unique to capital projects at Rowan-Cabarrus Community College. These requirements supplement the most current edition of the State Construction Manual required by the North Carolina Department of Administration, State Construction Office (SCO).

1.6.1. The Designer shall comply with Chapter 600 of the State Construction Manual regarding the final report and closeout requirements. The Designer shall provide the following project close-out services upon completion of the project:

1.6.1.1. Assemble and forward all Final Report Documents for review by the College.

1.6.1.2. Prepare a written description of the HVAC system and operational requirements. The Designer shall also schedule and conduct a review of the HVAC plans and specifications with the Facilities Operations & Maintenance personnel.

1.6.1.3. Provide copies of all Operations and Maintenance manuals to be supplied by the General Contractor or Project Manager.

1.6.1.4. Provide a List of Equipment for Planned Maintenance, listing the equipment, systems and elements to be added to the College's electronic maintenance management program. This listing will include a matrix of all manufacturer recommended planned maintenance.

1.6.1.5. Provide the results of the fire alarm tests and invite a representative of fire alarm contractor to the final inspection with SCO. The Designer shall coordinate the delivery of as-built drawings of the fire alarm system and spare parts (6% of installed stand-alone smoke/heat detectors) to be handed over to the College within 30 days of the final inspection.

1.6.1.6. Submit close-out documents to Duke Energy Smart Energy Advantage incentive program and track final acceptance and delivery of incentive reimbursement.

1.6.1.7. Computation and disposition of liquidated damages (if required).

1.6.1.8. Issue the Certificate of Final Completion & Compliance.

1.6.1.9. Provide record drawings and specifications within 30 days of substantial completion (or 15 days after receiving Contractor's field mark-ups, whichever is later) in accordance with the requirements outlined in Chapter 600 of the State Construction Manual. The digital format shall be compatible with the College's computing environment. An As-Built Conference will be attended by the Owner, Architect, and Contractor to review the drawings and specifications.

1.6.1.10. Provide an electronic copy of the Final Report in accordance with the requirements outlined in Chapter 600 of the State Construction Manual.

1.6.1.11. Provide Emergency Egress Maps of each floor of the building with escape routes from each room identified and safety equipment shown.

1.6.1.12. The Designer shall continue with Construction Administration through the 1 year warranty period and will make an inspection report findings from the One Year Walk-Through Inspection.

Table of Contents: Design Guidelines

2. DESIGN GUIDELINES	2-3
2.1. Introduction	2-3
2.2. General Considerations	2-3
2.2.1. Design within Available Funds	2-3
2.2.2. Energy and Materials Conservation	2-3
2.2.3. Sustainable Design	2-4
2.3. Site Design	2-8
2.3.1. Facility Siting	2-8
2.3.2. Site Surveys	2-8
2.3.3. Grading	2-9
2.3.4. Flood Protection and Stormwater Management	2-9
2.3.5. Site Utilities	2-10
2.3.6. Demolition	2-10
2.3.7. Accessibility	2-11
2.3.8. Campus Services	2-11
2.3.9. Environmental Protection	2-11
2.3.10. Outdoor Lighting	2-12
2.3.11. Site Amenities and Structures	2-12
2.3.12. Public Art	2-12
2.4. Site Circulation Elements	2-13
2.4.1. Access Management	2-13
2.4.2. Connectivity	2-13
2.4.3. Pedestrian and Bicycle Circulation	2-14
2.4.4. Public Transit	2-15
2.4.5. Parking	2-16
2.4.6. Wayfinding	2-16
2.4.7. Landscaping	2-17
2.5. Buildings	2-19
2.5.1. Building Form and Massing	2-19
2.5.2. Facades	2-19
2.5.3. Entrances	2-20
2.5.4. Roofs	2-20
2.5.5. Fenestration	2-21
2.5.6. Structure	2-21
2.5.7. Arcades	2-22
2.5.8. Basements	2-22
2.6. Building Interior	2-22
2.6.1. General	2-22
2.6.2. Walls	2-22
2.6.3. Floors	2-23

2.6.4.	Ceilings	2-23
2.6.5.	Systems	2-24
2.7.	Spaces	2-26
2.7.1.	General	2-26
2.7.2.	Classrooms	2-27
2.7.3.	Laboratories	2-29
2.7.4.	Lecture Halls and Auditoriums	2-29
2.7.5.	Offices	2-29
2.7.6.	Conference Rooms	2-33
2.7.7.	Employee Break Rooms	2-36
2.7.8.	Informal Collaboration Spaces	2-37
2.7.9.	Student Break Areas / Vending	2-38
2.7.10.	Work Rooms	2-38
2.7.11.	File Storage Rooms	2-39
2.7.12.	Storage Rooms	2-40
2.7.13.	Restrooms	2-40
2.7.14.	Mother's Privacy Rooms	2-42
2.7.15.	Custodial Closets	2-43
2.7.16.	Stairs	2-43

2. DESIGN GUIDELINES

2.1. Introduction

The purpose of the Design Guidelines section is to convey guidance for planning, design and construction at Rowan-Cabarrus Community College. The guidelines offer direction for aesthetics and general design intent. The Designer should reference Section 3 – College Standards for detailed requirements.

Rowan-Cabarrus Community College strives to protect the history and traditions of the communities in which our campuses and centers are located. These guidelines are intended to allow and encourage each campus to continue to evolve in such a way that every building contributes in a unique way to the context of the campus, while being respectful of its natural surroundings.

The Campus Master Plan is the official document for continued growth and new development at Rowan-Cabarrus Community College. It is expected that the Designer shall adhere to the design intent of the Master Plan and Guiding Principles.

No written guidelines can fully describe in detail all aspects of the required design criteria. These guidelines seek to portray a prescriptive approach for defining the parameters of a project and design outcome. For design and construction of new facilities (or renovation of existing buildings), the Designer should carefully consider the following parameters for each new project at the College:

- Responsive to use
- Sustainable
- Occupant wellness
- Flexible
- Technologically advanced
- Responsive to topography
- Pedestrian oriented
- Exhibits detail
- Expresses physical harmony
- A 100-year solution
- Model for learning

2.2. General Considerations

In addition to the parameters defined in the previous paragraphs, the College has defined several general considerations the Designer should address and/or integrate into each new project: design within available funds, energy conservation, and materials conservation.

2.2.1. Design within Available Funds

Designers are directed and required to base their designs upon the budgeted funds available. The Designer shall continually monitor program requirements and cost estimates to assure that the project is designed within the available funds and does not deviate from the quality standards established herein. If at any time, the Designer believes that satisfying the stated program requirements, at the level of quality desired, will exceed the budgeted funds available, he or she must inform the College without delay.

2.2.2. Energy and Materials Conservation

The College is dedicated to the principle of conserving materials and energy. College personnel will examine proposed construction for means of reducing, not only the initial cost of energy and non-renewable resources, but also long-range operating costs. In addition to basic conservation requirements, the Designer should consider the utilization of passive solar energy techniques, non-

conventional and renewable energy resources, recycled materials content of specified materials, and non-conventional materials.

2.2.3. Sustainable Design

The College shall uphold a sustainable doctrine by incorporation of new technologies for existing and future facilities, by providing efficiencies in energy, economic, and environmental performance that are substantially better than conventional practice, as a model for the state and region. All new campus construction will be built to at least the the International Well Building Institutes Silver Standard. The College will determine whether or not the project is to be certified with IWSBI or any other sustainability certification organization.

2.2.3.1. Low-Impact Development (LID): New development on campus shall follow the guidelines for Low Impact Development (LID) by utilizing innovative storm water management techniques. Low Impact Development (LID) is an approach to land development that can be utilized at Rowan-Cabarrus Community College as the campuses continue to grow and that works with nature to manage stormwater as close to its source as possible. LID employs principles such as preserving and recreating natural landscape features, minimizing effective imperviousness to create functional and appealing site drainage that treats stormwater as a resource rather than as a waste product. By implementing LID principles and practices throughout the campus environment, water can be managed in a way that reduces the impact of built areas and promotes the natural movement of water within an ecosystem or watershed. Applied on a broad scale, LID can maintain or restore a watershed's hydrologic and ecological functions, creating a better environment for the Rowan and Cabarrus County communities. There are many practices that have been used to adhere to these principles, such as:

2.2.3.1.1. Stormwater Wetlands: These temporarily store rain runoff in shallow pools that support conditions suitable for the growth of wetland plants. These constructed wetland systems, which can be utilized as development occurs on campus, are designed to maximize the removal of pollutants from stormwater runoff via several mechanisms: microbial breakdown of pollutants, plant uptake, retention, settling, and absorption. These structural practices are similar to wet ponds, but incorporate wetland plants, strategically placed stone to encourage growth of various wetlands species, and irregular shorelines to break up linear flow of stormwater. These accommodations mimic a natural pond or wetland with the affect that, as stormwater flows through the wetland, pollutant removal is achieved by settling and biological uptake.

2.2.3.1.2. Bioswales: These are landscape elements designed to remove silt and pollution from surface runoff water. They consist of a swaled drainage course with gently sloped sides and are filled with vegetation, compost, and/or riprap. The water's flow path, along with the wide and shallow ditch, is designed to maximize the time water spends in the swale, which aids the trapping of pollutants and silt. A simple application on campus could be around parking lots, where substantial automotive pollution is collected by the paving and then flushed by rain. The bioswale wraps around the parking lot and treats the runoff before releasing it to the watershed or storm sewer.

2.2.3.1.3. Riparian Buffers: These are vegetated areas, near a stream or pond, which help shade and partially protect a body of water from the impact of adjacent land uses. They play a key role in increasing water quality in associated streams, rivers, and lakes, thus providing environmental benefits. These buffers are important natural biofilters, protecting aquatic environments from excessive sedimentation, polluted surface runoff, and erosion. They supply shelter and food for many aquatic animals and shade that is an important part of aquatic environment temperature regulation. With development comes the decline of many aquatic

ecosystems. Riparian buffers can become a conservation choice aimed at increasing water quality and lessening pollution of Rowan-Cabarrus Community College's water sources.

2.2.3.1.4. Cisterns: These are receptacles constructed to catch and store rainwater for later use. Promoting the use of cisterns can provide an alternative source for irrigation, reducing the demand on local water sources within the campus area. To conserve groundwater, rainwater can be collected, stored, and used for such things as watering gardens, washing cars, or other non-potable water needs throughout the Rowan-Cabarrus Community College campus.

2.2.3.1.5. Permeable Pavements: These can be utilized throughout the campus for roads, parking lots, and walkways to allow the movement of water and air around the paving material. These paving surfaces keep the pollutants in place in the soil and allow water seepage to groundwater recharge while preventing stream erosion problems. They capture heavy metals that fall on them, preventing the heavy metals from washing downstream and accumulating inadvertently in the environment. Porous pavement also gives campus trees the rooting space they need to grow to full size. This integrates healthy ecology and the thriving Rowan-Cabarrus Community College campus with the living tree canopy above, the campus traffic on the ground, and living tree roots below.

2.2.3.1.6. Green Roofs: These are roofs of buildings that are partially, or completely, covered with vegetation and soil, or a growing medium, planted over a waterproofing membrane. Numerous benefits can result from the adoption of green roof technologies: the recovery of green space, moderation of the urban heat island effect, improved stormwater management, water and air purification, and a reduction in energy consumption. The mitigation of stormwater runoff can be a great benefit to Rowan-Cabarrus Community College because of the prevalence of impervious surfaces in the campus area. A major benefit of green roofs is their ability to absorb stormwater and release it slowly.

2.2.3.1.7. Planted Filtering Strips: These are land areas situated between a potential pollutant source area and a stream or pond that receives runoff. A planted filter strip provides water quality protection by reducing the amount of pollutants before the runoff enters the surface water body. Filter strips also provide localized erosion protection since the vegetation covers an area of soil that otherwise might have a high erosion potential.

2.2.3.2. Water Conservation: The College will strive to prove itself a leader in water management over time by enforcing the integration of water conservation practices throughout the campus. All evidence points to increasingly stressed water supplies in North Carolina and throughout the Southeast. Additionally, trends suggest that water management will be more heavily regulated in the future. By beginning to address these eventualities now, the campus will prove itself a leader in water management. Reduce freshwater use 40% by implementing technology to enable water capture and reuse as part of the building design.

2.2.3.2.1. Reduce stormwater runoff impacts by implementing at least one Low Impact Development technology as described above.

2.2.3.2.2. Protect surface water by preventing culverts on any currently daylight surface water. Existing surface water enclosed in culverts will be daylight to the extent practical.

2.2.3.2.3. Utilize permeable surfaces as much as possible.

2.2.3.2.4. Select drought resistant plantings.

2.2.3.3. Energy Efficiency: The College will strive to reduce its carbon footprint over time by enforcing the integration of energy efficient practices throughout the campus. Whether it be for global concerns of climate change or national concerns of energy independence, the College can have a significant impact on the consumption of energy through subtle and inexpensive changes to conventional design. All new construction on campus shall be designed in an energy efficient

manner that complements the overall design intent and reduces total building energy consumption by addressing the following requirements:

- 2.2.3.3.1.** Design site, building envelope, and systems and equipment in compliance with ANSI/ASHRAE/IES/USGBC Standard 189.1-2014 Standard for the Design of High Performance Green Buildings.
- 2.2.3.3.2.** Reduce overall building energy loads.
- 2.2.3.3.3.** Optimize the use of natural daylighting in lieu of electrical lighting. Where impractical, utilize the high efficiency electrical lighting sources.
- 2.2.3.3.4.** Utilize occupancy sensor controls.
- 2.2.3.3.5.** Incorporate exterior shading devices or extended roof overhangs to control heat gain, particularly on southern and western exposures.
- 2.2.3.3.6.** Design high performance mechanical systems that minimize energy use while maintaining standards for indoor air quality and comfort.
- 2.2.3.3.7.** Incorporate building systems are simple and easy to use and maintain.
- 2.2.3.3.8.** Group similar building functions into the same mechanical zone.
- 2.2.3.3.9.** Provide Energy Star-rated equipment and appliances.
- 2.2.3.3.10.** Eliminate the use of ozone-depleting materials.
- 2.2.3.3.11.** Incorporate renewable or alternative energy sources.
- 2.2.3.3.12.** Utilize energy modeling and analysis.
- 2.2.3.3.13.** Utilize enhanced commission on all new projects and, as a minimum, limited commissioning on renovation/remodel projects.
- 2.2.3.3.14.** Facilitate the tracking of energy utilization by installing individual building metering on all utilities servicing new and significantly modified buildings.
- 2.2.3.3.15.** Maximize the thermal efficiency of the building envelope.

2.2.3.4. Material Conservation: The College will strive to conserve the use of natural materials and resources by enforcing the integration of material conservation practices on all new projects. The design and construction for new projects should include strategies that utilize materials with minimal environmental impact. Reusing building materials can greatly reduce the demand for virgin materials, which must be processed, transported, and installed. Reduce waste associated with construction and demolition by diverting materials from landfills for reuse or recycling.

- 2.2.3.4.1.** Specify local materials as a first preference, then regional products to reduce shipping energy cost.
- 2.2.3.4.2.** Specify materials with recycled content.
- 2.2.3.4.3.** Plan for future growth and expansion.
- 2.2.3.4.4.** Utilize flexible design and flexible spaces to provide a maximum lifespan for the use of the building.

2.2.3.5. Indoor Environmental Quality: The College will maintain healthy and comfortable interior environments that promote learning. Facilities should be designed and constructed with an appreciation of the importance of providing a high-quality interior environment for all users. Elements of this will include:

- 2.2.3.5.1.** Maximizing daylighting for all occupied spaces, when possible.
- 2.2.3.5.2.** Maximizing views to the exterior for all occupied spaces.
- 2.2.3.5.3.** Providing operable windows for occupied spaces.
- 2.2.3.5.4.** Designing spaces to meet the acoustical performance identified in ANSI S12.60 Acoustical Performance Criteria, Design Requirements and Guidelines for Schools.

- 2.2.3.5.5.** Suppling adequate levels of outside air to ensure indoor air quality.
- 2.2.3.5.6.** Ensuring adequate fresh air is provided to all spaces. Provide CO2 monitoring and control of spaces with occupancy above 40 persons.
- 2.2.3.5.7.** Prevent the infiltration of moisture into buildings.
- 2.2.3.5.8.** Specify low Volatile Organic Compounds (VOC) products for all interior spaces.

2.2.3.6. Resiliency: Facilities should be designed and constructed with an appreciation of the importance of providing a resilient facilities that will withstand the forces of nature to which they may reasonably be expected to survive.

2.2.3.6.1. Hazard Assessment indicates that they following natural force have been identified for Rowan and Cabarrus Counties, and should be taken into account in the design:

- 2.2.3.6.1.1.** Wind Storm
- 2.2.3.6.1.2.** Flooding
- 2.2.3.6.1.3.** Tornados
- 2.2.3.6.1.4.** Hurricanes
- 2.2.3.6.1.5.** Earthquake
- 2.2.3.6.1.6.** Wildfire

2.2.3.6.2. As a minimum, the design shall address:

- 2.2.3.6.2.1.** Design of building structure and envelope shall comply with local building codes as it applies to wind resistance.
- 2.2.3.6.2.2.** Ensuring adequate shelter space exists within the building for its anticipated occupancy in accordance with FEMA Manual P-431Tornado Protection: Selecting Refuge Areas in Buildings.
- 2.2.3.6.2.3.** Ensuring multi-use shelter space within the building is designed in accordance with FEMA Manual P-361 Safe Rooms for Tornadoses and Hurricanes: Guidance for Community and Residential Safe Rooms.
- 2.2.3.6.2.4.** Buildings shall not be placed within a FEMA designated Special Flood Hazard Area carrying designations of Zone A, or V (100 flood). Special consideration should before locating a building in Zones B or X (500 year flood), given the changing environment. Basements should not extend below the 100 year flood elevation for the area.
- 2.2.3.6.2.5.** Seismic Design
- 2.2.3.6.2.6.** Fire resistance
 - 2.2.3.6.2.6.1.** To the greatest extent possible, use of flammable materials should be avoided in the construction of the Colleges facilities.
 - 2.2.3.6.2.6.2.** All buildings shall have active fire suppression in the form of a fire sprinkler systems. Special use areas (Kitchens, Data Sever Rooms), my require different fire suppression approaches. Fire suppression and detection systems will comply with State Construction Office requirements.

2.2.3.7. Safety & Security: Facilities should be designed and constructed with an appreciation of the importance of providing a safe, secure environment. Students faculty and staff should feel safe anywhere in the building or on the grounds. A secure environment is created primarily by design: opportunities for natural surveillance are optimized; a sense of community is reinforced; and access is controlled. Security technology is used to enhance, rather than substitute for, the design features.

2.3. Site Design

A primary task of all campus architecture and landscape design is the physical definition of streets and public spaces as places of shared use. All site designs shall comply with the State Construction Office's Site Preparation and Grading Criteria. Streets lined by buildings or landscaping rather than parking lots are more interesting to travel, especially for pedestrians, and provide a safer environment. The following guidelines serve to unify the campus through site design principles that will be applied to all projects.

2.3.1. Facility Siting

It is the intent of the facility siting criteria to emphasize continuity for the planning of new facilities on campus. Significant opportunities arise during the site planning stages of design and have a tremendous impact on the overall success of a project. The College requires that each new facility planned for the campus follow the Facility Siting Guidelines to ensure a comprehensive approach to the site design. The Designer shall visit the site and evaluate proposed locations of elements of the project. Site design alternatives must comply with the design intent of the approved Campus Master Plan.

For new construction or additions to existing buildings, site selection is generally indicated in the building program requirements. Designs should address the following criteria:

- 2.3.1.1.** Reinforces the functional relationships of the building program with the existing or planned future campus as represented in the approved Campus Master Plan.
- 2.3.1.2.** Meets access requirements for pedestrian, bicycle, public transportation, and services.
- 2.3.1.3.** Works with existing topography to minimize cut and fill material.
- 2.3.1.4.** Responds to existing sub-soil conditions.
- 2.3.1.5.** Avoids unnecessary environmental impacts.
- 2.3.1.6.** Maximizes sustainable design principles for solar orientation.
- 2.3.1.7.** Responds appropriately to the locations of existing utilities and infrastructure.
- 2.3.1.8.** Maximizes views to and from the building.
- 2.3.1.9.** Considers constructability issues for contractors' access.
- 2.3.1.10.** Provides emergency vehicle access (fire trucks, ambulances, etc.)
- 2.3.1.11.** Minimizes on-campus surface parking.
- 2.3.1.12.** Maximizes open spaces.
- 2.3.1.13.** Preserves nature where possible.
- 2.3.1.14.** Consider extreme weather conditions of the region.

2.3.2. Site Surveys

- 2.3.2.1.** Boundary and Topographic Survey: A Site-specific topographic and utility survey of the property shall be conducted. Limits shall be the full extent of the site and beyond the site limits as necessary to ensure that the site design will fully and completely integrate with the existing

surroundings. The Architect is to define the specific requirements needed for this effort, direct, and provide the site survey as an additional service to his contract services. The survey shall a) be conducted by a professional surveyor licensed in the State of North Carolina; b) not only satisfy the minimum statutory requirements, but also field verify (inclusive of using nondestructive subsurface investigative techniques as necessary) the location and depth of the existing utility systems; c) contour the survey plan, establish two controlling benchmarks for the project; d) be signed and sealed and made a part of the Construction Documents. All surveys shall include contour lines at every two feet (2'-0") of elevation change.

2.3.2.2. Soil Survey and Engineering: A Site-specific soils survey of the property shall be conducted. Limits shall be the full extent of the built site and beyond as necessary to ensure that the site design will fully and completely integrate with the existing surroundings. The Architect is to define the specific requirements needed for this effort, direct, and provide the site survey as an additional service to his contract services.

2.3.3. Grading

Design of the topography of the site will be carefully considered so that development "touches as lightly on the land" as possible, while meeting the needs of the project, particularly as it applies to accessibility.

2.3.3.1. Rough Grading: Slopes shall not be steeper than one (1) vertical to five (5) horizontal in general open lawn and other grassed areas. Steeper slopes will be permitted only on a case-by-case basis where special need warrants. Tops and bottoms of banks and other break points shall be rounded to provide smooth and graceful transitions. All cuts and slopes shall be graded such that they will not create a topography susceptible to erosion, particularly after temporary erosion controls have been removed or have deteriorated. Slopes must be gentle enough to achieve natural repose.

2.3.3.2. Ensure accessible routes exist between all public amenities. In areas of walks without ramps, slopes shall not be steeper than one (1) vertical to twenty (20) horizontal. Ensure ramped areas comply with the ADA Accessibility Code requirements.

2.3.3.3. Finish Grading: This operation shall consist of the final dressing to provide a uniform layer of either the topsoil and nutrients required under Section 2.4.7 Landscaping for the placement of plant materials or of the subgrade in preparation of pavement construction. This work shall achieve elevations within 0.1 inches of required elevation so that the proper thicknesses of overlays can be provided.

2.3.3.4. Mulch, pinned sod, or landscape fabric or netting shall not be utilized as a means of permanent erosion control.

2.3.4. Flood Protection and Stormwater Management

Protecting the investment of the college from predictable weather events is critical and can be achieved relatively easily through proper planning. Similarly, the environmental impact of the large paved and impervious areas associated with the college can be managed through thoughtful design that acknowledges that we are stewards of the lands and waters, and that "code minimum" is not the best way to enhance the environment of the College and surrounding areas.

2.3.4.1. Utilizing the site survey, the Designer shall evaluate the potential for localized flooding. Building elevations shall be established to ensure that the structure is protected from the 100-year base flood.

2.3.4.2. Site design shall also ensure that site alterations do not artificially create a base flood threat to the building or other surrounding buildings.

2.3.4.3. To avoid localized flooding from adjacent streets and drives, building ground floor finished floor elevations should be no less than 1 foot above the top of curb elevation for the street or drive.

2.3.4.4. Storm Water Management will be thoughtfully planned with an eye to improving the waterways of the college back to pre-colonial clearing of the land for agriculture (not just restoring to pre-institutional development).

2.3.4.4.1. Retention Ponds shall be designed as an amenity to the college and shall mimic a natural pond to the greatest extent possible with gently sloped banks, irregular shore line, riparian plantings, stone outcroppings, disguised inlets and outlets. Outlets should provide aeration of stormwater as well as dissipate energy so that stream banks are not eroded.

2.3.4.4.2. Within the lines of demarcation for any project compromised delineated streams and other natural bodies of water shall be restored to pre-development conditions.

2.3.5. Site Utilities

Above ground elements of site utilities should be screened or otherwise hidden from the view of the pedestrian.

2.3.5.1. Consult with the utility companies early in the design process about the location of transformers, boxes, and meters. Ensure that all utility equipment is located, sized, and designed to be as inconspicuous as possible. All utilities, both new and existing, should be placed underground in conduits and vaults. All utility services should be underground. Compatible utility elements should be grouped so that they can effectively be maintained, secured, and screened. Whenever possible, designers are encouraged to create mechanical courtyards where several utility elements are grouped together. The mechanical courtyard should consist of a concrete housekeeping pad or gravel to facilitate grounds maintenance.

2.3.5.2. Specify that any connection to existing utility systems must first be scheduled with the Facilities Operations & Maintenance Department so disruption of services is minimized.

2.3.5.3. It is to be amply noted in the plans and specifications that the Contractor is not authorized to operate any valve of an existing utility system. When needed, such activity is to be requested of the Facilities Operations & Maintenance Department who will perform the necessary operation. Ample advanced notice is to be required to schedule this service. Two days is the normal minimum notice period, but could be a lot stronger depending on complexity and extent of impact on services and operations.

2.3.6. Demolition

Structures should be carefully evaluated prior to making the decision to demolish them, and the case for demolition should be demonstrated with defensible mathematical analysis (i.e. Castaldi Analysis) and captured in writing.

2.3.7. Accessibility

It is the policy of the College to make all areas of the campus, and all buildings located within the campus, physically accessible to all students, faculty and staff, regardless of individual limitations which may affect mobility.

2.3.7.1. The Designer is required to consider and accommodate the special requirements of all segments of the College population, including wheelchair users, those using walking aids, the hearing impaired, and those with sight limitations.

2.3.7.2. The Designer is required to meet all appropriate regulations as set forth by the current North Carolina Accessibility Code and adopted Amendments, as well as the current edition of the Americans with Disabilities Act (ADA). If there are any variations, the Designer is required to design to the more stringent requirement.

2.3.7.3. Recognizing the challenges faced by those with limited mobility, Accessible parking spaces should be located within two hundred feet (200'), or at the closest location possible, of the nearest accessible entrance to a building.

2.3.7.4. Each building's primary accessible entrance will be equipped with a door operator to facilitate access into the building. Where a building has multiple accessible entrances providing access to key campus functions, or where the main corridor within the building serves as a thoroughfare allowing movement from building to building, or other amenity, under cover, secondary access doors may also have operators installed. Secondary and lesser entrances (other than those previously mentioned in this section), service entrances, and interior doors will typically not be provided with operators.

2.3.8. Campus Services

Service areas should be screened or otherwise hidden from the view of the pedestrian.

2.3.8.1. Locate trash storage, loading, and truck parking to minimize visibility from the street/sidewalk and building entrances. Avoid locating service and loading areas along important view corridors.

2.3.8.2. All exterior trash or dumpster areas should be screened from public view on three sides and on the fourth side by a gate that also screens the receptacles from view. The enclosure should be made of materials and colors compatible to that of the principal structure and sufficiently durable to match the intended life of the related facility.

2.3.8.3. Where feasible, screen loading docks and truck parking from public view using building mass, freestanding walls, and/or landscaping.

2.3.8.4. Do not locate HVAC equipment on the street side of the building. Screen all rooftop equipment from public view.

2.3.9. Environmental Protection

All campus development should respect natural resources as an essential component of the built environment. The most sensitive landscape areas, both environmentally and visually, are steep slopes greater than 15%, watercourses, and floodplains. Any development in these areas should minimize intervention and maintain the natural condition except under extreme circumstances. Where practical,

these features should be conserved as open space amenities and incorporated into the overall site design.

2.3.9.1. Piping of creeks should be avoided and channelization should be minimized.

2.3.9.2. Where crossing of existing creeks is necessary, a bridge structure is superior to a culvert. Bridges permit the natural ecosystem of the stream to remain unimpeded under the crossing.

2.3.9.3. Existing vegetation and large specimen trees should be preserved and incorporated into the site design in order to create a natural landscape and the impression of a mature landscape.

2.3.10. Outdoor Lighting

Outdoor lighting should provide a safe and visible pedestrian realm for the College, as well as perpetuate the character for the area. Lighting for outdoor conditions should comply with the design guidelines outlined by the IDA (International Dark-Sky Association). Light source to be LED.

2.3.10.1. Use a low intensity of high-quality white light (4,000-degree K), which will provide good, uniform visibility while avoiding light pollution.

2.3.10.2. Cutoff fixtures are required because they are more efficient than non-cutoff fixtures at casting light on the sidewalk and avoiding light spillage and pollution.

2.3.10.3. Lighting control by wireless system and/or Building Automation System.

2.3.11. Site Amenities and Structures

Incorporate site furnishings (benches, tables, umbrellas, chairs, trash/recycling centers), including engineering tie downs and foundations, where required, into design.

2.3.11.1. Utilize bench walls to establish the perimeter of gathering spaces. Tops shall facilitate comfortable seating, while shedding moisture.

2.3.11.2. Anti-skate principles will be incorporated into all site design and amenities.

2.3.12. Public Art

Works of art have contributed to the visual quality of Rowan-Cabarrus Community College over a long period of time. This amenity adds a visual texture and character that should be continued, as appropriate.

2.3.12.1. Public art should be constructed and placed to add beauty and character to the campus. The piece of art should have meaning and give meaning to the campus and inspiration to those that have the opportunity to see it.

2.3.12.2. Artwork may be free-standing pieces (e.g. sculpture or water fountain) or it may be integrated into its surroundings as an architectural element (e.g. relief sculpture imbedded in pavement or a wall, a mosaic or mural on a wall, lighting or sound effects, or decorative railing or lighting).

2.3.12.3. All lighting of artwork should be in conformance with Campus Standards.

2.4. Site Circulation Elements

These Design Guidelines encourage the development of a network of interconnecting streets that work to disperse traffic while connecting and integrating various areas of the campus. Equally important, these guidelines encourage the development of a network of pedestrian paths, sidewalks, and bicycle lanes that provide an attractive and safe mode of travel for pedestrians and cyclists.

2.4.1. Access Management

The control of driveways, roadways, and other curb cuts through a comprehensive access management program should be a high priority to maintain the efficient operation of the major campus corridors, thereby securing the long-term infrastructure investment.

Street designs on the campus should permit the comfortable use of the street by cars, bicyclists, and pedestrians. Pavement widths, design speeds, and the number of vehicle lanes should be minimized without compromising safety. The specific design of any given street must consider the building which fronts on the street and the relationship of the street to the campus's street network.

The following standards are based upon North Carolina Department of Transportation's Policy on Street and Driveway Access to North Carolina Highways (Drive Manual), latest edition, as well as best practices for corridors similar to those found throughout campus.

2.4.1.1. Driveways shall be limited in accordance with the Campus Standard and/or the North Carolina Department of Transportation's Policy on Street and Driveway Access to North Carolina Highways (Drive Manual), latest edition. Where the NC DOT Driveway Manual conflicts with the Campus Standard, the stricter of the two standards shall prevail.

Frontage (feet)	Number of Driveways Allowed
<500	1
501-999	2
>1,000	3

2.4.1.2. The minimum distance between a driveway and an intersection shall be in accordance with the Campus Standard and/or the North Carolina Department of Transportation's Policy on Street and Driveway Access to North Carolina Highways (Drive Manual), latest edition. Where the NC DOT Driveway Manual conflicts with the Campus Standard, the stricter of the two standards shall prevail.

Street Type	Minimum Distance (feet)
Major/Minor Thoroughfare	500
Local/Collector Street	200

2.4.1.3. The Minimum Spacing between median openings shall be 1,000 feet. Where the NC DOT Median Crossover Guidelines conflict, the stricter of the two standards shall prevail.

2.4.2. Connectivity

The campus should consist of a well-connected street network that provides internal and external connections.

Traffic studies have shown that highly connected street networks provide much greater mobility for a campus community at less cost. A high degree of connectivity should occur not only at the level of

arterials, but also on collector, local, and other secondary roads. Such connectivity vastly improves a street network's performance. The street pattern should not force short trips by vehicle, but rather, should provide means of pedestrian circulation which is more convenient. With a highly connected street network, cross-campus trips should be possible using fairly direct secondary roads.

2.4.2.1. Good transportation design requires the development of a network of interconnecting streets that disperse traffic and support transit options while connecting and integrating the campus with the existing urban fabric of the surrounding area. A network of narrower streets with reduced curb radii slows and disperses traffic and provides a pedestrian-friendly atmosphere.

2.4.2.2. Unless directed otherwise, Campus roadways will be designed in accordance with the NC DOT Roadway Design Manual and details from the NC DOT Roadway Standard Drawings should be utilized. Main campus roads should have a cross-section width of 48' and a posted speed limit of 20 MPH. Facility access roads should have a minimum cross-section width of 36' and a posted speed limit of 20 MPH. Service roads should have a minimum cross-section width of 24' and a posted speed limit of 15 MPH.

2.4.2.3. For good, clear visibility, intersections are to be perpendicular and have lighting arranged at 90 degrees to each street. All landscaping and site amenities in excess of 42" tall at maturity shall be located a minimum of 50' behind the face of curbing at the intersections.

2.4.3. Pedestrian and Bicycle Circulation

Provide a complete network of paths that interconnect building entrances, parking, transit stops, sidewalks and crossings, adjacent properties, adjoining off-street paths, and other key destinations on or adjacent to the site. Where sidewalks do not exist on connecting public roadways, linkages should be advocated for during the site development permitting process.

2.4.3.1. Walks: Pedestrian pathways should be provided from the street to the parking area between buildings, as necessary to ensure reasonably safe, direct and convenient access to building entrances and off-street parking. Pedestrian routes should minimize potential conflicts with vehicles. For pedestrian safety and comfort, where a main pedestrian route must go along or across a parking lot or driveway, provide a separate path with buffer landscaping and other amenities. Walks should not dead-end into the middle of parking lots and other vehicular-oriented areas. Walks should be clearly defined and enjoyable to use.

2.4.3.1.1. To aid pedestrian navigation and comfort, provide the following elements along paths:

2.4.3.1.1.1. Landscaping, such as rows of trees and shrubs, flower beds, and planters

2.4.3.1.1.2. Campus standard outdoor lighting fixtures

2.4.3.1.1.3. Small wayfinding signs

2.4.3.1.1.4. Vertical architectural elements, such as markers or arches

2.4.3.1.1.5. Seating and resting spots

2.4.3.1.1.6. Special paving to delineate seating and gathering spots.

2.4.3.1.2. Whenever pathways cross internal drives, provide a highly-visible crosswalk made of a material that provides strong contrast with the vehicular surface (imbedded elastomeric paint or unit pavers in concrete).

2.4.3.1.2.1. Consider elevating the crosswalk to the level of the connecting walk. These elevated crosswalks will also serve to calm traffic which further enhances safety.

2.4.3.1.2.2. ADA Truncated Domes are required at the intersections where primary pedestrian routes intersect roadways.

2.4.3.1.2.3. Cross walks shall be a minimum of a 10' wide crosswalk, as recommended by the Federal Highway Administration (FHA) Manual on Uniform Traffic Control Devices (MUTCD).

2.4.3.1.2.4. Use warning signs and light fixtures to alert drivers to crossings.

2.4.3.1.3. Provide pedestrian links to each adjacent property only where the College and the adjacent property Owner have a written agreement. The links should be highly visible and conveniently located. Avoid steps; provide curb ramps to accommodate wheelchairs, bicycles, and baby strollers.

2.4.3.1.4. Consistent walkway widths should be maintained across the campus, respond to pedestrian movement, and emphasize a hierarchy for pedestrian circulation. No pedestrian path should be less than six feet (6') in paved width. Whenever parking abuts a walkway, (head-in, diagonal or parallel), add one-and-one-half feet (1.5') to the walkway width to accommodate car overhang or open car doors, or provide wheel stops which hold the wheels at least two feet (2') off the sidewalk.

2.4.3.2. Bicycle Paths and Accommodations:

2.4.3.2.1. Multi-use paths (bicycle and pedestrian) should not be less than eight feet (8') in paved width. These should connect the campus network of paths with every adjacent public roadway.

2.4.3.2.2. Bike racks or lockers should be located close to each building so they are visible and convenient, but not on pedestrian courtyards or in front of the primary entry to the building. The racks should be observable and well lit. To facilitate access, install a curb ramp in any drive near the bike parking.

2.4.3.3. Ramps and Steps

2.4.3.3.1. Siting and building design should minimize the need for steps or ramps. When possible, alternative grading measures should be considered.

2.4.3.3.2. Ramps should be installed for supply and service deliveries.

2.4.3.3.3. Ramps should be installed for accessibility for renovation projects.

2.4.3.3.4. Provide overhead exterior lighting for all steps and ramps. Recessed wall or step lights below twenty-four inches (24") are discouraged due to maintainability issues.

2.4.3.3.5. All walking surfaces should have a surface providing traction. Carborundum or similar abrasive will NOT be permitted.

2.4.3.3.6. The building design shall take into account the need to protect steps and ramps from the fall of snow from the roofs at entrances and along walkways.

2.4.4. Public Transit

The regional transit system should be maintained and enhanced as one of the greatest resources of the campus and surrounding area.

2.4.4.1. Bus stops must be closely coordinated with the regional transit provider, but should be ½ to 1 mile apart, unless increased speed and/or higher ridership justifies closer placement. Shelters should be constructed where stops are not immediately adjacent to a building with identified waiting area. Maximum distance from building exit to bus stop should be two hundred feet (200'), otherwise a bus shelter should be planned.

2.4.4.2. All stops should be tied to the campus pedestrian circulation with paved walks and crosswalks.

2.4.4.3. Bus shelter design shall be coordinated with transit system and college staff. As a minimum, bus shelters shall be roofed, enclosed on three sides, have seating and space for wheel chairs, and adequately lit. Solar bus shelters are highly encouraged and should be investigated whenever a stop is planned.

2.4.5. Parking

Parking lots (and decks) should not dominate the frontage of pedestrian-oriented streets, interrupt pedestrian routes, or negatively impact surrounding developments.

2.4.5.1. Parking lots or decks should be located behind buildings whenever possible. Parking lots should not occupy more than 1/3 of the frontage of the adjacent building or no more than sixty-four feet (64'), whichever is less.

2.4.5.2. Large surface parking lots larger than 75,000 square feet of vehicular surface should be visually and functionally segmented into several smaller lots enclosed by landscaping.

2.4.5.3. Parking lots along the street must be screened from the adjacent street and sidewalk by a combination of berms, low walls, native stone, and landscaping.

2.4.5.4. One electric vehicle parking space with electrical power capacity and infrastructure to support a 220V charging station should be planned in each major parking area.

2.4.5.5. Incorporate Compact (with appropriate signage) and Standard parking spaces in all parking areas.

2.4.5.6. As a minimum, include two (2) Van Accessible ADA parking spaces closest to the main entrance and one Standard Accessible ADA space as close as possible to the main entrance of each building.

2.4.5.7. Parking lots should be designed to support video surveillance, emergency call stations with mass notification, and wayfinding/emergency notification digital messaging signs.

2.4.6. Wayfinding

Appropriate interior and exterior wayfinding signage shall be incorporated into all projects. Wayfinding signage will include a combination of permanent, and changeable, electronic signage.

2.4.6.1. Major entries to each campus shall have a marquee with a changeable electronic message board to announce the daily activities at the campus.

2.4.6.2. Fixed and changeable message boards shall be located strategically around campuses to guide visitors to campus events.

2.4.6.3. Permanent signage on drives will announce the location and major tenants of every building.

2.4.7. Landscaping

The landscape of the College's campuses creates a sense of place for the students, faculty, and visitors to the campus. This sense of place encourages social interaction which is a vital aspect of any pedestrian campus. Because the area is composed of diverse site and building elements, the landscape character is the integral component that serves to unify and create an attractive whole.

As outlined in the Guiding Principles, it is important that the "College emphasize the quality of the natural environment" and "preserve the natural habitat". As the campus continues to grow and evolve, dedicated landscaped open space should be protected, preserved, and enhanced as appropriate. Open space preservation and creation will be vital to the health, function, and beauty of the overall campus. The plan proposes a mix of formal and informal areas that recognize the existing conditions and build upon the inherent beauty of the campus. For this reason, it is imperative that existing plant material be integrated into the overall concept of the landscape plan for a specific project, as well as the use of indigenous plant material that enhances the overriding sustainable approach to the campus environment. Developing a campus landscape that is aesthetically attractive while also being practical and cost-effective to maintain is also critical. Safety in the landscape is a serious consideration which should be addressed through incorporation of the principles of Crime Prevention through Environmental Design (CPTED) that discourage designs that create "hiding places".

2.4.7.1. General:

2.4.7.1.1. All new construction and major renovations and remodels affecting the site and exterior envelope of the building, will include a complete landscaping plan, which includes plantings at all facades of the buildings and parking areas. For renovations and remodels, this may only be an enhancement or refurbishment of a previously executed landscaping plan.

2.4.7.1.2. Trees and other plantings should to be selected, sized and located so as not to disrupt site lighting, paths, and security both at the time of initial planting but also at maturity. These landscape elements should be coordinated with Site Photometrics and Security planning during the Design Phases of the project. For specific material suggestions and size requirements, please refer to Section 3 – College Standards.

2.4.7.1.3. Minimize site disturbance and erosion through retention of existing vegetation and by avoiding development in sensitive areas.

2.4.7.1.4. Enhance existing streams, ponds, and watersheds with overhanging trees, rock and plant materials appropriate to a piedmont stream.

2.4.7.2. Trees

2.4.7.2.1. Existing trees shall be preserved whenever feasible.

2.4.7.2.2. New tree plantings will be made on a regular basis and existing mature trees and quality tree stands should be protected as an available campus resource.

2.4.7.2.3. New construction on campus, whether it be expansion or infill related, begins to put intense pressure on existing, mature trees and often results in the compaction of their critical root zone. All new projects should consider this fact and plan to enforce tree protection measures and enhance the site with new tree plantings.

2.4.7.2.4. Many of the older trees on campus will inevitably become less viable and will be lost to disease or other causes at some point in the future. The preservation, protection, and ongoing health of campus trees should never be a second priority for any proposed project.

2.4.7.2.5. When selecting which trees to preserve, the following shall be considered: existing and proposed grading, age and vigor, condition and type of tree, location of site improvements, utility connections, wildlife, and environmental benefits.

2.4.7.2.6. Trenching, placing backfill in the critical root zone, driving or parking equipment in the critical root zone, and dumping of materials detrimental to plant health in close proximity of a tree to be preserved is prohibited.

2.4.7.2.7. Should any tree designated for preservation within the lines of demarcation for a construction project die during or within the warranty period of the project, the contractor shall be responsible to replace it with a size and species type approved by the College.

2.4.7.2.8. Prior to grading, protective barricades shall be placed around all trees designated to be saved.

2.4.7.2.9. Establish new tree plantings along all major walkways and major campus streetscapes.

2.4.7.3. Plantings

2.4.7.3.1. Define outdoor living spaces and quads with plantings to create informal gathering spaces with access to seating.

2.4.7.3.2. Provide landscape screening around exposed building equipment such as transformers or mechanical units. Plants specified for this screening to be ‘slow growing’ or not need frequent trimming, that would otherwise hinder operation or maintenance of, or access to, the units being screened.

2.4.7.3.3. Distinguish the corners of street intersections, particularly gateways and site entries (from both street and sidewalk) by special landscape treatments: flower displays, specimen trees and shrubs, accent rocks, low walls, signage, decorative lighting, sculpture, architectural elements, and/or brick paving. Features for vehicular entry points must meet NCDOT’s sight triangle requirements.

2.4.7.3.4. Balance the plantings (softscape) with the special paved areas (hardscape). Whenever possible, pervious paving systems should be utilized to decrease stormwater runoff and its effects.

2.4.7.4. Open Space

2.4.7.4.1. To ensure that open space is well used, it is essential to locate and design it carefully. The space should be located where it is visible and easily accessible from public areas (building entrances, sidewalks). Consider views and sun exposure as well.

2.4.7.4.2. New open spaces should contain direct access from the adjacent streets. They should be open along the adjacent sidewalks and allow for multiple points of entry. They should also be visually permeable from the sidewalk, allowing passersby to see directly into the space.

2.4.7.4.3. The space should be well-buffered from moving cars so that users can enjoy and relax in the space. The space may be visible from streets or internal drives, but should not be wholly exposed to them. Partially enclose the space with building walls, freestanding walls, landscaping, raised planters, or on-street parking to help buffer it and create a comfortable “outdoor room”.

2.4.7.4.4. Do not overlook general open spaces (not part of the dedicated open space). These areas help tie the campus together into a memorable experience, thus giving them great value.

2.4.7.4.5. The design of these spaces can be enhanced with plazas, fountains or public art.

2.4.7.4.6. Maintaining open spaces at varying scales is also important and encourages both passive and active spaces within the campus setting.

2.4.7.4.7. Conserve open land, including those areas containing unique and sensitive features such as natural areas, wildlife habitat, streams or creeks, wetlands, and floodways.

- 2.4.7.4.8.** Lands to be preserved as open space should include wetlands, floodways, soils unsuitable for development, mature woodlands, significant wildlife habitat, and historic archaeological and cultural features.
- 2.4.7.4.9.** Create additional open grassed areas, where possible, to provide an enjoyable place for relaxation and recreation.
- 2.4.7.4.10.** For supplemental lighting or operable site features at remote locations, consider commercial grade, solar powered devices in lieu of electric.

2.5. Buildings

While Rowan-Cabarrus Community College does not have a single consistent vocabulary of architecture on campus, there are a number of key elements and details found in many of the newer buildings on campus. In order for new buildings or additions to be integrated into the fabric of the campus, it is important for the Designer to be aware of such building attributes.

The architectural style of each campus, as defined by the College, is identified in the Campus Standards. It is the desire of the College that all new structures constructed on any campus follow the identified genre and not deviate significantly in terms of palate of materials or colors, unless specifically directed. The intent of the guidelines is to loosely define the elements of a building in order to maintain a consistent vocabulary for each new project on campus.

2.5.1. Building Form and Massing

Building form and scale should be of human proportion. The massing of existing buildings on the College's campuses are one to three stories in height and it is generally recognized, given the escalating value of land, that future buildings should be planned as three to four stories in height, where compatible with the program elements planned for the building. All new buildings will be based on a highly efficient, cost effective, grid layout. The interface of interior and exterior space through the use of covered entries, arcades, or courtyards should be considered in the initial form of the building. In addition, the massing should respond to the size of the adjacent context, as well as the functional requirements of the program. Some design elements to consider in designing proportionately scaled buildings include:

- 2.5.1.1.** Recess entries at ground level.
- 2.5.1.2.** Alter exterior walls in depth and dimension.
- 2.5.1.3.** Introduce a base or plinth to the lower level of the building.
- 2.5.1.4.** Vary the heights of the building to create distinct or separate massing.
- 2.5.1.5.** Articulate the building façade with humanly proportioned windows or openings.

2.5.2. Facades

Each building façade should be articulated in a simple, consistent manner.

- 2.5.2.1.** Curved facades should be avoided.
- 2.5.2.2.** Brick will be the standard exterior finish of all College buildings.
- 2.5.2.3.** Windows or openings should be spaced at regular intervals to create a horizontal pattern along the façade. This may vary depending on the function and scale of the structure.

2.5.2.4. The Designer should carefully consider the relationship between roof forms and massing when developing the design for the elevations of the building. Structural expression at the exterior may be included but should be incorporated in a thoughtful manner.

2.5.2.5. In general, design elements of the façade should appear to become “lighter” in the order from bottom to top of building (heavier base: lighter top).

2.5.2.6. The use of more than three (3) primary building materials is discouraged.

2.5.2.7. Accent details of precast or stone should be included to add design interest.

2.5.3. Entrances

Placing the main entrance is perhaps the single most important step the Designer takes during the evolution of a building plan.

1.1.1.1. Placement of the main entrance should face primary pedestrian routes. The main entrance must be a bold, visible shape, which is a significant feature of the design for the facility.

1.1.1.2. All entries must be easily identifiable and visually impressive for those entering the building. Covered entrances are preferred by the College to protect students, faculty, staff, and visitors from snow or inclement weather upon entering the building.

1.1.1.3. Primary and secondary entries should be connected internally with a direct route to allow pedestrian passageway from building to building on campus.

2.5.4. Roofs

Flat or low slope roofs are the most efficient, durable roof and will be the standard on all new buildings. Other roof forms may be considered to bring emphasis to discreet areas of buildings. Special attention should be given by the Designer to the roof forms.

2.5.4.1. Roof forms should be designed carefully with other massing elements of the building.

2.5.4.2. When possible, mechanical equipment should not be located on the roof. In addition, penetrations of any roof system should be kept to a minimum.

2.5.4.3. Roof access must be as safe as possible.

2.5.4.3.1. Permanent access shall be provided to every major roof level.

2.5.4.3.1.1. In multi-story buildings, primary roof access will be via an extension of a stair tower to the main roof level. Access to the stair leading to the roof level will be via a door at the highest publicly accessible stair landing.

2.5.4.3.1.2. In a single-story building and in major renovations, Roof access should be located in a controlled access space, preferably dedicated to roof access, but a Mechanical Room would be acceptable. Metal stairs are the preferred method, but in extraordinary situations a vertical ladder may be acceptable. Ensure roof access spaces allow adequate maneuvering space, particularly in shared use spaces.

2.5.4.3.1.3. Brows and awnings are excluded from the requirement for roof access.

2.5.4.3.2. Public access to any roof area is not acceptable.

2.5.4.3.3. Fall prevention (creating situations where a fall would be difficult or impossible) and fall protection (creating a system which will protect against a fall) will be factored into all new roof designs and added in any re-roof project. A parapet with a minimum height of 42-48 inches above the adjacent roof surface is the preferred method of roof fall prevention and is easily facilitated in flat roof designs.

2.5.4.3.4. Systems

2.5.4.3.4.1. Plumbing: A water spigot shall be provided at every major roof level.

2.5.4.3.4.2. Power: A convenience electrical outlet shall be located in close proximity to any roof-mounted equipment.

2.5.4.3.4.3. Solar: Accommodation for Solar Photovoltaic and Thermal (hot water) shall be considered in the design of all major roof areas, and should guide the location of all roof mounted equipment.

2.5.5. Fenestration

Windows and doors located in exterior walls should be recessed to create shade and shadow along the building façade.

2.5.5.1. Openings are another means for providing an appropriate human scale to the exterior appearance of a structure. Appropriately sized individual windows or openings, treated as penetrations of the wall surface, are preferred to large expanses of glass.

2.5.5.2. Larger openings may be used to express principle entries or gateways, or as vertical separation of massing along a building façade.

2.5.5.3. Orientation and solar gain of openings should be a priority for the design of the exterior.

2.5.5.4. Appropriate overhangs or screening devices should be considered.

2.5.5.5. Windows with clear (Low-E) glass are recommended to be used where feasible.

2.5.6. Structure

Building structure will be a cost effective grid layout which maximizes flexible interior space and minimizes odd angles and curves which create inefficient layouts.

2.5.6.1. Structure and cladding should be designed with an eye towards an easily maintainable, 100-year life facility.

2.5.6.2. Structural steel will be the standard. Other systems can be considered where they show significant life cycle or flexibility benefits.

2.5.6.3. Concrete decks on steel pan will be the standard for floor construction. Alternate substrate options on steel deck may be considered for roof decks. Other systems can be considered where they show significant life cycle or flexibility benefits.

2.5.6.4. Masonry precast panel cladding with integral, full panel insulation and thin brick inserts will be the standard. A site cast tilt-wall system is also acceptable. Other systems can be considered where they show significant life cycle or flexibility benefits.

2.5.6.5. Architectural elements which serve a primary aesthetic purpose (towers, bastions, etc.) while creating interior space with limited function, should be avoided. With the exception of mechanical penthouses, all interior space must be ADA accessible.

2.5.7. Arcades

Arcades, archways, or colonnades may be incorporated into the design of the exterior.

- 2.5.7.1. These elements may be freestanding or integrated into the building façade.
- 2.5.7.2. The height-to-length ratio should be expressed proportionately to human scale.
- 2.5.7.3. Materials must be able to withstand the weather, insects, etc. to provide a minimum 20-year lifespan.
- 2.5.7.4. Fabric awnings are not acceptable.

2.5.8. Basements

Full Basements will generally be avoided, unless a specific need is identified. Where topography dictates, occupy able floors of a building may be cut into a hillside.

- 2.5.8.1. Any occupy able area below grade shall be protected against ground water/moisture intrusion by a combination of membrane, drainage board, and pipes or conduits to move the moisture away from the building foundation.
- 2.5.8.2. Exterior basement walls will generally be reinforced, cast in place concrete.

2.6. Building Interior

2.6.1. General

- 2.6.1.1. Incorporate ANSI S12.60 Acoustical Performance Criteria, Design Requirements and Guidelines for Schools into the design of all interior spaces, particularly as it relates to sound transmission, reverberation times, and background noise levels. This requires that careful consideration be given not just to the finishes of interior spaces, but also to the building placement, the structural and building envelope, and mechanical and electrical systems.
- 2.6.1.2. Ensure all architectural elements within sight-lines correlate (i.e. all doors/frames/hardware on a corridor appear uniform, doors/window frames/storefront on a façade match in finish, terrazzo flooring is extended from existing corridors into new spaces, terminating at a logical break point, etc.).
- 2.6.1.3. Appropriate interior wayfinding signage shall be incorporated into all projects. Wayfinding signage will include a combination of permanent, and changeable printed and electronic signage to:
 - 2.6.1.3.1. Guide visitors to every major tenant within the building. Each room shall have a room number/name plaque affixed in the corridor(s) leading to the space.

2.6.2. Walls

- 2.6.2.1. The standard for interior walls shall be painted 5/8" gypsum board over minimum 3-5/8" 25 ga. metal studs, 16" on center, with empty cavities, unless there are issues in the space regarding durability, security, acoustics, moisture, special use, etc. Size and thickness of studs to be heavier as necessary to meet minimum deflection criteria.

2.6.2.2. Spaces requiring sound mitigation will have wall sections based on those identified in the USG Acoustical Assemblies Brochure.

2.6.2.3. Spaces where walls are anticipated to be exposed to abuse, or requiring greater durability, should consider alternative wall systems including:

2.6.2.3.1. Corridors, Labs and other spaces where light abuse is anticipated should be sheathed in abuse-resistant 5/8" gypsum board.

2.6.2.3.2. Corridors, Labs, Stair Towers, and other spaces where significant abuse can be predicted should be constructed of Concrete Masonry Units (CMU) or another masonry system with appropriate finish.

2.6.3. Floors

2.6.3.1. Incorporate low maintenance, sustainable hard flooring in Lobbies, heavily trafficked Corridors, and Stair Towers.

2.6.3.2. Incorporate carpet in Offices, Open Office Areas, Conference Rooms, Classrooms, and Labs where appropriate for the intended program.

2.6.3.3. Incorporate low maintenance, sustainable resilient flooring into lessor trafficked Corridors, Classrooms, and Labs where appropriate for the intended program, and in Closets, File/Storage Rooms, Break Rooms, etc.

2.6.3.4. Incorporate sealed concrete floors in Electrical Closets, Mechanical Rooms, Receiving, and Storage Rooms.

2.6.3.5. Spaces requiring sound mitigation will have floor sections that meet the acoustical requirements.

2.6.3.6. Restrooms Rooms to receive ceramic tile.

2.6.4. Ceilings

2.6.4.1. Standard ceiling heights shall be as follows:

Space	Minimum	Standard	Maximum
Classroom	8'-6"	9'-0"	11'-0"
Individual Offices	8'-6"	9'-0"	10'-0"
Open Area Offices	9'-0"	10'-0"	N/A
Conference Rooms	9'-0"	10'-0"	12'-0"
Labs	9'-0"	N/A	N/A
Data/Telecom Rooms	9'-0"	To Deck	To Deck
Mechanical/Electrical	9'-0"	To Deck	To Deck

2.6.4.2. The standard for interior ceilings will be 2'x2' tegular edge lay-in acoustical ceiling tile suspended in a grid system, unless there are issues in the space regarding durability, security, acoustics, moisture, special use, etc.

2.6.4.3. Spaces requiring sound mitigation will have ceiling sections based on those identified in the USG Acoustical Assemblies Brochure.

2.6.4.4. All ceiling tiles and grid will be a product and material specifically manufactured for that purpose.

2.6.4.5. Restroom ceilings will be painted 5/8" gypsum board attached to a suspended grid for security.

2.6.5. Systems

2.6.5.1. General

2.6.5.1.1. Demolish and remove all abandoned elements from previous systems and any systems unused or made obsolete by the planned remodel/renovation. No abandonment in place is acceptable.

2.6.5.1.2. Install individual metering into all utilities servicing any new building or significant renovation/remodel of an existing building. Meters should tie into the campus building automation system.

2.6.5.1.3. All vibration generating or vibration sensitive equipment will be mounted on vibration dampening feet, bases, or suspension systems. Piping and ducting systems shall include vibration dampeners at any connection to similar equipment.

2.6.5.2. Electrical

2.6.5.2.1. All electrical panels shall be located in dedicated Electrical Rooms, with the exception of subpanels serving special needs spaces which will be located in those spaces. In major remodels and renovations, these Electrical Rooms shall be created, and existing panels in public spaces shall be removed, with the circuitry relocated to the Electrical Room. Any panel remaining in a space accessible to students, faculty, or non-facilities staff will be provided with a locking face.

2.6.5.2.2. Consider the installation of roof-mounted solar energy harvesting system (photovoltaic) on any new building and in any existing building being substantially remodeled/renovated. This will include a structural evaluation of the roof as well as an analysis of remaining life of the roofing system.

2.6.5.2.3. Emergency Generators and other power generating systems should be monitored and controlled by the campus building automation system. Generator shall be mounted exterior to the building, and shielded from view.

2.6.5.3. Mechanical

2.6.5.3.1. Follow the Rowan-Cabarrus Community College HVAC Design Standards.

2.6.5.3.2. All HVAC systems to be monitored and controlled by the campus building automation system.

2.6.5.3.3. Existing pneumatically controlled systems will be replaced with digital control systems within the established lines of demarcation of all renovation/remodel projects.

2.6.5.3.4. Consider installation of roof-mounted solar energy harvesting system (hot water) on any new building and in any existing building being substantially remodeled/renovated.

2.6.5.4. Life Safety

2.6.5.4.1. Install fire sprinkler system in all new buildings and in any existing building being substantially remodeled/renovated. This may entail expanding the lines of demarcation for this element of the project if the Authorities Having Jurisdiction (AHJ) requires the whole building be sprinkled.

2.6.5.4.2. Install new voice annunciated Fire Alarm System in all new buildings and in any existing building being substantially remodeled/renovated. New fire alarm systems(s) will integrate within the existing campus fire alarm system allowing building level visibility to outside monitoring.

2.6.5.5. Security

2.6.5.5.1. Electronic Access Controls

2.6.5.5.1.1. Each building will have door controls and hardware which are tied into the College-wide electronic Avigilon access control system.

2.6.5.5.1.2. Typically, one Card Controlled Access Point will be provided on each building. This location will be selected by the Owner, but is usually the main entrance to a building.

2.6.5.5.1.3. Public access doors to a building will be provided with locksets capable of being locked remotely via the electronic access control system and locally with a key.

2.6.5.5.1.4. Emergency egress doors and doors to service spaces will have position monitoring sensors installed which tie into the electronic access control system. These doors shall be provided with door closers and appropriate locksets to ensure that they remain normally closed and latched.

2.6.5.5.1.5. Door hardware to classrooms, labs, offices, office, suites, conference rooms, and other “normally occupy able” spaces will be provided with a means of securing the space, by any occupant, from inside the space in the case of an emergency.

2.6.5.5.1.6. All exterior doors shall be monitored.

2.6.5.5.2. Mass Notification

2.6.5.5.2.1. Each building will have speakers, strobes and do matrix notification signs which tie into the Campus-wide Mass Notification System as part of each Building’s Fire Alarm System in accordance with NFPA 72: National Fire Alarm and Signaling Code.

2.6.5.5.2.2. Areas outside buildings will be served will wall-mounted speakers and strobes, to annunciate the mass notification communications. One on each face of the building.

2.6.5.5.2.3. Parking Lots and other common outdoor areas remote from buildings will be provided with pole-mounted emergency phones, which shall also act as annunciators for the Mass Notification System. Phones will be one button type with no keypad.

2.6.5.5.2.4. Mass notification systems will be ADA compliant, which will include the use of amber strobes and digital message boards to communicate visually.

2.6.5.5.3. Campus Emergency Phones

2.6.5.5.3.1. One wall-mounted emergency phone will be provided on each floor of every building. Do not locate near elevator call stations. Phones shall have two call buttons, no keypad.

2.6.5.5.4. Video Surveillance System

- 2.6.5.5.4.1.** Each building will be provided with video surveillance cameras which tie into the College-wide Video Surveillance System. Video Surveillance System shall be tied into the Building Emergency Power System
- 2.6.5.5.4.2.** The primary purpose of the Video Surveillance System is to document access into the campus and each building. Cameras will be strategically located to view the approaches to and access points into a building, and onto floors within a building.
- 2.6.5.5.4.3.** Cameras may be installed in areas where there is elevated risk of theft or misbehavior.
- 2.6.5.5.4.4.** Cashier Stations will have cameras to capture the handling of cash and the customer interface.
- 2.6.5.5.4.5.** All Elevators will have surveillance cameras.
- 2.6.5.5.4.6.** Emergency Phone Poles in Parking Lots and other common outdoor areas will be provided cameras.
- 2.6.5.5.4.7.** Pan-tilt-zoom cameras should not be used. 360-degree cameras to be used in lieu of PTZ cameras.

2.6.5.6. Data/Communication: Data Cabling and Infrastructure shall be in compliance with the College's Telecommunications Standard, including the qualifications. All work shall comply with North Carolina STS-1000 guidelines.

2.7. Spaces

Although not intended to be comprehensive, the following are general guidelines for the space which may be created within the College's buildings.

2.7.1. General

- 2.7.1.1.** Incorporate ANSI S12.60 Acoustical Performance Criteria, Design Requirements and Guidelines for Schools into the design of all interior spaces.
- 2.7.1.2.** Ensure all architectural elements within sight-lines correlate (i.e. all doors/frames/hardware on a corridor appear uniform, doors/window frames/storefront on a façade match in finish, floor finish is extended from existing floor into new spaces, terminating at a logical break point, etc.).
- 2.7.1.3.** Every effort will be made to provide daylighting of all instructional and office spaces. Windows shall be a minimum of 8" AFF and shall not extend above the ceiling height of the room.
- 2.7.1.4.** All Offices, Classrooms, Conference Rooms, Laboratories, and Break Rooms shall have doors with sidelights and/or transoms to facilitate security and moving natural light into corridors and interior spaces. Doorlights shall be used in areas not conducive to sidelights.
- 2.7.1.5.** Door hardware to classrooms, labs, offices, office suites, conference rooms, and other "normally occupiable" spaces will be provided with a means of securing the space, by any occupant, from inside the space in the case of an emergency.
- 2.7.1.6.** HVAC Supply and Returns to be alternately located high and low, and on opposite ends of the Classroom, to maximize air mixing through room.

2.7.1.7. Use Rowan-Cabarrus Community College Furnishing Standards and prototypical office and cubicle layouts when laying out spaces, including power, lighting, and ventilation. This is particularly critical as it pertains to switching, placement of thermostats, and other controls. All furnishings to be specified/designed to allow for flexibility and multiple room layouts and uses.

2.7.2. Classrooms

Classrooms will be the primary locations for instructor-led educational experiences. They shall support diverse educational pedagogies. Each classroom building shall have a mix of Small, Standard, and Large Classrooms to ensure maximum utilization. Associated classrooms shall be located in close proximity to Lab spaces to support the classroom instruction portion of Lab sections. Ensure ample consideration is given to classroom acoustics, particularly as it relates to sound transmission, reverberation times, and background noise levels.

2.7.2.1. General

- 2.7.2.1.1.** Entry doors shall be located at the rear of the classroom to minimize disruption of entry during instruction.
- 2.7.2.1.2.** To facilitate multiple program uses of the classroom, storage closets should be included where instructional aids are needed.
- 2.7.2.1.3.** Provide space allocation at the front of the room, as well as power and data, for Smart Podium or Media Cabinet, Interactive Whiteboards, and Flat Panel Display in each Classroom.
- 2.7.2.1.4.** Provide chair rail on all walls; height as necessary based on specified chairs.
- 2.7.2.1.5.** Clip/tack strips are to be provided on side walls to facilitate presentation of teaching aids.

2.7.2.2. Small Classroom

- 2.7.2.2.1.** Size: 18 to 20 Student Stations which, at 30 sf per Student Station, yields a space of no larger than 600 sf.
- 2.7.2.2.2.** Envelope:
 - 2.7.2.2.2.1.** Walls: Walls from floor to underside of deck, minimum STC Rating 52, painted.
 - 2.7.2.2.2.2.** Ceiling: Acoustical ceiling tile.
 - 2.7.2.2.2.3.** Floors: Depending on the planned educational program, carpet or resilient flooring, rubber base.
 - 2.7.2.2.2.4.** Fenestration: Solid wood door with sidelight/transom. Exterior windows or glazing is preferred.
 - 2.7.2.2.2.5.** Fit Out: White Board on the Teaching Wall.
 - 2.7.2.2.2.6.** Storage: None.
- 2.7.2.2.3.** Systems:
 - 2.7.2.2.3.1.** Lights: 2 x 4 general lighting with dual level switching and occupancy sensor.
 - 2.7.2.2.3.2.** Power: Electrical receptacles to support technology, provide general housekeeping, and provide the flexibility to provide a powered row of tables
 - 2.7.2.2.3.3.** HVAC: Branch lines from trunk line (outside of Classroom envelope). Branch lines should not extend from one Classroom to another. Where not provided with a ducted return to air handling units, return air to plenum via sound mitigating transfer duct.
 - 2.7.2.2.3.4.** Data: Data receptacles as necessary to support technology. Wireless access point in ceiling to support student connectivity.
- 2.7.2.2.4.** Technology:

- 2.7.2.2.4.1.** Smart Podium or Media Cabinet, as selected by the Owner, with connections to Network and Flat Panel Display.
- 2.7.2.2.4.2.** Wall mounted networked Flat Panel Display, coordinated with white board(s).
- 2.7.2.2.4.3.** Ceiling mounted speakers connected to Smart Podium or Media Cabinet.
- 2.7.2.2.5.** Furnishings: Tables and chairs as needed to fulfill the intended use of the space.
- 2.7.2.2.6.** Related Spaces: None.
- 2.7.2.2.7.** Adjacencies: Divisional/Departmental Office Suite.

2.7.2.3. Standard Classroom

- 2.7.2.3.1.** Size: 24 to 30 Student Stations which, at 25 sf per Student Station, yields a space of no larger than 750 sf.
- 2.7.2.3.2.** Envelope:
 - 2.7.2.3.2.1.** Walls: Walls from floor to underside of deck. Minimum STC Rating 52, painted.
 - 2.7.2.3.2.2.** Ceiling: Acoustical ceiling tile. Large spaces may require enhanced acoustical ceiling tiles.
 - 2.7.2.3.2.3.** Floors: Depending on the planned educational program, carpet or resilient flooring, rubber base.
 - 2.7.2.3.2.4.** Fenestration: Solid wood door with sidelight/transom.
 - 2.7.2.3.2.5.** Fit Out: White Board on the Teaching Wall.
 - 2.7.2.3.2.6.** Storage: None.
- 2.7.2.3.3.** Systems:
 - 2.7.2.3.3.1.** Lights: 2 x 4 general lighting with dual level switch and occupancy sensor.
 - 2.7.2.3.3.2.** Electrical receptacles to support technology, provide general housekeeping, and provide the flexibility to provide a powered row of tables for student convenience.
 - 2.7.2.3.3.3.** HVAC: Branch lines from trunk line (outside of Classroom envelope). Branch lines should not extend from one Classroom to another. Where not provided with a ducted return to air handling units, return air to plenum via sound mitigating transfer duct.
 - 2.7.2.3.3.4.** Data: Data receptacles as necessary to support technology. Wireless access point in ceiling to support student connectivity.
- 2.7.2.3.4.** Technology:
 - 2.7.2.3.4.1.** Smart Podium or Media Cabinet, as selected by the Owner, with connections to Network and Flat Panel Display.
 - 2.7.2.3.4.2.** Wall mounted Flat Panel Display, coordinated with white board(s).
 - 2.7.2.3.4.3.** Ceiling mounted speakers connected to Smart Podium or Media Cabinet.
- 2.7.2.3.5.** Furnishings: Tables and chairs as needed to fulfill the intended use of the space.
- 2.7.2.3.6.** Related Spaces: Storage Closet.
- 2.7.2.3.7.** Adjacencies: Divisional/Departmental Office Suite.

2.7.2.4. Large Classroom

- 2.7.2.4.1.** Size: 30 to 40 Student Stations which, at 25 sf per Student Station, yields a space of no larger than 1,000 sf.
- 2.7.2.4.2.** Envelope:
 - 2.7.2.4.2.1.** Walls: Walls from floor to underside of deck. Minimum STC Rating 52, painted.
 - 2.7.2.4.2.2.** Ceiling: Acoustical ceiling tile.

- 2.7.2.4.2.3. Floors: Depending on the planned educational program, carpet or resilient flooring, rubber base.
- 2.7.2.4.2.4. Fenestration: Solid wood door with sidelight/transom. Exterior windows or glazing is preferred.
- 2.7.2.4.2.5. Fit Out: White Boards on the Teaching Wall. Other white boards as appropriate for the space's intended purpose.
- 2.7.2.4.2.6. Storage: Small enclosed storage space(s) within the classroom envelope.
- 2.7.2.4.3. Systems:
 - 2.7.2.4.3.1. Lights: 2 x 4 general lighting with dual level switching and occupancy sensor.
 - 2.7.2.4.3.2. Power: Electrical receptacles to support technology, provide general housekeeping, and provide the flexibility to provide a powered row of tables for student convenience.
 - 2.7.2.4.3.3. HVAC: Branch lines from trunk line (outside of Classroom envelope). Branch lines should not extend from one Classroom to another. Where not provided with a ducted return to air handling units, return air to plenum via sound mitigating transfer duct.
 - 2.7.2.4.3.4. Data: Data receptacles as necessary to support technology. Wireless access point in ceiling to support student connectivity.
- 2.7.2.4.4. Technology:
 - 2.7.2.4.4.1. Smart Podium or Media Cabinet, as directed by the Owner, with connections to Network and Flat Panel Display.
 - 2.7.2.4.4.2. Wall mounted Flat Panel Display, coordinated with the white board(s).
 - 2.7.2.4.4.3. Ceiling mounted speakers connected to Smart Podium or Media Cabinet.
- 2.7.2.4.5. Furnishings: Tables and chairs as needed to fulfill the intended use of the space.
- 2.7.2.4.6. Related Spaces: Storage Closets (Multiple).
- 2.7.2.4.7. Adjacencies: Divisional/Departmental Office Suite.

2.7.3. Laboratories

Laboratories will be the primary location for hands-on student application of instructor-led education, and shall support the educational needs of the appropriate curriculum. Labs shall be located in close proximity to the associated classrooms, and should be designed to serve specific programs, without duplicating space needs and equipment. Locking Storage closets should be provided for instructional aids and equipment. Provide power and data in each Lab, and at each lab counter as appropriate for the equipment utilized. Exterior windows in Labs are preferred. Lab program and requirements will be established at the Programming Phase.

2.7.4. Lecture Halls and Auditoriums

Lecture Hall and Auditoriums provide large spaces to accommodate instructor delivered programs or conference sessions. The program and requirements will be established at the Programming Phase.

2.7.5. Offices

2.7.5.1. Individual Offices

2.7.5.1.1. President: The President's Office is typically associated with a President's Suite which would have a waiting area; a President's Assistant's cubicle with reception counter, acting as the reception point for the space; and, other offices and cubicles for the President's support staff. This President's Suite would include a Storage/File Room, a Work Room, and the President's Conference Room.

2.7.5.1.1.1. Size: Roughly 250 sf, including an informal seating area for four.

2.7.5.1.1.2. Envelope:

2.7.5.1.1.2.1. Walls: Masonry walls from floor to underside of deck, sheathed in gypsum board. Minimum STC Rating 52, painted, wood crown molding and base.

2.7.5.1.1.2.2. Ceilings: Acoustical ceiling tile.

2.7.5.1.1.2.3. Floors: Carpet with wood base.

2.7.5.1.1.2.4. Fenestration: Solid wood door with transom (no sidelight). Windows to exterior on two walls.

2.7.5.1.1.3. Systems:

2.7.5.1.1.3.1. Lights: 2 x 4 general lighting with accent lights as necessary, controlled by dimming system and occupancy sensor.

2.7.5.1.1.3.2. Power as required for all areas of work within the office.

2.7.5.1.1.3.3. HVAC: Separate individual zone with thermostat.

2.7.5.1.1.3.4. Technology: Data receptacle at desk, at wall-mounted Flat Panel Display, and at Conference Table in Office. Ensure wireless connectivity to the network.

2.7.5.1.1.3.5. Security: Electronic locks with Card Reader on any doors that could provide access to any of the President's spaces.

2.7.5.1.1.4. Furnishings: Wood Executive Double Pedestal Desk with Bridge, Credenza with Hutch, Executive Leather Office Chair, 2 guest chairs, 4 Lounge Chairs, Coffee Table, End Table, other furnishings as required. Confirm re-use of existing President's Suite Furnishings and ensure spaces are configured to accommodate.

2.7.5.1.1.5. Related Spaces:

2.7.5.1.1.5.1. Coat/Storage Closet.

2.7.5.1.1.5.2. Private Restroom.

2.7.5.1.1.5.3. President's Medium Conference Room – Seating a minimum of 11 persons, access directly from President's Office and President's Reception Area, as well as an egress to a Corridor (bail-out path).

2.7.5.1.1.6. Adjacencies:

2.7.5.1.1.6.1. President's Suite: Which will include:

2.7.5.1.1.6.2. Reception Area

2.7.5.1.1.6.3. President's Executive Assistant Cubicle

2.7.5.1.1.6.4. Other identified support staff offices and cubicles.

2.7.5.1.1.6.5. Storage/File Room

2.7.5.1.1.6.6. Work Room

2.7.5.1.2. VP/Chiefs: The VP/Chief's Office is typically associated with a Divisional Office Suite which would have a small waiting area; an Executive Assistant's cubicle with reception counter, acting as the reception point for the space; and, other offices and cubicles for the Divisional staff. This Office Suite would include a Storage/File Room, a Work Room, and ideally have direct access to a Medium Conference Room. The VP/Chief's Office includes a conference area with table and wall-mounted monitor.

2.7.5.1.2.1. Size: Roughly 200 sf, including conference area (seating 5).

2.7.5.1.2.2. Envelope:

2.7.5.1.2.2.1. Walls: Walls from floor to underside of deck. Minimum STC Rating 52, painted.

2.7.5.1.2.2.2. Ceilings: Acoustical ceiling tile.

2.7.5.1.2.2.3. Floors: Carpet with rubber base.

2.7.5.1.2.2.4. Fenestration: Solid wood door with sidelight/transom. One window.

2.7.5.1.2.3. Systems:

- 2.7.5.1.2.3.1. Lights: 2 x 4 general lighting with dual level switching and occupancy sensor.
- 2.7.5.1.2.3.2. Power as required for all areas of work within the office.
- 2.7.5.1.2.3.3. HVAC
- 2.7.5.1.2.3.4. Technology: Data receptacle at desk, at wall-mounted Flat Panel Display, and at Conference Table in Office.
- 2.7.5.1.2.4. Furnishings: Wood Veneer Manager's Single Pedestal Desk with Pedestal Bridge, Credenza with Lateral Files and Storage/Shelving Hutch, Standing Coat Hutch, Executive Chair, 6-Seat Conference Table, 5 Side/Conference Chairs, 3'W x 4'T Wood Bookshelf.
- 2.7.5.1.2.5. Related Spaces: None.
- 2.7.5.1.2.6. Adjacencies:
 - 2.7.5.1.2.6.1. Divisional Suite: Which will include:
 - 2.7.5.1.2.6.1.1. Waiting Area
 - 2.7.5.1.2.6.1.2. Executive Assistant Cubicle
 - 2.7.5.1.2.6.1.3. Other identified support staff offices and cubicles.
 - 2.7.5.1.2.6.1.4. Medium Conference Room
 - 2.7.5.1.2.6.1.5. Work Room
 - 2.7.5.1.2.6.1.6. File/Storage Room
- 2.7.5.1.3. **AVP/Supervising Directors/Deans:** The AVP/Supervising Directors/Deans' Office is typically associated with a Departmental/Faculty Office Suite which would house offices and cubicles for the related staff, as well as a small conference room for private conversations. The space shall allow for small meetings with an expectation of privacy.
 - 2.7.5.1.3.1. Size: Roughly 150 sf, including consultation area (seating 3).
 - 2.7.5.1.3.2. Envelope:
 - 2.7.5.1.3.2.1. Walls: Above ceiling height partition to achieve minimum STC Rating 49, painted.
 - 2.7.5.1.3.2.2. Ceilings: Acoustical ceiling tile with high NRC/CAC or acoustical insulation overlay extending around perimeter of room four feet inside the space. Acoustical insulation not required if all surrounding walls go to deck above with STC rating noted above.
 - 2.7.5.1.3.2.3. Floors: Carpet with rubber base.
 - 2.7.5.1.3.2.4. Fenestration: Solid wood door with sidelight.
 - 2.7.5.1.3.3. Systems:
 - 2.7.5.1.3.3.1. Lights: 2 x 4 general lighting with dual switching and occupancy sensor.
 - 2.7.5.1.3.3.2. Power as required for all areas of work within the office.
 - 2.7.5.1.3.3.3. HVAC
 - 2.7.5.1.3.3.4. Technology: Data receptacle at desk.
 - 2.7.5.1.3.4. Furnishings: L-Shaped Desk, Keyboard Tray, Lateral Files, 2 Mobile Pedestals, Office Chair, 3-Seat Round Conference Table, 2 Side Chairs, 3'W x 4'T Bookshelf.
 - 2.7.5.1.3.5. Related Spaces: None.
 - 2.7.5.1.3.6. Adjacencies:
 - 2.7.5.1.3.6.1. Departmental/Faculty Office Suite: Which will include:
 - 2.7.5.1.3.6.1.1. Waiting Area
 - 2.7.5.1.3.6.1.2. Other identified support staff offices and cubicles.
 - 2.7.5.1.3.6.1.3. Small Conference Room
 - 2.7.5.1.3.6.1.4. File/Storage Room

2.7.5.1.4. Sr. Administrator/Program Chair: The Sr. Administrator/Program Chair Office is typically associated with a Departmental/Faculty Office Suite which would house offices and cubicles for the related staff, as well as a small conference room for private conversations. The space shall allow for individual and two-person counseling with an expectation of privacy.

2.7.5.1.4.1. Size: Roughly 125 sf.

2.7.5.1.4.2. Envelope:

2.7.5.1.4.2.1. Walls: Above ceiling height partition to achieve minimum STC Rating 45, painted.

2.7.5.1.4.2.2. Ceilings: Acoustical ceiling tile with high NRC/CAC or acoustical insulation overlay extending around perimeter of room four feet inside the space. Acoustical insulation not required if all surrounding walls go to deck above with STC rating noted above.

2.7.5.1.4.2.3. Floors: Carpet with rubber base.

2.7.5.1.4.2.4. Fenestration: Solid wood door with sidelight.

2.7.5.1.4.3. Systems:

2.7.5.1.4.3.1. Lights: 2 x 4 general lighting with dual level switching and occupancy sensor.

2.7.5.1.4.3.2. Power: as required for all areas of work within the office.

2.7.5.1.4.3.3. HVAC

2.7.5.1.4.4. Technology: Data receptacle at desk.

2.7.5.1.4.5. Furnishings: Laminate Veneer L-Shaped Desk with 2 Lockable Pedestals, Keyboard Tray, Office Chair, File Cabinet, 2 Guest Chairs.

2.7.5.1.4.6. Related Spaces: None.

2.7.5.1.4.7. Adjacencies: Divisional/Departmental Office Suite.

2.7.5.2. Open Office Areas

Open Office Areas are generally incorporated into Divisional/Departmental/Faculty Office Suites, although they may be stand-alone spaces. They facilitate efficient use of square footage while providing work spaces for Administrators/Full-Time Faculty, Lower Level Administrators, Administrative Assistants, Clerks, and “Touchdown spaces” for Part-Time Faculty and Staff. Ideally, these spaces should include informal Collaboration Space (grouping of lounge chairs), a small Conference Room for private conversation, a Coat Closet sized appropriately for the number of cubicles, and a multi-function printer (in a Work Room if provided, otherwise at the end of a cubicle grouping).

2.7.5.2.1. Size: Varies depending on number and mix of work stations. Work areas roughly 50-60 SF per person (if no guest chairs), or 80-90 SF per person (including guest chairs); can be adjusted if deemed necessary for the proposed function.

2.7.5.2.2. Envelope:

2.7.5.2.2.1. Walls: Walls from floor to deck. Minimum STC Rating 52, painted.

2.7.5.2.2.2. Ceiling: Acoustical ceiling tile.

2.7.5.2.2.3. Floors: Carpet with rubber base.

2.7.5.2.2.4. Fenestration: Solid wood doors with sidelights. Electronic locks with Card Reader on any doors that could provide access.

2.7.5.2.3. Systems:

2.7.5.2.3.1. Lights: 2 x 4 general lighting with dual level switching and occupancy sensor.

2.7.5.2.3.2. Power: General convenience power. Cubicles to be powered as groups.

2.7.5.2.3.3. HVAC

2.7.5.2.3.4. Technology: Cubicles to receive data as groups.

- 2.7.5.2.4.** Furnishings: a combination of high and low wall cubicle systems furniture, (4) lounge chairs, coffee table.
- 2.7.5.2.4.1.** Administrators/Full-Time Faculty: 6' high partitions enclosing roughly 90 sf, "U"-Shaped cubicle work station with separate computing and work surfaces, Keyboard Tray, Task Light, 1 Lockable Pedestal, Lockable Flipper Door Upper Cabinets, Task Chair, 1 Guest Chair, 1 Lateral Filing Cabinet (or bookshelf), coat hook.
- 2.7.5.2.4.2.** Receptionists: 4' tall furniture system cubicle wall panels with reception counter. "U"-Shaped cubicle work station with separate computing and work surfaces, Keyboard Tray, Task Light, 1 Lockable Pedestal, Lockable Flipper Door Upper Cabinets, Task Chair, 1 Lateral Filing Cabinet (or bookshelf), coat hook.
- 2.7.5.2.4.3.** Lower Level Administrators/Administrative Assistants/ Clerks: 4' high partitions enclosing roughly 50-60 sf, "L"-Shaped cubicle work station with separate computing and work surfaces, Keyboard Tray, Task Light, File Drawer, Flipper Door Upper Cabinets, Task Chair, coat hook.
- 2.7.5.2.4.4.** Touchdown Spaces: 4' high partitions enclosing roughly 50 sf, Computing and Work Surfaces, Keyboard Tray, Task Chair, Two-Drawer Mobile Pedestal with Seat Top Drawer/Seat, Locker.
- 2.7.5.2.5.** Related Spaces:
- 2.7.5.2.5.1.** Coat Closet – sized appropriately for the number of anticipated occupants.
- 2.7.5.2.6.** Adjacencies:
- 2.7.5.2.6.1.** Work Room.
- 2.7.5.2.6.2.** Small Conference Room

2.7.6. Conference Rooms

2.7.6.1. Board Rooms: The Board Room is intended to be used as the primary meeting space for the College's Board of Trustees. In that these are public meetings, space must be provided for guests, visitors, and the media. Ensure ample consideration is given to acoustics, particularly as it relates to sound transmission, reverberation times, and background noise levels. The Board Room will be provided with a Coat Closet and Table and Chair Storage. The Board Room should be accessed from a Lobby Area which should have restroom facilities. An Employee Break Room should be in close proximity and fitted out to act as an occasional Catering Kitchen. Glass walled Conference Rooms are discouraged.

- 2.7.6.1.1.** Size: 960-1000 SF (20 sf per occupant) based on space for 21 to 25 persons at the table (10 on each side, Chairman at the end seat), and a similar number in side chairs in a gallery or on the perimeter of the space.
- 2.7.6.1.2.** Envelope:
- 2.7.6.1.2.1.** Walls: Walls from floor to underside of deck. Minimum STC Rating 52, upgraded wall finish, wood crown molding, wainscot, and base.
- 2.7.6.1.2.2.** Ceilings: Acoustical ceiling tile with ceiling upgrade above table.
- 2.7.6.1.2.3.** Floors: Carpet with wood base.
- 2.7.6.1.2.4.** Fenestration:
- 2.7.6.1.2.4.1.** Solid wood doors (double doors to be avoided) with narrow frosted sidelights.
- 2.7.6.1.2.4.2.** Windows to exterior on one wall or solar tubes. Windows to have light filtering and black-out shades, solar tubes to have light dampers.
- 2.7.6.1.3.** Systems:

- 2.7.6.1.3.1. Lights: 2 x 4 general lighting, with dual level switching, and task lighting over the conference table connected to a dimming system. Occupancy sensor.
 - 2.7.6.1.3.2. Power as required for all areas of work within the space. Floor mounted receptacles under the conference room table to power the table. Power will be provided to support coffee and food offerings at a counter. Conference table to have under-mounted electrical receptacles sufficient for the number seated at the table.
 - 2.7.6.1.3.3. HVAC: Separate individual zone with thermostat. No trunks or ducts serving other spaces should transit this space. Monitor CO2 and control ventilation as necessary. Where not provided with a ducted return to air handling units, return air to plenum via sound mitigating transfer duct.
 - 2.7.6.1.3.4. Data: Data receptacles as necessary to support technology. Wireless access point in ceiling to support guest connectivity.
 - 2.7.6.1.4. Technology:
 - 2.7.6.1.4.1. Smart Podium or Media Cabinet, with connections to Network and Flat Panel Display.
 - 2.7.6.1.4.2. Table mounted presentation system at Board Room Table with connections to network and Flat Panel Display.
 - 2.7.6.1.4.3. Flat Panel Display.
 - 2.7.6.1.4.4. Ceiling mounted speakers connected to smart podium or Media Cabinet.
 - 2.7.6.1.4.5. Conferencing camera and microphone system connected to smart podium or Media Cabinet.
 - 2.7.6.1.4.6. Conference Phone.
 - 2.7.6.1.5. Furnishings and Fittings
 - 2.7.6.1.5.1. Furnishings: A modular conference table with Data/Power Receptacles (fed from floor) sufficient for the number seated at the table, corresponding number of Conference Chairs, corresponding number of Guest Chairs, Credenza, Presentation/Technology Podium, Wall-, White Board with wooden doors.
 - 2.7.6.1.5.2. Fittings: Upper and lower cabinets, with a coffee sink and adequate counter space to facilitate light refreshments.
 - 2.7.6.1.6. Related Spaces:
 - 2.7.6.1.6.1. Coat Closet – sized to accommodate jackets for the occupants seated at the Board Room Table.
 - 2.7.6.1.6.2. Chair & Table Storage
 - 2.7.6.1.7. Adjacencies:
 - 2.7.6.1.7.1. Lobby
 - 2.7.6.1.7.2. Employee Break Room to function as occasional Catering Kitchen.
- 2.7.6.2. Large Conference Room:** For larger meetings with table space for 10 to 15 occupants, as well as seating at the perimeter. It is intended that the Large Conference Room should be sized and configured so that it could easily be converted into a Small Classroom.
- 2.7.6.2.1. Size: 300-600 SF (25 sf per occupant).
 - 2.7.6.2.2. Envelope:
 - 2.7.6.2.2.1. Walls: Walls from floor to underside of deck, minimum STC Rating 52, chair rail.
 - 2.7.6.2.2.2. Ceilings: Acoustical ceiling tile.
 - 2.7.6.2.2.3. Floors: Carpet with rubber base.
 - 2.7.6.2.2.4. Fenestration:
 - 2.7.6.2.2.4.1. Solid wood doors with sidelites/transom.

- 2.7.6.2.2.4.2. Windows to exterior on one wall or solar tubes. Windows to have light filtering and black-out shades, solar tubes to have light dampers.
 - 2.7.6.2.3. Systems:
 - 2.7.6.2.3.1. Lights: 2 x 4 general lighting with dual level switching and occupancy sensor.
 - 2.7.6.2.3.2. Power as required for all areas of work within the space. Floor mounted receptacles under the conference room table to power the table. Power will be provided to support coffee and food offerings at a counter.
 - 2.7.6.2.3.3. HVAC:
 - 2.7.6.2.3.4. Data: Data receptacles as necessary to support technology.
 - 2.7.6.2.4. Technology:
 - 2.7.6.2.4.1. Table mounted presentation system with connections to network and wall mounted Flat Panel Display.
 - 2.7.6.2.4.2. Flat Panel Display.
 - 2.7.6.2.4.3. Conferencing camera and microphone system connected to Smart Podium or Media Cabinet.
 - 2.7.6.2.4.4. Conference Phone.
 - 2.7.6.2.5. Furnishings and Fittings
 - 2.7.6.2.5.1. Furnishings: A modular conference table with Data/Power Receptacles (fed from floor) sufficient for the number seated at the table, corresponding number of Conference Chairs, corresponding number of Guest Chairs, Credenza, Smart Podium, White Boards, Clip/Tack Strips.
 - 2.7.6.2.5.2. Fittings: None.
 - 2.7.6.2.6. Related Spaces: - None.
 - 2.7.6.2.7. Adjacencies: None.
- 2.7.6.3. Medium Conference Room:** For mid-sized group meetings with 6 to 12 attendees. When associated with President's and Divisional Office Suites, these spaces will have a door from within the suite, as well as access from a corridor.
- 2.7.6.3.1. Size: 120-300 SF (20 sf per occupant).
 - 2.7.6.3.2. Envelope:
 - 2.7.6.3.2.1. Walls: Walls from floor to underside of deck, minimum STC Rating 49, chair rail.
 - 2.7.6.3.2.2. Ceilings: Acoustical ceiling tile.
 - 2.7.6.3.2.3. Floors: Carpet with rubber base.
 - 2.7.6.3.2.4. Fenestration: Solid wood door with sidelights/transom.
 - 2.7.6.3.3. Systems:
 - 2.7.6.3.3.1. Lights: 2 x 4 general lighting with dual level switching and occupancy sensor.
 - 2.7.6.3.3.2. Power as required for all areas of work within the space. Wall receptacles under the conference room table.
 - 2.7.6.3.3.3. HVAC:
 - 2.7.6.3.3.4. Data: Data receptacles as necessary to support technology.
 - 2.7.6.3.4. Technology:
 - 2.7.6.3.4.1. Table mounted presentation system with connections to network and Flat Panel Display.
 - 2.7.6.3.4.2. Flat Panel Display.
 - 2.7.6.3.4.3. Conferencing camera and microphone system.
 - 2.7.6.3.4.4. Telephone.
 - 2.7.6.3.5. Furnishings and Fittings
 - 2.7.6.3.5.1. Furnishings: A modular peninsula conference table with Data/Power Ports (fed from floor) sufficient for the number seated at the table, corresponding number of Conference Chairs, Credenza, White Boards, Clip/Tack Strips.

- 2.7.6.3.5.2. Fittings: None.
- 2.7.6.3.6. Related Spaces: - None.
- 2.7.6.3.7. Adjacencies: None.

2.7.6.4. Small Conference Room: For small group meeting with space for 4 to 6 occupants. It is intended that the Small Conference Room should be sized and configured so that it could easily be converted into an Office.

- 2.7.6.4.1. Size: 100-150 SF (25 sf per occupant).
- 2.7.6.4.2. Envelope:
 - 2.7.6.4.2.1. Walls: Walls from floor to underside of deck, minimum STC Rating 49, chair rail.
 - 2.7.6.4.2.2. Ceilings: Acoustical ceiling tile with high NRC/CAC or acoustical insulation overlay extending around perimeter of room four feet inside the space. Acoustical insulation not required if all surrounding walls g to deck above with STC rating noted above.
 - 2.7.6.4.2.3. Floors: Carpet with rubber base.
 - 2.7.6.4.2.4. Fenestration: Solid wood door with sidelights.
- 2.7.6.4.3. Systems:
 - 2.7.6.4.3.1. Lights: 2 x 4 general lighting with dual level switching and occupancy sensor.
 - 2.7.6.4.3.2. Power as required for all areas of work within the space. Wall receptacles under the conference room table.
 - 2.7.6.4.3.3. HVAC:
 - 2.7.6.4.3.4. Data: Data receptacles as necessary to support technology.
- 2.7.6.4.4. Technology:
 - 2.7.6.4.4.1. Table mounted presentation system with connections to network and Flat Panel Display.
 - 2.7.6.4.4.2. Wall mounted Flat Panel Display.
 - 2.7.6.4.4.3. Telephone.
- 2.7.6.4.5. Furnishings and Fittings
 - 2.7.6.4.5.1. Furnishings: A peninsula conference table with Data/Power Ports (fed from floor) sufficient for the number seated at the table, corresponding number of Chairs, Credenza, White Boards.
 - 2.7.6.4.5.2. Fittings: None.
- 2.7.6.4.6. Related Spaces: None.
- 2.7.6.4.7. Adjacencies: None.

2.7.7. Employee Break Rooms

These spaces are designed to provide space for hourly staff to eat lunch, staff and faculty to gather informally for discussion, or sit individually. They should include tables which allow groups of up to four to sit, but could also include counters with stools for individuals. Each building should have one Employee Break Room. Where adjacent to a Board Room or Lecture Hall, this space may also be fitted out to serve as a Catering Kitchen. The space will be provided with refrigerators, microwaves, coffee maker. Upper and lower cabinets should be provided.

2.7.7.1. Size: Varies depending on the size of the building and also the number of non-exempt hourly employees working in the building.

2.7.7.2. Envelope:

- 2.7.7.2.1. Walls from floor to underside of deck, minimum STC Rating 49, chair rail.
- 2.7.7.2.2. Ceilings: Acoustical ceiling tile.

- 2.7.7.2.3.** Floors: Resilient flooring with rubber base.
- 2.7.7.2.4.** Fenestration: Solid wood door with sidelights/transom. Ideally located on an exterior wall so that windows can be provided (these spaces are lower priority for windows than classrooms).

2.7.7.3. Systems:

- 2.7.7.3.1.** Lights: 2 x 4 general lighting with dual level switching and occupancy sensor.
- 2.7.7.3.2.** Power as required for all areas of work within the space. Over counter receptacles at cabinet and “lunch” counters.
- 2.7.7.3.3.** HVAC:
- 2.7.7.3.4.** Data: Ensure wireless connectivity to the network.
- 2.7.7.3.5.** Plumbing: Plumbed for kitchen sink and water supply to refrigerator ice maker. (Coffee maker should not have water.)

2.7.7.4. Furnishings and Fittings:

- 2.7.7.4.1.** Furnishings: An appropriate number of 2- and 4-seat tables with chairs, stools (if a “lunch counter” is provided), Bulletin Board.
- 2.7.7.4.2.** Fittings: Upper and lower cabinets with kitchen sink and lunch preparation. Counter space or shelf for microwave (should be ADA compliant). Narrow “lunch counter” with stools, if appropriate.

2.7.7.5. Related spaces: None.

2.7.7.6. Adjacencies: Major corridors.

2.7.8. Informal Collaboration Spaces

These spaces are designed to provide both students and staff areas to gather informally for discussion, or sit individually. They should include groupings of furniture which allow groups of up to four to sit, but also counters or carrels that would allow individuals to sit quietly and study. These spaces should be fitted with power and wireless data to facilitate “plugging in”. Ideally, each building should have at least one informal collaboration space.

2.7.8.1. Size: Varies

2.7.8.2. Envelope: These spaces are typically located as wide areas of corridors, but outside the flow of traffic.

- 2.7.8.2.1.** Walls: Because of the conversation that occurs, any walls shared with classrooms, labs, or offices should adequately mitigate sound transmission. Finish will typically match that of the adjacent corridor.
- 2.7.8.2.2.** Ceilings: Ceilings will vary but will likely carry that of the adjacent corridor.
- 2.7.8.2.3.** Floors: Flooring will typically match that of the adjacent corridor.
- 2.7.8.2.4.** Fenestration: Typically, these spaces are not separated from the adjacent corridor by a door. Ideally located on an exterior wall so that windows can be provided (these space are lower priority for windows than classrooms).

2.7.8.3. Furnishings: Lounge chairs, end tables (with power receptacles), counters, stools, carrel or counter (with power receptacles).

2.7.8.4. Related spaces: None.

2.7.8.5. Adjacencies: Major corridors.

2.7.9. Student Break Areas / Vending

Similar to, but separate from, Informal Collaboration Spaces, these areas off major corridors provide space for students to obtain refreshment and sit and eat. Ideally, each building would have one Student Break Area/Vending.

2.7.9.1. Size: Varies.

2.7.9.2. Envelope: These spaces are typically located as wide areas of corridors, but outside the flow of traffic.

2.7.9.2.1. Walls: Because of the conversation that occurs and noise from vending machines, any walls shared with classrooms, labs, or offices should adequately mitigate sound transmission. Finish will typically match that of the adjacent corridor.

2.7.9.2.2. Ceilings: Ceilings will vary but will likely carry that of the adjacent corridor.

2.7.9.2.3. Floors: Flooring will typically match that of the adjacent corridor

2.7.9.2.4. Fenestration: Typically, these spaces are not separated from the adjacent corridor by a door. Ideally located on an exterior wall so that windows can be provided (these space are lower priority for windows than classrooms).

2.7.9.3. Systems:

2.7.9.3.1. Lights: 2 x 4 general lighting with dual level switching and occupancy sensor.

2.7.9.3.2. Power as required for all areas of work within the space. Over counter receptacles at cabinet and “lunch” counters.

2.7.9.3.3. HVAC: Sufficient ventilation to accommodate heat load of equipment housed in the space.

2.7.9.3.4. Data: Ensure wireless connectivity to the network.

2.7.9.4. Furnishings and Fittings:

2.7.9.4.1. Furnishings: An appropriate number of high 2- and 4-seat tables with stools, stools (if a “lunch counter” is provided), Bulletin Board.

2.7.9.4.2. Fittings: One (1) dry food vending machine, one (1) drink vending machine. Narrow “lunch counter” with stools, if appropriate.

2.7.9.5. Related spaces: None.

2.7.9.5.1. Adjacencies: Major corridors. Convenient access to exterior parking area to facilitate loading vending machines.

2.7.10. Work Rooms

These rooms in an office suite provide general storage location for common office equipment in built-in upper and lower cabinetry. This would also be the location for a multi-function printer and related paper storage. As a minimum, one of these spaces will be provided per building (with access from a corridor). May be consolidated with an Employee Break Room.

2.7.10.1. Size: Roughly 200 SF.

2.7.10.2. Envelope:

2.7.10.2.1. Walls: Because printers and other equipment are located in these spaces, any walls shared with classrooms, labs, or offices should adequately mitigate sound transmission. Painted.

2.7.10.2.2. Ceilings: Acoustical ceiling tile.

2.7.10.2.3. Floors: Resilient flooring with rubber base.

2.7.10.2.4. Fenestration: Solid wood door.

2.7.10.3. Systems:

2.7.10.3.1. Lights: 2 x 4 general lighting with dual level switching and occupancy sensor.

2.7.10.3.2. Power as required for all equipment located within the space.

2.7.10.3.3. HVAC: Sufficient ventilation to accommodate heat load of equipment housed in the space.

2.7.10.3.4. Data: Data receptacles as necessary to support technology.

2.7.10.4. Technology:

2.7.10.4.1. Multi-Function Printer.

2.7.10.4.2. Wall mounted telephone.

2.7.10.5. Furnishings and Fittings:

2.7.10.5.1. Fittings: Roughly 10' of Upper and Lower Cabinets

2.7.10.5.2. Furnishings: None.

2.7.10.6. Related spaces: None.

2.7.10.7. Adjacencies: Incorporated into large Office Suites.

2.7.11. File Storage Rooms

These spaces are generally associated with Divisional or Departmental Office Suites and provide for the diminishing paper file capacity necessary for College administration.

2.7.11.1. Size: Roughly 110 SF.

2.7.11.2. Envelope:

2.7.11.2.1. Walls: Any walls shared with classrooms, labs, or offices should adequately mitigate

2.7.11.2.2. Ceilings: Acoustical ceiling tile.

2.7.11.2.3. Floors: Resilient flooring with rubber base.

2.7.11.2.4. Fenestration: Solid wood door.

2.7.11.3. Furnishings: File cabinets sized as necessary.

2.7.11.4. Related spaces: Office Suites.

2.7.11.5. Adjacencies: Divisional or Departmental Office Suite.

2.7.12. Storage Rooms

These spaces are generally associated with Specialty Classrooms and Labs and provide for the diminishing storage capacity necessary for instruction. General Classrooms will not typically be provided with Storage Rooms.

2.7.12.1. Size: Roughly 125 SF, although can be larger based on intended use.

2.7.12.2. Envelope:

2.7.12.2.1. Walls: Any walls shared with classrooms, labs, or offices should adequately mitigate sound transmission. Painted.

2.7.12.2.2. Ceilings: Acoustical ceiling tile.

2.7.12.2.3. Floors: Resilient flooring with rubber base.

2.7.12.2.4. Fenestration: Solid wood door.

2.7.12.3. Furnishings: Engineered Metal Shelving (capacity, type, size dependent on intended use).

2.7.12.4. Related spaces: Classrooms, Labs, Workshops.

2.7.12.5. Adjacencies: Incorporated into large Office Suites.

2.7.13. Restrooms

2.7.13.1. Group Restrooms

2.7.13.1.1. Size: Varies depending on fixture count.

2.7.13.1.2. Envelope:

2.7.13.1.2.1. Walls: Walls from floor to underside of deck, minimum STC Rating 49. Glazed CMU or CMU/drywall with glazed ceramic tile on all walls to ceiling. Cove base tile flush with floor.

2.7.13.1.2.2. Ceilings: Suspended drywall. Appropriate insulation to complement wall sound rating. All access hatches to be lockable to prevent unauthorized access above ceiling. Painted.

2.7.13.1.2.3. Floors: Porcelain Tile.

2.7.13.1.2.4. Fenestration: Solid wood doors. Doors should open out, into a vestibule. When located at the perimeter of a building or on the uppermost floor, natural daylighting should be facilitated by the use of solar tubes or obscured glass windows.

2.7.13.1.3. Systems:

2.7.13.1.3.1. Lights: 2 x 4 general lighting with occupancy sensor.

2.7.13.1.3.2. Power as required for housekeeping. Convenience outlet at vanity.

2.7.13.1.3.3. HVAC: Sufficient to meet Code. Exhaust ventilation with sound mitigating transfer duct for make-up air. Grates in doors are not acceptable.

2.7.13.1.3.4. Plumbing: Low Flow Toilets. Vanity counter with underhung sinks, or modular multisink hand washing station. All flush valves and faucets to be automatic. Adjustable Floor Drain.

2.7.13.1.3.5. Data: None.

2.7.13.1.4. Furnishings and Fittings:

2.7.13.1.4.1. Fittings: Solid phenolic toilet partitions, at all toilets and urinals; dual large roll SS TP dispenser; electric hand dryers; coat/bag hooks; solid surface vanity with integral bowls over a wall hung, ADA base (fully enclosed to prevent unauthorized access beneath).

2.7.13.1.4.2. Furnishings: None.

2.7.13.1.5. Related spaces: None.

2.7.13.1.6. Adjacencies: Corridor

2.7.13.2. Individual Unisex Restroom

2.7.13.2.1. Size: ADA Minimum.

2.7.13.2.2. Envelope:

2.7.13.2.2.1. Walls: Walls from floor to underside of deck, minimum STC Rating 49. Glazed CMU or drywall with glazed ceramic tile on all walls to ceiling. Cove base tile flush with floor.

2.7.13.2.2.2. Ceilings: Suspended drywall. Appropriate insulation to complement wall sound rating. All access hatches to be lockable to prevent unauthorized access above ceiling. Painted.

2.7.13.2.2.3. Floors: Porcelain Tile.

2.7.13.2.2.4. Fenestration:

2.7.13.2.2.4.1. Solid wood doors. Door lockset to indicate "Occupied/Unoccupied".

2.7.13.2.2.4.2. When located at the perimeter of a building or on the uppermost floor, natural daylighting should be facilitated by the use of solar tubes or obscured glass windows.

2.7.13.2.3. Systems:

2.7.13.2.3.1. Lights: 2 x 4 general lighting with occupancy sensor.

2.7.13.2.3.2. Power as required for housekeeping. Convenience outlet at vanity.

2.7.13.2.3.3. HVAC: Sufficient to meet Code. Exhaust ventilation with sound mitigating transfer duct for make-up air.

2.7.13.2.3.4. Plumbing: Low Flow Toilets. Wall hung sink. All flush valves and faucets to be automatic. Adjustable Floor Drain.

2.7.13.2.3.5. Data: None.

2.7.13.2.4. Furnishings and Fittings:

2.7.13.2.4.1. Fittings: Small, double roll SS TP dispenser, SS paper towel dispenser, coat/bag hook, 13-gallon SS semi-recessed waste receptacle, adult rated changing table.

2.7.13.2.4.2. Furnishings: None.

2.7.13.2.5. Related spaces: None.

2.7.13.2.6. Adjacencies: Corridor.

2.7.13.3. Private Restroom (President only)

- 2.7.13.3.1. Size: ADA minimum.
- 2.7.13.3.2. Envelope:
 - 2.7.13.3.2.1. Walls: Walls from floor to underside of deck, minimum STC Rating 49. Drywall. Painted.
 - 2.7.13.3.2.2. Ceilings: Suspended drywall. Painted.
 - 2.7.13.3.2.3. Floors: Resilient Floor. Wood Base.
 - 2.7.13.3.2.4. Fenestration: Solid wood doors.
- 2.7.13.3.3. Systems:
 - 2.7.13.3.3.1. Lights: 2 x 4 general lighting with occupancy sensor.
 - 2.7.13.3.3.2. Convenience outlet at vanity.
 - 2.7.13.3.3.3. HVAC: Sufficient to meet Code. Exhaust ventilation.
 - 2.7.13.3.3.4. Plumbing: Low flow Toilet. Vanity.
 - 2.7.13.3.3.5. Data: None.
- 2.7.13.3.4. Furnishings and Fittings:
 - 2.7.13.3.4.1. Fittings: Vanity Cabinet, residential grade TP holder, towel rack, paper towel dispenser, coat hook.
 - 2.7.13.3.4.2. Furnishings: None.
- 2.7.13.3.5. Related spaces: None.
- 2.7.13.3.6. Adjacencies: President's Office.

2.7.14. Mother's Privacy Rooms

Each campus will be provided with a Mother's Privacy Room which will provide a private location for nursing mothers to pump and feed.

- 2.7.14.1. Size: Roughly 60 SF.
- 2.7.14.2. Envelope:
 - 2.7.14.2.1. Walls: Above ceiling height partition to achieve minimum STC Rating 49; painted.
 - 2.7.14.2.2. Ceilings: Acoustical ceiling tile with acoustical insulation overlay extending four feet inside the space.
 - 2.7.14.2.3. Floors: Carpet with rubber base.
 - 2.7.14.2.4. Fenestration: Solid wood door; Transom (no sidelite).
- 2.7.14.3. Systems:
 - 2.7.14.3.1. Lights: 2 x 4 general lighting with occupancy sensor.
 - 2.7.14.3.2. Power for refrigerator, pump apparatus, and convenience outlets.
 - 2.7.14.3.3. HVAC: Adequate ventilation to accommodate heat load from refrigerator
 - 2.7.14.3.4. Data: Ensure wireless connectivity to network.
- 2.7.14.4. Furnishings and Fittings
 - 2.7.14.4.1. Fittings: Roughly 48" Base cabinet with small wash sink, open counter space, and room for a small under-counter refrigerator.
 - 2.7.14.4.2. Furnishings: Large lounge chair, end table, under counter refrigerator.
- 2.7.14.5. Related spaces: None.
- 2.7.14.6. Adjacencies: A supervised space, such as Learning Resource Center or Student Services, so that the entrance to the Privacy Room can be monitored.

2.7.15. Custodial Closets

2.7.15.1. Size: Roughly 60 SF, unless Custodial Storage is incorporated (one per building).

2.7.15.2. Envelope:

2.7.15.2.1. Walls: Walls from floor to underside of deck, minimum STC Rating 49. CMU or drywall. Painted

2.7.15.2.2. Ceilings: Ceiling to match adjacent Lobby Space.

2.7.15.2.3. Floors: Sealed concrete or resilient flooring. Rubber Base.

2.7.15.2.4. Fenestration: Solid wood doors.

2.7.15.3. Systems:

2.7.15.3.1. Lights: 2 x 4 general lighting with occupancy sensor.

2.7.15.3.2. Power as required for all equipment located within the space.

2.7.15.3.3. HVAC: Sufficient ventilation to accommodate heat load of equipment housed in the space.

2.7.15.3.4. Plumbing: Mop Sink. Floor Drain.

2.7.15.3.5. Data: Data receptacles as necessary to support technology.

2.7.15.4. Furnishings and Fittings:

2.7.15.4.1. Fittings: Shelving to support intended use. Mop Rack. Space reserved for chemical dispensing system.

2.7.15.4.2. Furnishings: None.

2.7.15.5. Related spaces: Custodial Storage.

2.7.15.6. Adjacencies: Corridor.

2.7.16. Stairs

2.7.16.1. Lobby Stairs

2.7.16.1.1. Size: Varies depending on intended purpose.

2.7.16.1.2. Envelope:

2.7.16.1.2.1. Walls: Upgraded masonry (glazed CMU, Polished Face CMU, Stucco Plaster). Other finishes upon approval of the Owner.

2.7.16.1.2.2. Ceilings: Ceiling to match adjacent Lobby Space.

2.7.16.1.2.3. Floors: Stair tread/risers to be pre-cast Terrazzo or similar. Landings to match stairs.

2.7.16.1.2.4. Fenestration: Windows for natural daylighting. Solid wood doors.

2.7.16.1.3. Systems:

2.7.16.1.3.1. Lights: Continuation from adjacent Lobby. If additional lighting is required, install wall mounted fixtures accessible without special lifts or scaffolding from a landing.

2.7.16.1.3.2. Power as required for housekeeping.

2.7.16.1.3.3. HVAC: None

2.7.16.1.3.4. Plumbing: None

2.7.16.1.3.5. Data: None.

- 2.7.16.1.4.** Fittings:
 - 2.7.16.1.4.1.** Handrails to be stainless steel. Cap may be wood or metal

- 2.7.16.1.5.** Related spaces: None.

- 2.7.16.1.6.** Adjacencies: Lobby.

2.7.16.2. Access/Egress Stairs

- 2.7.16.2.1.** Size: Varies depending on intended purpose.

- 2.7.16.2.2.** Envelope:

- 2.7.16.2.2.1.** Walls: Masonry (CMU or stucco plaster). Painted.

- 2.7.16.2.2.2.** Ceilings: Acoustical ceiling tile.

- 2.7.16.2.2.3.** Floors: Painted steel pans with polished stained concrete treads with aluminum, non-skid nosings. Landings to match stair, or adjacent corridor flooring. Other masonry systems may be considered with Owner's approval.

- 2.7.16.2.2.4.** Fenestration: Windows for natural daylighting. Solid wood doors.

- 2.7.16.2.3.** Systems:

- 2.7.16.2.3.1.** Lights: Wall mounted fixtures located such as to be accessible without special lifts or scaffolding from a landing.

- 2.7.16.2.3.2.** Power as required for housekeeping.

- 2.7.16.2.3.3.** HVAC: As appropriate for comfort.

- 2.7.16.2.3.4.** Plumbing: None

- 2.7.16.2.3.5.** Data: None.

- 2.7.16.2.4.** Fittings:

- 2.7.16.2.4.1.** Handrails to be painted steel.

- 2.7.16.2.5.** Related spaces: None.

- 2.7.16.2.6.** Adjacencies: Corridors.

Table of Contents: College Standards

3. COLLEGE STANDARDS	3-6
General Information	3-6
Materials Conservation	3-6
Durability/Maintainability	3-6
Local Products	3-6
Standard Stock Items	3-6
3.1. Division 1 - General Requirements	3-6
3.1.1. Form of Construction Contract	3-6
3.1.2. General Conditions of the Contract	3-6
3.1.3. Building Permits	3-6
3.1.4. Materials	3-7
3.1.5. Temporary Facilities	3-7
3.1.6. Temporary Protection	3-7
3.1.7. Safety	3-7
3.1.8. Cutting and Patching	3-8
3.1.9. Site Limits	3-8
3.1.10. Photo Documentation	3-8
3.2. Division 2 – Existing Conditions	3-8
3.2.1. Site Permitting	3-8
3.2.2. Relocated Equipment and Amenities	3-8
3.2.3. Demolition	3-9
3.2.4. Site Preparation	3-9
3.2.5. Blasting	3-9
3.2.6. Hazardous Materials Abatement	3-9
3.3. Division 3 – Concrete	3-10
3.3.1. Mock-ups	3-10
3.3.2. Foundation Systems	3-10
3.3.3. Vertical Concrete Structure	3-11
3.3.4. Slab on Grade	3-11
3.3.5. Elevated Slabs and Decks	3-11
3.3.6. Sidewalks	3-11
3.3.7. Dumpster Pads	3-12
3.3.8. Recycle Container Pads	3-12
3.4. Division 04 – Masonry	3-12
3.4.1. Concrete Masonry Units (CMU):	3-12
3.4.2. Precast Wall Panels	3-13
3.4.3. Unit Brick	3-13
3.4.4. Brick Pavers	3-13
3.4.5. Manufactured or Natural Stone	3-13
3.4.6. Mortar	3-13
3.4.7. Retention and Ground Walls	3-13

3.5. Division 5 – Metals	3-13
3.5.1. Structures.....	3-13
3.5.2. Column Base Plates.....	3-13
3.5.3. Lintels	3-13
3.5.4. Exterior Ferrous Metals	3-13
3.5.5. Shop Primer	3-14
3.5.6. Exterior Railings	3-14
3.5.7. Storage and Protection	3-14
3.5.8. Expansion Joint Covers	3-14
3.6. Division 6 – Wood and Plastics (Not Used).....	
3.7. Division 7 - Thermal and Moisture Protection.....	3-14
3.7.1. Membrane Waterproofing	3-14
3.7.2. Metal Roofing.....	3-15
3.7.3. Snow Guards	3-15
3.7.4. Polyvinylchloride (PVC) Roofing	3-15
3.7.5. Vapor Barriers.....	3-15
3.7.6. Air and Moisture Barrier	3-15
3.7.7. Insulation	3-15
3.7.8. Rigid Insulation	3-15
3.7.9. Walkway Pads.....	3-15
3.7.10. Downspouts	3-15
3.7.11. Caulking.....	3-16
3.8. Division 8 - Openings	3-16
3.8.1. Interior Doors.....	3-16
3.8.2. Exterior Doors.....	3-16
3.8.3. Fire-Rated Doors.....	3-17
3.8.4. Aluminum-Framed Entrances	3-17
3.8.5. Curtain Wall Systems	3-17
3.8.6. Windows/Glazing.....	3-17
3.8.7. Door Hardware	3-18
3.9. Division 9 - Finishes	3-20
3.9.1. Gypsum Board	3-20
3.9.2. Acoustical Tile Ceilings	3-21
3.9.3. Flooring	3-21
3.9.4. Tile Carpeting	3-22
3.9.5. Access Flooring	3-22
3.9.6. Resilient Wall Base	3-23
3.9.7. Painting	3-23
3.9.8. Wall Coverings	3-26
3.10. Division 10 – Specialties	3-26
3.10.1. Signage	3-26
3.10.2. Room Numbering	3-27
3.10.3. Toilet Compartments.....	3-27
3.10.4. Toilet and Bath Accessories	3-27
3.10.5. Fire Extinguishers & Cabinets.....	3-28

3.10.6.	Automatic Electronic Defibrillators (AEDs) & Cabinets	3-28
3.10.7.	Wall Protection	3-28
3.11.	Division 11 – Equipment	3-29
3.11.1.	Parking Control	3-29
3.11.2.	Trash Compactors	3-29
3.11.3.	Recycle Equipment.....	3-29
3.11.4.	Dumpsters	3-30
3.11.5.	Vending Equipment.....	3-30
3.12.	Division 12 – Furnishings	3-30
3.12.1.	Entrance Floor Mats and Fames.....	3-30
3.12.2.	Roller Window Shades	3-30
3.12.3.	Site Furnishings.....	3-30
3.13.	Division 13 – Special Construction (Not Used)	
3.14.	Division 14 - Conveying Equipment	3-31
3.14.1.	Elevators.....	3-31
3.15.	Division 15 – Undefined	
3.16.	Division 16 – Undefined	
3.17.	Division 17 – Undefined	
3.18.	Division 18 – Undefined	
3.19.	Division 19 – Undefined	
3.20.	Division 20– Undefined.....	
3.21.	Division 21 - Fire Suppression	3-33
3.21.1.	Automatic Sprinkler Systems	3-33
3.22.	Division 22 – Plumbing	3-33
3.22.1.	Domestic Water Piping	3-33
3.22.2.	Sanitary Sewer Waste & Vent Piping.....	3-33
3.22.3.	Back-Flow Prevention Devices	3-34
3.22.4.	Water Meters	3-34
3.22.5.	Grease Traps	3-34
3.22.6.	Plumbing Fixtures	3-34
3.22.7.	Drinking Fountains & Water Coolers	3-35
3.23.	Division 23 - Heating, Ventilation, and Air Conditioning	3-35
3.23.1.	Mechanical Design Requirements	3-35
3.23.2.	Sound and Vibration Control	3-36
3.23.3.	Piping Insulation	3-37
3.23.4.	Piping and Valves	3-37
3.23.5.	Pumps & Pump Systems	3-37

3.23.6.	Chilled Water Systems	3-37
3.23.7.	Boilers	3-38
3.23.8.	Refrigeration Equipment	3-38
3.23.9.	Cooling Towers	3-38
3.23.10.	Air Handling Units	3-39
3.23.11.	Ductwork	3-39
3.23.12.	Building Automation System	3-40
3.23.13.	Labeling	3-40
3.24.	Division 24 – Undefined	
3.25.	Division 25 – Integrated Automation (Not Used)	
3.26.	Division 26 – Electrical	3-40
3.26.1.	Campus Primary Electric Distribution	3-40
3.26.2.	Transformers	3-41
3.26.3.	Emergency Generators	3-41
3.26.4.	Electrical Device Manufacturers	3-41
3.26.5.	Interior Lighting	3-42
3.26.6.	Exterior Lighting	3-44
3.27.	Division 27 – Communications	3-45
3.27.1.	Emergency Telephones	3-45
3.27.2.	Data Infrastructure	3-45
3.28.	Division 28 - Electronic Safety and Security	3-54
3.28.1.	Alarm and Detection System	3-54
3.28.2.	Fire Alarm System and Mass Notification	3-54
3.28.3.	Access Controls	3-55
3.28.4.	Closed Circuit Television System (CCTV)	3-46
3.29.	Division 29 – Undefined	
3.30.	Division 30 – Undefined	
3.31.	Division 31 – Earthwork	3-56
3.31.1.	Excavating	3-56
3.31.2.	Backfill	3-57
3.31.3.	Termite Control	3-58
3.31.4.	Site Drainage	3-58
3.32.	Division 32 - Exterior Improvements	3-59
3.32.1.	Walks, Steps, and Ramps	3-59
3.32.2.	Asphalt Paving	3-60
3.32.3.	Landscaping	3-60
3.32.4.	Xeriscaping	3-61
3.32.5.	Large Trees Recommended for Campus	3-61
3.32.6.	Medium Trees Recommended for Campus	3-62
3.32.7.	Small Trees Recommended for Campus	3-63

3.33.	Division 33 – Utilities	3-64
3.33.1.	Underground Utilities	3-64

3. COLLEGE STANDARDS

General Information

Materials Conservation

The College is dedicated to the principle of conserving materials. In addition to basic conservation requirements, the Designer should consider the utilization of recycled materials content of specified materials and non-conventional materials. Salvage of scrap materials shall be pursued to the maximum extent practical, especially with regard to scrap metals and lumber.

Durability/Maintainability

Designers are required to focus on long term durability and maintainability when designing and specifying equipment, materials and finishes. New buildings should be designed with a 100-year life cycle and any renovations with a 25-year life cycle. First cost should not be the overriding consideration.

Local Products

When it is possible, and where it is consistent with the desired quality and cost of the project, materials and equipment manufactured or distributed by local vendors should be incorporated into the design of the project.

Standard Stock Items

Designers are directed and required to base their designs upon standard stock items whenever possible. Do not use end of run or items being taken out of stock. Where custom-built items are required, the Designer shall clearly indicate this information on the contract documents and approval of mock-ups will be required.

3.1. General Requirements

3.1.1. Form of Construction Contract

The Contractor in submitting a bid or proposal for services acknowledges that they are familiar with the forms of contract required by the College:

3.1.1.1. For Formal Construction Projects: Contractor agrees to execute the State Construction Office Form of Construction or Construction Management Contract.

3.1.1.2. For Informal Construction Projects: Contractor agrees to execute the Rowan-Cabarrus Community College modified version of the State Construction Office Informal Construction Contract Form.

3.1.2. General Conditions of the Contract

The Contractor in submitting a bid or proposal for services acknowledges that they are familiar with and will execute the construction contract with OC-15 Instructions to Bidders and General Conditions of the Contract.

3.1.3. Building Permits

Unless directed otherwise in the Contract documents, the Contractor shall secure and pay for the building permit as well as for other permits, fees, licenses, and inspections necessary for proper execution and completion of the Project as required by governmental agencies.

3.1.4. Materials

Unless directed otherwise in the Contract documents, all materials incorporated into the work shall be new. These materials and the systems into which they are incorporated will be protected for the duration of the project and turned over to the Owner at project completion in like new condition. Visible patches, nicks, dings, will not be acceptable. Damaged materials will be replaced at the contractor's sole expense.

3.1.5. Temporary Facilities

Each Contractor shall install, operate, protect, and maintain temporary facilities and services.

3.1.5.1. The contractor shall provide temporary offices onsite as required for their on-site supervision and project management. If, in the form of a jobsite trailer, this trailer shall be fully permitted by the local Authority Having Jurisdiction. For smaller interior projects a "Rolling Office/Plan Table" could be acceptable. The College may provide office space, if available in the vicinity of the project. Requests for office space inside the College's buildings will be made in writing from the contractor to the College, and shall document the savings to the College.

3.1.5.2. The contractor shall provide temporary restroom facilities as required for their onsite personnel. For smaller interior projects, the College may select to allow the contractor(s) to use the existing restrooms within the facility under renovation.

3.1.5.3. Staging areas will be made available to the Contractor as close as possible to the Job Site unless noted otherwise. Security of the staging area will be the responsibility of the Contractor, and will be fenced by the Contractor, have a locking gate, have signage identifying the name of the Contractor with emergency contact information.

3.1.5.4. Parking will be provided on-campus for the Contractor's forces unless noted otherwise.

3.1.5.5. Temporary Utilities: Temporary electric service required for a project should be requested by the Contractor through the local power provider in their name. Where permanent utilities are available and can be tapped, the College may decide to allow use of these rather than having additional temporary services installed so long as savings to the College are documented.

3.1.6. Temporary Protection

Prior to the start of construction, and for the duration of the progress of the work, existing finishes, equipment, landscaping, etc. shall be adequately protected from damage by the accomplishment of the Work.

3.1.7. Safety

The contractor shall adhere to the rules, regulations and interpretations of the North Carolina Department of Labor relating to Occupational Safety and Health Standards for the Construction Industry (Title 29, Code of Federal Regulations, Part 1926, published in Volume 39, Number 122, Part II, June 24, 1974, Federal Register), and revisions thereto as adopted by General Statutes of North Carolina 95-126 through 155.

3.1.7.1. The College's Construction Safety Guidelines shall be included by reference in the Construction Contract and shall be strictly enforced. (<https://www.rccc.edu/environservices/college-construction-safety-guidelines/>.)

3.1.7.2. Maintaining the safety of students, faculty, and staff is paramount, and all actions and communications necessary must be taken to ensure that segregation from construction is maintained for the duration of the project.

3.1.8. Cutting and Patching

The integration of new work into existing finishes is critical to the overall appearance of the project and shall be given due attention by the design and construction teams.

3.1.8.1. It is acknowledged that patches are very difficult to seamlessly blend into existing finishes; however, the college's standard for patching is very high, approaching "indistinguishable".

3.1.8.2. Cutting and patching of new work must be indistinguishable from adjacent new work.

3.1.8.3. Where existing paving is cut, the asphalt shall be neatly cut and removed with an asphalt cutter. Broken, ripped, or crushed edges are not acceptable, and any cut edge should be protected during the work. Cut areas shall be large enough for sub-base to be mechanically compacted. Pavement shall be replaced in accordance with College and North Carolina Department of Transportation (NCDOT) Standards for intended use.

3.1.9. Site Limits

The limits of the construction site are to be established by the Designer in coordination with the College. These limits shall be shown on the construction drawings. The location of site fences, temporary partitions, staging and parking, if required by the project, shall also be shown.

3.1.9.1. The construction site shall be enclosed with a six feet (6') chain link type fence with top rail. Interior construction will be segregated by construction of temporary partitions and locking temporary doors. Door locks shall be provided by the College so that they integrate into the College's keying system.

3.1.9.2. Drawings shall also specify the area to be used for material storage during construction.

3.1.10. Photo Documentation

Contractor shall photo document the existing conditions of the building and site, adjacent areas, drives, roadways and paths intended for use by construction traffic, and other areas potentially impacted by the construction, prior to the commencement of any work. This documentation will be shared with the Owner and Architect, and will be evidence of existing conditions should disputes arise regarding damage.

3.2. Division 02 – Existing Conditions

3.2.1. Site Permitting

No demolition, requiring a permit, shall commence in advance of the permit being picked up and posted on the jobsite by the Contractor.

3.2.2. Relocated Equipment and Amenities

Special concern shall be taken with equipment to be reused. Establish schedule for removal and reinstallation through the College. Relocation of existing equipment shall include: disconnection and moving, photo documentation of the condition of the equipment, storage and protection outside the area of work, restoration and capping of utilities, recording existing piping arrangements to facilitate reinstallation, and replacing utilities/extensions required to complete reinstallation.

3.2.3. Demolition

Structures should be carefully evaluated prior to making the decision to demolish them, and the case for demolition should be demonstrated and captured in writing.

3.2.3.1. Debris resulting from demolition will be completely removed from the site and disposed of in an appropriate recycling/dump site. Foundations of structures shall be removed entirely unless specifically approved by the Owner and documented in the Demolition Plans. Where new structures will replace existing structures, indicate extent of foundation removal on the drawings.

3.2.3.2. To the greatest extent possible, demolition debris and excess equipment should be re-used or recycled and quantities of the various materials diverted away from landfills should be documented in the project history.

3.2.3.3. No structure, equipment or systems will be permitted to be abandoned in place and, to the greatest extent possible, as-built surveys of existing facilities should identify and direct the removal of items which may have been abandoned in place prior to the design the project. The contractor shall be responsible for notifying the Architect of any abandoned equipment or systems discovered during the course of any project and directives shall be issued to ensure that the equipment/systems are removed.

3.2.4. Site Preparation

3.2.4.1. All objectionable growth within the site area planned for building and landscaping improvements shall be cleared. All debris resulting from any clearing, stripping, grubbing, and demolition activities shall be removed at frequent intervals to prevent unsightly accumulation.

3.2.4.2. Clearing and grubbing of all trees, shrubs, and turf shall include the removal of stumps and roots. No stump or root greater than three (3) inches in diameter shall remain in the areas where underground structures, utility lines, footings and pavements are to be constructed. Grubbing in open areas shall remove stumps and roots greater than three (3) inches in diameter to a depth of two (2) feet below finished grade.

3.2.4.3. Soil, both structural and topsoil, free of tree roots, brush and other debris can be stockpiled within the site for subsequent needs. All material in excess of subsequent needs shall be removed from the College. A deductive alternate shall be provided to the college if clean structural fill and topsoil is allowed to be disposed of in an identified spoil area on college property, where it would be graded and seeded by the Contractor.

3.2.5. Blasting

Blasting is strongly discouraged. If blasting is authorized by the College, a blasting plan and schedule must be submitted by the contractor to the Designer's geotechnical engineer for approval. The blasting plan will include at a minimum: seismograph monitoring locations and dust, traffic, and noise control contingencies. Contractor is responsible for documenting the conditions of adjacent structures, when collateral damage is possible. Contractor is responsible for collateral damage to existing conditions.

3.2.6. Hazardous Materials Abatement

3.2.6.1. Demolition, renovation, or remodeling projects are likely to involve some abatement of hazardous materials, including asbestos. Designers are required to have a qualified Hazardous materials consultant on the Design Team. The College will provide available information on

identified hazardous materials on any site, but the Designer may encounter questionable material which may contain hazardous materials. Designer will perform an onsite visual survey and will have testing conducted on questionable material involved with/ interfere with the project. Designer will provide the Project Manager with a copy of the report.

3.2.6.2. The Designer shall provide a design for hazardous material removal, if required, as part of the Design Contract as per the State Construction Manual.

3.2.6.3. The College requires the Designer to provide for hazardous material abatement on structures on the site scheduled for demolition. All abatement work shall be done in compliance with the authority having jurisdiction.

3.2.6.4. Certified hazardous material abatement contractors must be contracted with to remove hazardous materials; certified hazardous materials transported must be used to transport material to a certified landfill. The limit of liability required by these contractors for Hazardous Materials is no less than \$10,000,000 per occurrence. Rowan-Cabarrus Community College must be named as additional insured on all policies.

3.3. Division 03 – Concrete

All concrete construction shall be designed and constructed in accordance with the American Concrete Institute's (ACI) Standards.

3.3.1. Mock-ups

A sample panel for exposed concrete may be required at the site prior to beginning production. The panel shall show all the various finishing techniques required in the structure (i.e. joints, texture, color, workmanship, sandblasting, etc.). The concrete used shall be provided from the Project Supplier and shall represent the approved design mix in all aspects. Panel shall be protected from construction operations but shall be left exposed to the elements and left in place until all architectural concrete has been approved. Special attention shall be given to areas that routinely have caused concern in concrete construction, such as:

- 3.3.1.1.** Adequate cover over reinforcing steel,
- 3.3.1.2.** Sealing and waterproofing,
- 3.3.1.3.** Proper drainage,
- 3.3.1.4.** Joints and connections,
- 3.3.1.5.** Proper dimension and sizing for embedded items,
- 3.3.1.6.** Coordination of the electrical and mechanical requirements for penetrations and across expansion joints,
- 3.3.1.7.** Protection of in-place work during construction (against vandalism).

3.3.2. Foundation Systems

3.3.1.1. Foundation Systems shall be designed to comply with the recommendations of a geotechnical engineer and/or licensed structural engineer.

3.3.1.2. Where there is a risk of moisture intrusion into the envelope of the building an appropriate foundation drainage system shall be incorporated into the design.

3.3.3. Vertical Concrete Structure

3.3.3.1. All structural concrete should have wire or steel rods, or both, as a reinforcement properly suspended in the pour. All steel rods should be tied with an overlap of one foot (1') in all linear runs and at intersections.

3.3.3.2. All exposed surfaces of concrete walls, columns, ceilings, and parapets shall be hand cleaned and rubbed to remove stains, foreign matter, burrs, fins, and any other surface irregularities, after removal of form ties and after any repairs and patching work has been completed. Exposed surfaces shall be left true to line and plane and free from form marks and other imperfections. Cosmetic coatings used to disguise underlying defects are not acceptable.

3.3.4. Slab on Grade

Ground slabs will have controls in place to limit moisture intrusion and control cracking and movement of the slab.

3.3.5. Elevated Slabs and Decks

3.3.5.1. Elevated slabs will have controls in place to limit moisture intrusion and control cracking and movement of the slab.

3.3.5.2. Interior Floors shall be level and without trowel marks, dirt, rust stains, and, especially, oil-based paints (stains) or oil or grease spots. These floors shall be finished with an approved penetrating seal and hardener for concrete. Concrete floors not covered with a flooring material shall receive one smooth coat of membrane seal.

3.3.6. Sidewalks

3.3.6.1. Concrete sidewalks are the College Standard except in "off path" gathering areas and intersections where emphasis is desired, in which case brick pavers shall be used.

3.3.6.2. Sidewalks constructed with concrete will be a minimum of four inches (4") deep with a six-inch (6") gravel base on compacted earth.

3.3.6.3. All exterior concrete flatwork shall, as a minimum, be designed with a minimum of 3,000 PSI strength in 28 days with fiber and six to eight percent (6-8%) entrained air. A maximum water-to-cement ration shall be 0.45.

3.3.6.4. Plastic insert ADA Truncated Domes are required at the intersections where sidewalks intersect roadways.

3.3.6.5. Pervious Concrete Mix for sidewalks and other paving conditions may be substituted as a slab or under-slab installation. The Designer should consult with the College Project Manager for standard applications.

3.3.6.6. All exterior concrete ramps, walks, loading docks, aprons, and other such surfaces subject to wetting shall be finished with a non-slip broom finish.

3.3.7. Dumpster Pads

3.3.7.1. Dumpster Pads shall be constructed of a ten feet (10') wide by eighteen feet (18') long concrete pad with a minimum reinforcing of 6x6 – 10/10 WWF for each refuse container. The pads shall be a minimum of six inches (6") deep with a six-inch (6") gravel base on compacted earth. An apron sufficient in size for the front wheels of a dumping vehicle shall be constructed similarly.

3.3.7.2. Dumpsters at food service areas will have pad graded to a floor drain (piped to sewer if necessary). A freeze-proof spigot will be provided to facilitate wash down.

3.3.7.3. A clearance of seventeen feet (17') shall be provided above all dumpster pads for handling of refuse container by the trash truck. Refuse container shall be so positioned that it cannot be easily blocked. Turnaround space for the servicing truck shall be provided. A travel path of heavy-duty paving will allow the trash vehicle access to the dumpster.

3.3.7.4. If a loading dock is provided, the container shall be located in the vicinity of the dock. There shall be no bumpers on the dock at the pad location. A stop six inches (6") from the rear of the pad shall be provided for each dumpster, consisting of three (3) pipe bollards filled with concrete.

3.3.7.5. The bollards shall be finished with one (1) coat exterior metal primer and two (2) coats exterior bronze "synthetic enamel". The bollards shall be six feet six inches (6'-6") in total length with three feet (3') set in concrete. If the bollards cannot be used, then a reinforced concrete stop shall be poured in place at the same location. This poured stop shall be six inches (6") deep by seven inches (7") high.

3.3.8. Recycle Container Pads

Recycle Container Pads shall be provided for recycle containers. This pad shall be located near the refuse container pad and should be easily accessible. Slab construction shall be similar to dumpster pads. Overall size will vary depending on number of containers.

3.4. Division 04 – Masonry

"Oversize" brick or brick in unusual colors is not appropriate. Glass block is not an approved material for exterior use on any facility on campus.

3.4.1. Concrete Masonry Units (CMU):

3.4.1.1. Glazed face CMU shall be considered for interior use in areas where durability and ease of cleaning are of primary concern in spaces such as the following:

- 3.4.1.1.1.** Stair Towers
- 3.4.1.1.2.** Restrooms

3.4.1.2. Painted CMU shall be considered for interior use in areas where durability and ease of maintenance are of primary concern in spaces such as the following:

- 3.4.1.2.1.** Corridors
- 3.4.1.2.2.** Industrial Program Labs

3.4.1.3. Painted or Glazed CMU shall not be utilized as the exposed finish in the following spaces:

- 3.4.1.3.1.** Classrooms
- 3.4.1.3.2.** Offices
- 3.4.1.3.3.** Conference Rooms

3.4.1.4. Filled cell or other partially insulated CMU is not to be used. Insulating of exterior masonry walls to be as otherwise noted in these Guidelines.

3.4.2. Precast Wall Panels

Factory precast wall panels and "Tilt-Wall" shall be considered as the preferred exterior building envelope system. Such panels shall provide insulation integrated into the "sandwich" of materials to maximize continuous insulation of the building envelope and provide a thermal break.

3.4.3. Unit Brick

In most exterior conditions, face brick shall be considered as the preferred material. Colors of brick and coursing patterns must be approved by The College.

3.4.4. Brick Pavers

Brick pavers shall be interlocking pavers, traffic bearing, and constructed on a concrete base over compacted earth. Top dress brick pavers with carpenter's sand. Pervious concrete mixtures for the base should be considered for most applications. Colors of brick and patterns must be approved by The College.

3.4.5. Manufactured or Natural Stone

Manufactured or natural stone is recommended to be integrated into the design of the exterior for copings, stools, and accents. Precast finishes should be selected from a range of natural colors.

3.4.6. Mortar

Mortar colors shall be compatible with the color of brick, stone, or precast concrete. It is recommended that the Designer select from a range of natural colors.

3.4.7. Retention and Ground Walls

Ideally, retention and ground walls will be constructed of cast-in-place concrete, but may, with specific approval of the Owner, be constructed of pre-cast concrete wall panels or unit retention block. Walls should coordinate in appearance with adjacent structures. Walls may be covered in brick, cast-in-place thin brick veneers, or natural or cast stone. Walls will be capped with a cast stone, or similar cap.

3.5. Division 05 – Metals

3.5.1. Structures

Structures shall be designed with due regard for vibration, deflection, seismic forces and avoidance of ponding. Consider expansion and contraction in the design and detailing of the structure.

3.5.2. Column Base Plates

Column base plates should be designed for ease of installation. Consider using anchor bolts with double nuts and one-and-one-half inch (1-1/2") space to grout after leveling.

3.5.3. Lintels

Exterior lintels shall be hot-dip galvanized after fabrication. Interior lintels in non-moisture areas to be painted to coincide with wall color.

3.5.4. Exterior Ferrous Metals

Exterior ferrous metals shall be hot-dip galvanized after fabrication. Field welds shall be ground and have cold galvanizing applied.

3.5.5. Shop Primer

Shop primer for ferrous metal shall be manufacturer's or fabricator's standard, fast-curing, lead-free, universal modified alkyd primer selected for good resistance to normal atmospheric corrosion, for compatibility with finish paint systems indicated, and for capability to provide a sound foundation for field-applied topcoats.

3.5.6. Exterior Railings

Exterior railings, including handrails and guard rails, shall ideally be stainless steel, but with specific approval of the Owner, may be welded aluminum or steel; shop primed, and powder coated paint.

3.5.6.1. Handrail pockets, sleeves, or anchor plates shall be designed to shed water and prevent corrosion.

3.5.6.2. Rail posts shall have cast-in-place concrete footings.

3.5.7. Storage and Protection

3.5.7.1. Structural steel shall be stored in a manner that will prevent damage from falling objects, corrosion, and soiling from mud, concrete, and debris.

3.5.7.2. Handrails, stairs, and other items incorporated into the work in the early stages of construction shall be properly protected from weather, falling mortar, concrete, debris, water, and other abuses.

3.5.8. Expansion Joint Covers

Exposed expansion or seismic joints over one inch in width shall be covered in an expansion joint cover. Expansion joint covers on interior floors shall be of color and texture that matches adjacent carpet or floor covering. Aluminum covered joints shall be avoided.

3.6. Division 06 – Wood and Plastics (Not Used)

3.7. Division 07 - Thermal and Moisture Protection

Roof design will comply with the current edition of "Roofing Design Criteria" from the North Carolina State Construction Office.

Avoid locating HVAC equipment or other equipment on a building roof, if possible. If equipment is required on the roof, it shall be screened completely from ground view.

Commercially manufactured fall protection systems will be incorporated into all roofs not protected by handrails or raised parapets meeting OSHA standards for fall prevention. These systems will be fully engineered to provide access to all areas of the roof. The system will be located six (6') feet inside the perimeter of the roof for a visible identify of the six 6' fall clearance guidance. The system shall be capable of supporting multiple workers on the roof each with a minimum weight of 300 pounds.

3.7.1. Membrane Waterproofing

Membrane waterproofing shall be provided at the following locations:

3.7.1.1. All exterior walls below grade that enclose rooms and spaces.

3.7.1.2. Walls at below-grade elevator pits.

3.7.1.3. Elevated toilet rooms, housekeeping closets, and all floors containing floor drains.

3.7.1.4. Floors of all mechanical rooms above other areas.

3.7.2. Metal Roofing

Metal roofing may be used in special situations, such as to highlight or accent a portion of the building or for curved roofs. Use of a metal roofing system must be approved by the College Project Manager. Metal roofing should be a standing seam, twenty-four (24) gauge metal roof system. Color must be approved by the College.

3.7.3. Snow Guards

Snow guards shall be required on all sloped roof structures along areas accessible to pedestrians below or where roofs or property can be damaged below.

Snow guards should be specified as the bar or pipe style application, mounted to the standing seam of the metal roof. Individual pad style guards are not acceptable.

3.7.4. Polyvinylchloride (PVC) Roofing

PVC roofing is the preferred system for low slope roofs. This system provides a heat-reflective and energy efficient roofing system, which can help reduce cooling requirements. This single-ply roofing membrane also provides exceptional resistance to ultraviolet, ozone, and chemical exposure. PVC roofs shall be provided with a minimum 20 year material warranty.

The Designer should work with the College for selection of the appropriate system suitable to the application. Color must be approved by College.

3.7.5. Vapor Barriers

Vapor barriers are required on all roofs, new or replacement.

3.7.6. Air and Moisture Barrier

Air and moisture barrier (preferred) to be fluid-applied acrylic or polymer-modified bitumen system which provides a more continuous and 'seam-free' barrier system than wraps or rolled goods.

3.7.7. Insulation

Insulation in exterior stud walls and under roof deck (preferred) to be a spray foam insulation with thermal barrier where required. Spray foam insulation provides a more continuous and 'void-free' insulating envelope than batt insulation.

3.7.8. Rigid Insulation

Rigid insulation is acceptable for masonry cavities and foundation insulation.

3.7.9. Walkway Pads

Prefabricated walkway pads from roof access to, and around, roof-mounted equipment shall be required for maintenance access.

3.7.10. Downspouts

Downspouts shall be sealed at the bottom with a cast iron boot and have a slip joint on the lower ten-foot (10') section to allow removal from the boot for cleaning. Screens shall protect the tops of all downspouts.

3.7.10.1. Downspouts or roof leader connections to the underground piping shall have a clean-out located below the boot for the underground portion of the drain pipe. The underground pipe shall equal, or exceed, the capacity of all downspouts entering it. The clean-out shall have a bolted or screw-on cover plate.

3.7.10.2. Where downspout size and boot vary in dimension or shape, provide manufactured transition piece to seal connection.

3.7.11. Caulking

Caulking shall be applied with adequate backing to ensure it does not sink or displace. Only durable caulks which are resistant to UV degradation shall be specified for exterior applications.

3.8. Division 08 - Openings

3.8.1. Interior Doors

Except in special situations, typical interior doors shall have a minimum width of three feet (3'-0") and a standard height of seven feet (7'-0") it will be mounted in a steel hollow metal frame with framed sidelight and transom.

3.8.1.1. Non-fire-rated doors shall be solid core wood doors similar and equal to Weyerhaeuser, Code DSC-1. Particle core doors are not acceptable.

3.8.1.2. Double doors are discouraged because of the problems involved in securing these doors. Where double doors are required, a key-removable mullion will be provided.

3.8.1.3. Interior doors will ideally open into the space which they serve and shall open against a wall. For doors which are required by Code to open outward, the door shall be recessed into a vestibule which will prevent the door from swinging into an egress corridor.

3.8.1.4. Interior doors to classrooms, labs, office suites and offices, and conference rooms shall be constructed with sidelight frames to allow occupancy of the space to be confirmed from outside the space. Sidelights should be no more than 12 inches wide with horizontal mullions; each glazed area to be a maximum of 648 square inches.

3.8.1.5. To facilitate moving natural daylighting into interior spaces, transoms should be provided on doors to spaces with windows to the exterior of the building.

3.8.2. Exterior Doors

Exterior doors shall have a minimum width of three feet (3'-0") and a standard height of seven feet (7'-0"). Taller doors can be considered (with the Owner's approval), when appropriate to the exterior proportions and massing.

3.8.2.1. Doors leading from the outside to vending equipment shall have a minimum door opening of three feet-six inches (3'-6") wide.

3.8.2.2. Exterior doors should be constructed with sidelights and transoms, or within storefront systems, to create an open, welcoming entrance to the building in which they serve.

3.8.2.3. Exterior doors shall have a maximum opening angle of one hundred twenty (120) degrees.

3.8.2.4. Entrance doors are to close against a full-length jamb at the strike. Double doors are to have a removable center post mullion. Doors in gang sets are preferred and should swing in parallel to each other.

3.8.2.5. All exterior doors and frames shall be hollow metal (steel) or an aluminum and glass storefront (or curtainwall) system.

3.8.2.6. Entrances to a building should never be designed as part of the smoke evacuation system.

3.8.2.7. An airlock or vestibule shall be provided at each major public entrance to the building for energy conservation purposes and to improve thermal comfort.

3.8.3. Fire-Rated Doors

Fire-rated doors shall be solid wood stave core doors similar and equal to Weyerhaeuser.

3.8.3.1. Fire-rated doors which open to corridors and which contain glass shall use one-quarter inch (1/4") UL fire-rated tempered glass or other fire-rated glazing (i.e. fire lite) as required for larger glazing, as required by Code. Wired glass is not acceptable. Glass shall not exceed one hundred (100) square inches per door.

3.8.3.2. Corridor and stairway doors which are required to be fire doors or smoke doors may be equipped with magnetic hold-open devices connected to the fire alarm system.

3.8.4. Aluminum-Framed Entrances

Aluminum-framed entrances and storefront systems shall have wide stile with eight-inch (8") midrail stile doors. Narrow stile doors are not acceptable. Aluminum entrances shall be a 0.125-inch wall thickness, aluminum-enclosed tube frame with screw-applied door stops. Continuous hinges are to be provided.

3.8.5. Curtain Wall Systems

Curtain Wall Systems are acceptable for design on larger scale projects. Parameters relating to solar gain should be considered. The Designer should include specifications for testing air and water infiltration of the system.

3.8.6. Windows/Glazing

3.8.6.1. Window requirements are as follows:

3.8.6.1.1. Exterior window frames shall have baked-on enamel paint finish. Color is to match the College standard.

3.8.6.1.2. Operable windows are preferred and should be included in normally occupied spaces where possible.

3.8.6.1.3. The orientation and solar gain potential of windows is always an important consideration. Installation of mirror, or highly reflective, glass is not encouraged.

3.8.6.1.4. Recessed window openings which emphasize depth and shadow lines are recommended. A minimum depth of two inches (2") is recommended from face of the exterior wall to face of window frame.

3.8.6.1.5. Window sections shall be so constructed as to enable outside glass surfaces to be cleaned from inside the building (i.e. in-swing, removable, or pivoted), except for those which can be reached from the ground or that are no higher than forty feet, six inches (40'-6") above grade.

- 3.8.6.1.6.** Window sections shall be equipped with concealed locks and removable keys. For certain buildings, fire department access and emergency escape windows are required to be operable from within, without the use of a special key. All keys shall be turned over to the Facility Department with a minimum of one key per each thirty (30) windows, or two (2) per floor, whichever is greater.
- 3.8.6.1.7.** All Exterior Glass areas shall be double-glazed with vacuum seal and each glass pane thickness shall be one-quarter inch (1/4") minimum thickness, clear, polished glass. Minimum U-value for insulated glass section to be 0.25.
- 3.8.6.1.8.** All Interior Glazing shall be 1/4" thick tempered glass. Additional requirements for glazing in rated openings to be as required by Code. Wired glass is not acceptable.
- 3.8.6.1.9.** Bathroom windows shall have obscure glass interior pane.
- 3.8.6.1.10.** Windows that cannot be reached from the ground, or cannot be cleaned from the interior, will have eye bolts anchored in the roof above the windows in accordance with the American National Standard Institute (ANSI) Publication I-14.1 Window Cleaning Safety Standard.
- 3.8.6.1.11.** Ledges and openings which can become bird roosts shall be avoided or bird roosting prevented by sheet metal installed at a forty-five (45) degree angle, by non-rusting wire, or by other suitable means acceptable to the Owner.
- 3.8.6.1.12.** Louvers and other shading mechanisms will be considered for the western and southern exposures of buildings. Western exposures will typically be provided with vertical shading and southern exposures with horizontal shading. Care should be exercised to ensure the shading mechanisms are justified by their ability to shade and not for aesthetics.

3.8.7. Door Hardware

Each type of device, (Hinges, Exit Devices, Locksets, and Closers) shall be furnished totally by one manufacturer, unless hardware schedule indicates otherwise. Ingersoll Rand is preferred manufacturer for door hardware. Use of other manufacturer must be approved by College Project Manager.

Closers shall be mounted on the door rather than on the frame. Closers mounted on storefront systems require reinforcement at the door and frame.

For doors with electronic access control, electric locks are preferred over electric strikes. These doors shall require a conduit and cable from hinge jamb and stub-up to ceiling plenum.

Card Reader access shall normally be provided at one (1) entrance to each building. If there is an entry vestibule, the card reader shall be placed inside the vestibule and control the second inside set of doors. This will provide additional protection from severe weather conditions.

Overhead stops are preferred. Hold-open, or select hold-open, features on overhead stops are not desirable, except where required for the function of the building.

Stair doors leading to roofs are to be secured at the highest publicly accessible landing and at roof level. Doors shall be equipped with closers, double cylinder deadbolt locks and a self-locking lockset.

Stair doors to the outside of the building shall have panic devices as required by Code. Doors shall be equipped with an overhead stop and a closer which is not exposed to the weather.

Stair doors to the inside of the building shall have closers, latches, and stops. Latches shall be activated by panic devices equipped with a thumb piece or lever handle function on the stair side of the door.

All access doors to roof shall be lockable and keyed to the College mechanical equipment room key.

3.8.7.1. Finish shall match existing hardware in renovation projects; US26D (Satin Chrome) finish shall be used on all hardware for new projects, since these are standard stock items.

3.8.7.2. Electronic Access Controls shall be installed in each building to provide a remote means of securing all doors; controlling via an electronic means who has access, and at what times, to buildings; providing card-key access to authorized individuals after normal working hours; logging who enters a building after hours; and, monitoring the status of all building perimeter doors. Electronic access controls shall be provided as follows:

3.8.7.2.1. Electronic Access Control System preferred vendor is Avigilon.

3.8.7.2.2. Public access doors to all buildings shall be provided in with electric locks with the ability to remotely lock and unlock.

3.8.7.2.3. Limited access doors (egress only doors, exterior doors to Mechanical Rooms, Labs, etc.) will be monitored to confirm their open or closed status.

3.8.7.2.4. Each building shall have a single card key access location to facilitate after-normal working hour access. This card reader shall be located at the most logical entry, keeping in mind CPTED principles. This entry shall also be monitored by video surveillance.

3.8.7.3. Locksets shall be commercial, Grade 1 mortise design mortise locks. ANSI/BHMA certified A156.13-2012 exceeding 1,000,000 ANSI cycles for heavy-duty traffic. Cylinder shall be from the same manufacturer.

3.8.7.4. Interior Door Closers shall be heavy-duty and have adjustments for back check, closing speed, latching speed, and delayed action cycle. Bracket type shall be specified.

3.8.7.5. Exterior Door Closers shall be heavy-duty and have adjustments for back check, closing speed, latching speed, delayed action cycle, and spring power adjustments. Floor-mounted with pivots is acceptable for exterior doors only with the approval of the College.

3.8.7.6. Labeled Doors Closers shall be non-hold-open type. Non-labeled doors shall have hold-open feature at maximum degree of swing.

3.8.7.7. Magnetic Hold-Open Devices for fire doors shall be provided at stairways and corridors.

3.8.7.8. Kickplates shall be US 18-gauge, 18-8 type, 302 stainless steel, satin finish. Size shall be eight inches (8") high by two inches (2") less than door width.

3.8.7.9. Hinges:

3.8.7.9.1. Aluminum storefront doors shall have Continuous Gear Hinge, Select (SL-11HD) for non-electric doors; Continuous Gear Hinge, Select (SL-11HD) prepped for a Transfer Bar (EPT-10 Transfer Bar x SP28 Finish) for electric doors.

3.8.7.9.2. Interior and corridor doors shall have heavyweight, premium quality, ball bearing hinges. All interior and corridor doors wider than three feet (3'-0") and/or taller than seven feet (7'-0") shall have four (4) ball bearing hinges.

3.8.7.9.3. Continuous hinges for fire doors shall be stainless steel.

3.8.7.10. Panic Hardware shall be provided for all doors serving fifty (50) or more persons. Panic hardware shall be equipped with cylinder dogging in lieu of Allen-wrench dogging, unless serving a

normally occupy able space, in which case the door should be capable of being secured with a thumb turn.

3.8.7.10.1. Exterior door panic hardware shall center the bar on door at thirty-seven inches 37" above the floor.

3.8.7.10.2. Stairway and corridor doors shall be UL listed.

3.8.7.11. Thresholds for all exterior conditions shall be stainless steel. Due to the use of salt and the extreme weather conditions, aluminum thresholds and pivots are not acceptable for exterior applications.

3.8.7.12. Exterior Door Stops for all exterior conditions shall be stainless steel.

3.8.7.13. Sound Gaskets will be provided at interior access to any spaces in which sound generating equipment is located (Mechanical Rooms, etc.).

3.8.7.14. Automatic Door Openers shall be provided on at least one ADA Accessible entrance to each building. Door operators will not typically be provided at interior doors, rather, ample room to maneuver shall be provided to achieve the required accessibility. Where installed, operators shall be completely protected from the weather. The housing for the pushbutton shall have a weatherproof seal to prevent water from entering to prevent freezing during cold weather. Operators shall be fully coordinated with the Access Control System.

3.9. Division 09 - Finishes

Designers should program into the design of all projects, a designated area (storage room, accessible attic space, etc.) for storage of attic stock finish items specified for the facility. This area should be accessible by representatives from the Facility Department for repair, replacement, and maintenance of building finishes. The percentage of attic stock required for each material shall be examined on a project basis and coordinated with the College.

Designers should consider minimizing the number of "different" finishes specified for a building to limit the amount of storage space required for attic stock items.

3.9.1. Gypsum Board

5/8" gypsum board with Level 3 finish shall be the standard wall finish throughout the College. Exceptions to this standard are the following spaces:

3.9.1.1. Classrooms and offices shall use standard gypsum board.

3.9.1.2. Any room that is subject to a high moisture content, such as bathrooms and showers, shall use waterproof gypsum board.

3.9.1.3. Any rooms subject to high humidity, such as mechanical rooms and locker rooms, shall use water-resistant gypsum board for walls and ceilings.

3.9.1.4. Areas subject to abuse (such as public corridors, industrial labs, stair towers, loading docks, and materials handling spaces) shall use wall construction types durable enough to withstand that abuse for the anticipated life of the building. These will include abuse-resistant gypsum wallboard, CMU, or concrete wall panels.

3.9.1.5. Restroom ceilings will be constructed of suspended gypsum board.

3.9.1.6. Areas requiring a Level 5 finish include Main Lobby, President's Office, and Board Rooms.

3.9.2. Acoustical Tile Ceilings

Acoustical tile ceilings shall be exposed grid, lay-in system. Acoustical tiles shall be two feet square (2'x2') lay-in tiles composed of non-combustible materials.

3.9.2.1. The standard Acoustical ceiling tile suspension systems shall be wide faces, double web, steel which are hot dip galvanized with prefinished 15/16" flanges. They shall be rated for intermediate duty. Color: White. Acceptable manufacturers are: Armstrong, USG, and Chicago Metallic Corporation.

3.9.2.2. The standard acoustical ceiling tiles shall be 3/4" thick, white, mineral based, treated with mold/mildew inhibitor. They shall have a reflectance of no less than LR 0.83, with a Noise Reduction Coefficient (NRC) of 0.70, and a Ceiling Attenuation Class on not less than 40 Armstrong Tundra, medium texture with tegular edge shall be the basis of design. Acceptable manufacturers are: Armstrong, USG, and Certainteed.

3.9.2.3. Open Office and Collaboration spaces will have ceilings with high NRC and CAC characteristics.

3.9.2.4. Class A "Fire-Rated" materials shall be specified to complete a UL fire-rated ceiling system for fire protection of structural components, where fire-rated assembly is required by Code.

3.9.2.5. "Attic stock" of ceiling tile and grid shall be furnished at the completion of the project for future maintenance, consisting of not less than five percent (5%) for each type and size installed, but not less than one full box.

3.9.3. Flooring

The following materials are preferred at the locations indicated:

3.9.3.1. Terrazzo or non-slip porcelain tile – high traffic areas such as lobbies and corridors. At ornamental stairs, treads and risers shall match the adjacent materials with non-slip nosings.

3.9.3.2. Luxury Vinyl Tile (LVT) – low traffic lobbies and corridors, general purpose rooms, labs, classrooms where appropriate.

3.9.3.3. Carpet Tile – offices, conference rooms, auditorium aisles (with permanent seating), lounges, classrooms as appropriate, music or language listening rooms.

3.9.3.4. Porcelain Tile – restroom, bathrooms and showers.

3.9.3.5. Quarry Tile or Anti-bacterial Cement – food service areas.

3.9.3.6. Sealed Concrete – mechanical rooms, storage rooms, custodial rooms.

3.9.3.7. Raised, Removable Panels supported on interconnecting grids and pedestals, providing an under-floor plenum for air distribution and utilities may be utilized in Server Rooms, and other appropriate spaces.

3.9.3.8. Steel Trowel Finish Concrete – treads and risers with non-slip nosings for service and egress stairs.

3.9.4. Tile Carpeting

All carpet shall be selected from the North Carolina Qualified Products List (QPL) established by the State Purchasing Department.

Light colors (such as white, yellow, or gold) and solid colors which immediately show all traffic patterns and any stain must be avoided.

All carpet to be 24" x 24" tiles to facilitate replacement of damaged carpet and storage of attic stock. Use of broadloom carpet must be approved by the College.

All newly carpeted areas shall be appropriately covered with plastic or brown paper to protect the carpet from construction debris. Carpet shall be in clean, like new condition when turned over to the College.

Tile carpeting with a hard composition backing, but not containing PVC, is preferred for public spaces where floor access is desirable and for ease of repair. A mixed pattern with high soil and stain hiding capabilities is preferred.

3.9.4.1. Carpet Specification Requirements

- 3.9.4.1.1.** Needle punch construction
- 3.9.4.1.2.** 100% Solution dyed
- 3.9.4.1.3.** Polypropylene fiber
- 3.9.4.1.4.** Minimum 28-ounce face weight
- 3.9.4.1.5.** Natural and synthetic composite rubber backing
- 3.9.4.1.6.** Seams sealed against water penetration into adhesive
- 3.9.4.1.7.** Stain resistant against red dye, ink, coffee, mustard
- 3.9.4.1.8.** Manufactured with recycled content materials
- 3.9.4.1.9.** Purchased from a company that will recycle the carpet when time to replace
- 3.9.4.1.10.** Resistant to chemical damage from bleach, sodium chloride, and sodium magnesium acetate (Ice Melt).

3.9.4.2. Acceptable Manufacturers: Shaw Carpet Tile, "Evolve", by Shaw Contract Group is typical; however, comparable products and manufacturers may be considered.

3.9.5. Access Flooring

Access flooring shall consist of twenty-four inch (24") square steel encapsulated wood core panels that are removable, interchangeable, and provide easy access to the plenum area beneath the floor panels.

The system shall be raised above the sub-floor to a height sufficient to allow wiring, bus duct, and adequate air flow to all air outlets. The understructure system shall be supported in such a way as to provide a floor that is rigid, level, and free of vibration.

The system shall have electrical continuity between the top of the floor panels and base plates. The system shall have a Class 1-A fire rating when tested in accordance with ASTM-84-79.

The system shall have available accessories as follows: cable cut outs with grommets, ramps, steps, handrails, fascia molding, plenum dividers, cove base, perforated air flow panels with adjustable air flow dampers, and panel lifting devices.

3.9.6. Resilient Wall Base

Standard Rubber Wall Base shall be Cove style with top set toe, 1/8" minimum thickness, 4 inches tall, with smooth surface. Base shall be from coils no less than 96 feet, with premoulded outside corners, and job formed inside corners. Acceptable manufacturers are: Roppe, Flexco, Burke, Mannington, and Johnsonite.

3.9.7. Painting

All surfaces shall be prepared for painting by thoroughly filling, sanding, scraping, brushing, or chemical cleaning, following industry accepted standards and manufacturer's recommendations.

Exterior and interior paint shall be a top-quality paint with maximum life and minimum shrinkage specifications. Acceptable manufacturers include Benjamin Moore, Devoe, Duron, Glidden, Kyanize, Pittsburg, Sherwin-Williams, PP&G, or any others approved by the Owner and Designer. Only first line premium paints shall be acceptable.

Provide paints from the same manufacturer to the greatest extent possible.

In areas of extremely high traffic or potential abuse, it is recommended that an epoxy paint be applied over a prime coat of recommended proportions. Washrooms not scheduled for wall tile should receive epoxy coating.

Elevator Pit & Equipment Rooms: The elevator equipment room and the elevator pit floors shall be acid-etched, finished with one (1) coat thinned 50/50, and then one (1) coat of gray porch and synthetic enamel. Walls shall be sealed or primed and painted with two (2) coats of light finish alkyd semi-gloss enamel.

The hoist way equipment and elevator pit equipment shall be painted with one coat of primer and two coats of alkyd resin, semi-gloss, or gloss finish coat.

3.9.7.1. Exterior Painting Schedule

3.9.7.1.1.	<u>Ferrous Metal</u>	• One (1) coat	Rust Penetrating Metal Primer
		• Two (2) coats	Alkyd Enamel
3.9.7.1.2.	<u>Galvanized Metal</u>	• One (1) coat	Galvanized Metal Primer
		• Two (2) coats	Acrylic Latex Flat
3.9.7.1.3.	<u>Concrete Masonry Units</u>	• One (1) coat	Block Filler Coat
		• Two (2) coats	Acrylic Masonry Coating
3.9.7.1.4.	<u>Exterior Wood</u>	• One (1) coat	Vinyl Latex Primer
		• Two (2) coats	Latex Satin
3.9.7.1.5.	<u>Exterior Handrail</u>	• One (1) coat	Rust Penetrating Metal Primer
		• Two (2) coats	Alkyd Enamel

- Duron Alkyd Gloss Enamel, Woodland Green mix BY L24 or Powder Coat (color to match)

3.9.7.1.6. Exterior Stucco

- Two (2) coats Bondex Waterproof

3.9.7.2. Interior Painting Schedule

3.9.7.2.1. Ferrous Metal

- One (1) coat Rust Penetrating Metal Primer
- Two (2) coats Semi-Gloss Alkyd Enamel

3.9.7.2.2. Concrete Masonry Units

- One (1) coat Latex Masonry Block Filler
- Two (2) coats Semi-Gloss Alkyd Enamel

3.9.7.2.3. Epoxy Finish on Masonry

- One (1) coat Masonry Block Filler
- Two (2) coats Epoxy Gloss Coating

3.9.7.2.4. Gypsum Wallboard (Ceilings)

- Spot prime all cemented and taped joints with Latex Vinyl Primer.
- One (1) coat Vinyl Latex Primer
- Two (2) coats Latex Flat

3.9.7.2.5. Wood Veneer Doors (Natural Finish)

- Prior to application of stain, thoroughly wash all faces of doors with mineral spirits or alcohol.
- One (1) coat Wood Sealer
- One (1) coat Gloss Spar Varnish
- Two (2) coats Satin Varnish

3.9.7.2.6. Wood Veneer Doors (Satin Finish)

- Prior to application of stain, thoroughly wash all faces of doors with mineral spirits or alcohol.
- One (1) coat Gloss Spar Varnish
- Two (2) coats Satin Varnish

3.9.7.2.7. Wood (Natural Finish)

- One (1) coat Wood Sealer
- One (1) coat Gloss Spar Varnish
- Two (2) coats Satin Varnish

3.9.7.2.8. Wood (Stain Finish)

- Stain as selected.
- One (1) coat Gloss Spar Varnish
- Two (2) coats Satin Varnish

3.9.7.2.9. Wood (Painted)

- One (1) coat Enamel Undercoat
- Two (2) coats Alkyd Semi-Gloss Enamel

3.9.7.3. Color Coding & Identification

3.9.7.3.1. Piping systems in mechanical rooms should be completely painted with the applicable colors listed below and have appropriate self-sticking or strap-on identifications and

arrows indicating direction of flow. Piping and ducts in chases above ceiling shall be color-banded and have stencil markings at appropriate intervals.

System	Color	ID
Condensate Return	Corrugate Brown	COND
Steam – High Pressure (25-75 psi)	Safety Orange	HPS #
Steam – Low Pressure (0-25 psi)	Safety Orange	LPS #
Water – Chilled, Supply	Dark Blue	CWS
Water – Chilled, Return	Dark Blue	CWR
Water – Cold Domestic	Safety Green	DOM CW
Water – Distilled	Safety Green	DSTW
Water – Condenser to Cooling Tower	Light Gray	CTW
Water – Condenser to Condenser	Light Gray	CCW
Water – Hot Domestic	Dark Yellow	DHW
Water – Hot Domestic – Recirculating	Dark Yellow	DHWR
Water – Hot - Heating	Safety Orange	HWS
Gas	Safety Yellow	GAS
Air	Safety Green	AIR
Nitrogen	Safety Yellow	Nitrogen
Helium	Safety Yellow	Helium
Hydrogen	Safety Yellow	Hydrogen
Vacuum	Safety Green	VAC
Chemical	Safety Blue	(labeled)
Fire Protection	Safety Red	(labeled)
Sprinkler	Safety Red	SPKR
Fire Line	Safety Red	FIRE
Drains/Vents/Supports/Hangers	Black	-

3.9.7.3.2. On straight runs of piping, markings should be no further than thirty feet (30') apart. Stencil identifications, color bands, and direction arrows should be near each valve, pressure reducing valve, heat exchanger, etc. Where pipe passes through walls or floors, markings should be near the penetration on both sides. Markings should be at each directional change of all piping systems.

3.9.7.3.3. The College recognizes OSHA Safety Color Designations for general safety color coding system for all items except pipe identification. Mechanical Room pipe color and color of bands are to be as follows:

3.9.7.3.3.1. Pipe identification should contrast in color to the pipe color and be easily readable. The width of color bands should be equal to the size of the stencil

indicated below. For insulated or non-insulated pipe systems, stencil sizes should be sized according to the total outside diameter as follows:

Outside Diameter of Pipe	Letter Size (height)
Up to 3/4 inch	3/8 inch
From 3/4 inch to 1-1/4 inches	1/2 inch
From 1-1/2 inches to 2 inches	3/4 inch to 1 inch
From 2-1/2 inches to 6 inches	1-1/4 inch to 3 inches
Greater than 6 inches	2-1/2 inches to 4 inches

3.9.7.3.3.2. At each floor level and at roof level, each exhaust air duct from safety cabinets and fume hoods shall be identified by two-inch (2") wide painted black bands and lettering identifying the specific type of safety cabinet or hood. Abbreviations may be used but need to be itemized.

3.9.7.3.3.3. Above-Ceiling Controls/Equipment Marking: A colored phenolic label identifying the equipment number shall be placed on the grid below items for easy locating, denoted on a plan drawing, and kept in a secure location, such as the main mechanical room.

Color	Equipment
Green	Domestic Water and Chilled Valves
Orange	Hot Water and Steam Valves & Controls for Heat
Red	Fire-related Valves & Controls
Black	Clean-Outs
Yellow	Gas/Air Valves
Blue	VAV Control Boxes
White	CATV Taps and Miscellaneous (label dot)

3.9.8. Wall Coverings

A multi-color paint that is not easily matched is not acceptable. No wallpaper shall be used and vinyl wallcovering usage shall be kept to a minimum. The flame spread ratings of wall and ceiling coverings shall be in accordance with the North Carolina Building Code and with the NFPA-101 Life Safety Code.

3.10. Division 10 – Specialties

3.10.1. Signage

The Designer is responsible for incorporating into the design and graphics signage for the following: room identification, directories, directional signage, exterior wayfinding, building identification, and parking regulations. All should be handled in accordance with the College's Campus Standards. All signage to be APCO, Model "Arcadia"; Designer to coordinate details with the Owner. The Designer is responsible for developing compatible graphics for any required applications not addressed by the signage program, such as "YOU ARE HERE" maps, including emergency egress routes.

3.10.1.1. Exterior: All should be handled in accordance with the College's Campus Standards.

3.10.1.2. Building Interior: All spaces, including corridors, stairs, custodial, mechanical, and closet spaces, shall have assigned numbers and appropriate signage.

3.10.1.3. Wayfinding signage will be installed to provide direction to spaces in large buildings.

3.10.1.4. Egress maps will be provided as required by Code in frames which allow periodic updates of the graphics. During phased occupancy of any building, egress signage will be updated with each change to egress.

3.10.2. Room Numbering

It is desirable that the construction numbering system be retained throughout the life of the facility. Numbering systems will be coordinated with the College. The following are general guidelines for space numbering in all buildings:

3.10.2.1. Designers are to submit and receive written approval of the “Room Numbering Plan” from the College prior to establishing final base plans. The Designer, therefore, is to submit a numbering system with the Schematic Design submittal. The Construction Documents for all design disciplines shall display the approved, permanent room number assignments.

3.10.2.2. The numbering system shall use three-digit numbers with alpha suffixes, if necessary; four digit numbers are not acceptable. Suites can be numbered with nested letters, such as 243-A, 243-B, 243-C, etc.

3.10.2.3. Number sequence shall progress continuously in a corridor, generally moving clockwise around the building. Using odd or even numbers on either side of the corridor is neither required nor desired. Where corridor configurations make it impossible for a continuous numerical progression, the Designer shall strive to achieve a logical numerical progression.

3.10.2.4. The numbering system shall provide spare numbers in the sequencing, especially where there are large rooms or open spaces where future renovations could subdivide the space.

3.10.2.5. All spaces are to be assigned room numbers (closets, elevators, janitorial rooms, lobbies, rest rooms, stairs, vestibules, etc.). Lobbies will not have signage.

3.10.2.6. The lowest floor with a primary entrance shall be assigned “100” series numbers. All other floors above 100 shall be labeled 200, 300 series, etc. All floors located below grade shall be assigned numbers with “B” prefix (B02, B03, etc.).

3.10.3. Toilet Compartments

The preferred partition for toilet compartment is floor-mounted, overhead-braced type. Provide one foot (1'-0") clearance from floor to partition for cleaning. Use stainless steel or phenolic plastic partition material. Provide one (1) coat/bag hook for each stall. Doors will be hung on self-closing hinges.

3.10.4. Toilet and Bath Accessories

All toilet accessories shall be stainless steel with satin finish, unless otherwise noted. The designers shall clearly show the location of all toilet and bath accessories in elevations to ensure ADA compliance and coordination. Toilet and bath accessories shall be provided as follows:

3.10.4.1. Framed Mirrors: One piece roll-formed frame heavy gauge, stainless steel angle with satin finish. Frame shall be continuous integral stiffener on all sides for added strength. Corners

shall be welded, ground, and polished smooth. The mirror shall be one-quarter inch (1/4") polished plate glass mirror, electrolytically copper plated. Womens and unisex Restrooms will also have a full length mirror mounted in the vicinity of the exit door.

3.10.4.2. Toilet Tissue Dispensers: Provide one (1) nine-inch (9") double-roll, stainless steel toilet paper dispenser unit per toilet stall.

3.10.4.3. Paper Towel Dispensers: Semi-recessed, surface-mounted, touch-free paper towel dispensers will be furnished by the current vendor for the College. Provide one (1) dispenser in each single-fixture toilet room.

3.10.4.4. Electric Hand Dryers: Provide one (1) electric hand dryer per two (2) sinks in each multi-fixture toilet room. Hand dryers to be a designed system that includes a stainless steel plate, or other wall guard, to protect against damage to grout and paint from water evaporation.

3.10.4.5. Soap Dispensers: Touch-free, battery operated liquid soap dispensers to be furnished by the current vendor for the College. Provide one (1) liquid soap dispenser per two (2) sinks.

3.10.4.6. Trash Cans: Provide one 13-20 gallon, semi-recessed trash receptacle with removable trash container for every two sinks.

3.10.5. Fire Extinguishers & Cabinets

Designers shall clearly identify locations for fire extinguishers and cabinets on the plans. Locations shall be planned with the intent to provide appropriate coverage, while having the least interference with the interior design. Finish of Cabinets to be selected and coordinated with the Interior Design palette.

3.10.5.1. Install 10-12 pound ABC type fire extinguishers in semi-recessed fire extinguisher cabinets as required.

3.10.5.2. Install CO2 fire extinguishers in hazardous areas and in mechanical room areas.

3.10.5.3. Install BC rated type fire extinguishers in cooking areas.

3.10.6. Automatic Electronic Defibrillators (AEDs) & Cabinets

Designers shall clearly identify locations for automatic electronic defibrillators and cabinets on the plans. Locations shall be planned with the intent to provide appropriate coverage, while having the least interference with the interior design.

3.10.6.1. Install AEDs in AED Cabinets as required.

3.10.6.2. AED Cabinets shall be grouped with fire extinguisher cabinets. Cabinets should coordinate in appearance and finish.

3.10.6.3. AED Cabinets will be equipped with an audible alarm which activates when the door is opened. Cabinet design should allow for visual inspection of the AED unit inside.

3.10.7. Wall Protection

Use corner guards fabricated of type 304 (18-8), 18-gauge stainless steel with exposed surfaces in architectural satin finish. Exposed edges and corners to be rounded, with adhesive strips for permanent installation. Use Bradley Corporation Model 991-48.

3.11. Division 11 – Equipment

3.11.1. Parking Control

Parking Control equipment shall be provided to match the existing campus standard equipment. See also Section 3.20 Division 28 – Electronic Safety and Security.

3.11.1.1. Entrance gates will have their own power supply and the opener will be provided with a contact that will open the gate. The gate will close when it senses that the car has passed.

3.11.1.2. Exit gates will have their own power supply and a sensing device that will open the gate when a car approaches from the parking lot side and another sensing device that will close the gate once the car has passed.

3.11.1.3. At the gate island, provide a campus standard card reader ten to twelve feet (10-12') before the gate.

3.11.1.4. Provide 3/4" conduit at the gate island to run from the gate opener housing on a direct path to the control equipment. The length of the conduit should be less than one hundred feet (100').

3.11.1.5. Provide a 3/4" conduit from the gate opener housing to the edge of the curb for the entrance and exit gates. This conduit will be used for the sensor wire placed in the pavement so the curb will not be cut.

3.11.2. Trash Compactors

Trash compactors shall have a six feet, six inches (6'-6") by six feet, six inches (6'-6") by six feet (6'-0") feet deep (8 cubic yards/6.1 cubic meters) trash holder with compactor located on top, such as the Vert-I-Pack (VIP) unit by Marathon.

3.11.2.1. A ten feet (10'-0") wide by twelve feet (12'-0") high overhead coiling door shall be provided for truck access. Controls will be provided on the interior and exterior and should be equipped with a remote control. The control on the exterior of the building shall have a key control that can activate the pushbuttons.

3.11.2.2. A ventilation fan shall be provided in the compactor area along with a hose bib and a place to store a hose, mop, and broom. The floor shall slope to a twelve inch by twelve inch (12"x12") drain with a minimum of six to eight inch (6"-8") drain pipe to the sanitary sewer system.

3.11.2.3. The temperature of the trash room shall be a minimum of 40 degrees F.

3.11.3. Recycle Equipment

Every building shall provide adequate space for recycling waste material. This space shall be exclusively for the storage of recycling equipment and recyclable material, in addition to a container for general trash. Recycle closets are not recommended. The guidelines for content is as follows:

3.11.3.1. Exterior: Allocate space adjacent to exterior dumpster for an eight (8) cubic yard "cardboard only" dumpster.

3.11.3.2. Interior: Allocate space on each primary floor of the building for a grouping of five (5) recycle containers; one each for office paper, newspaper, magazines, plastic bottles/aluminum cans, and glass.

3.11.3.3. Public Sidewalks: Provide a plastic bottle/aluminum can container adjacent to general trash container. See Section 3.12 for Site Furnishings.

3.11.4. Dumpsters

Dumpsters for trash and cardboard recycling to be furnished by the vendor for the College. Dumpsters to be 8 cubic yards in size, with a notched front.

3.11.5. Vending Equipment

3.11.5.1. If required by the building program, the Designer shall coordinate the requirements for all vending equipment with the Rowan-Cabarrus Community College Food Services Department.

3.11.5.2. Vending machines should be located as to minimize noise transference to other areas of the facility. This may include placing machines in a room or alcove.

3.11.5.3. Vending machines produce heat which will damage the food products. Heat buildup in the area must be vented to the outside.

3.12. Division 12 – Furnishings

3.12.1. Entrance Floor Mats and Fames

Where entry vestibules are provided, the entire vestibule will be carpeted in 24"x24" walk-off type carpet squares. At other locations, entrance mats will be provided by the Owner's vendor.

3.12.2. Roller Window Shades

3.12.2.1. Shades shall include headbox which conceals front and bottom of shade roller, brackets, and operating hardware. Standard shade band material shall be pvc coated fiberglass and polyester blends with an openness factor of 5%. Acceptable Manufacturers: Mecho Shade (Basis of Design), Draper, Hunter Douglas, Levolor, and Lutron.

3.12.2.2. Where required a 2nd black-out shade will be paired within the same headbox with material with a 0% (opaque) openness factor.

3.12.3. Site Furnishings

3.12.3.1. Site furnishings are listed as follows:

3.12.3.1.1. Exterior Trash Receptacles

- Leisure Craft, Inc.
- Model: TRD32D
- Description: 32-Gallon double trash and recycling bins with rounded roofs and front-opening doors
- Color: Black (typical) both bins

3.12.3.1.2. Exterior Tables

- Leisure Craft, Inc.
- Model: 36TAB30
- Description: 36" Round perforated table with star base
- Color: Black (typical)

- 3.12.3.1.3.** Exterior ADA Tables with Fixed Chairs
 - Leisure Craft, Inc.
 - Model: R466SSM-ADA
 - Description: 46" Round perforated table with star base with 5 attached chairs and ADA space
 - Color: Black (typical)
- 3.12.3.1.4.** Exterior Chairs
 - Leisure Craft, Inc.
 - Model: NGC
 - Description: NorthGate Chair
 - Color: Black (typical)
- 3.12.3.1.5.** Exterior Benches
 - Leisure Craft, Inc.
 - Model: HP6WB
 - Description: 6' Slated bench with back rest
 - Color: Black (typical)
 - Model: HP6NB
 - Description: 6' Slated bench without back rest
 - Color: Black (typical)
- 3.12.3.1.6.** Bike Racks
 - Leisure Craft, Inc.
 - Model: 1BK7P-SM
 - Description: Heavy duty winder, loop, surface flange, thermoplastic coated schedule 40 steel, available in 5 – 9 bikes.
 - Color: Black (typical)

3.14. Division 14 - Conveying Equipment

3.14.4. Elevators

Elevators shall comply with all current State guidelines and regulations for College buildings and State-owned facilities. Elevator to be selected based on building height and required use. Hydraulic elevators and machine room-less elevators will be considered. Cargo elevators will be provided as required (i.e. Advanced Technology Center, etc.).

3.14.1.1. Elevator Passenger Car

- 3.14.1.1.1.** Each passenger car shall be equipped with an exhaust fan (2-speed), emergency lighting supply, handrails on the walls, security camera, and emergency telephone cabinet (see Section 3.19 Division 27 Communications). All equipment and finishes shall be vandal resistant.
- 3.14.1.1.2.** Size car and door for building equipment and furniture. Provide taller cabs to accommodate larger furniture.
- 3.14.1.1.3.** Ceilings of the car shall not invite vandalism. Provide vandal-proof fixtures and ceiling installation.
- 3.14.1.1.4.** Flooring shall be match the adjacent flooring in the main lobby or ground floor landing.
- 3.14.1.1.5.** Walls shall be scratch-resistant laminate for heavy abuse areas and furnished with removable wall pads and hangers.
- 3.14.1.1.6.** All doors and exposed trim shall be stainless steel.

- 3.14.1.1.7.** Braille plates and signage shall be high quality zinc die cast braille and shall meet all ADA and ANSI requirements.
- 3.14.1.1.8.** Each car shall contain a lighted floor indicator above the car door or in the return column; soffit mounting is not acceptable.
- 3.14.1.1.9.** Elevator door safety system shall protect passengers by setting up a harmless curtain of infrared beams.
- 3.14.1.1.10.** Each car control panel shall have a “keyed switch” to take the elevator out of service, keyed to the College keying system.
- 3.14.1.1.11.** Car shall be prepped for CCTV camera. Travelling cable shall include two (2) Cat 6 data cables.

3.14.1.2. Elevator Fixtures & Equipment

- 3.14.1.2.1.** Elevator Controls Modernization System shall be a microprocessor-based network with improved performance over relay-based or conventional dispatching systems. The system shall have the capability of real time management and advance information processing to analyze building traffic patterns and evaluates estimated times of arrival (ETA) based on car position and hall call assignments for each car in the building. The system shall dispatch the car with the shortest ETA so passenger wait time is minimal.
- 3.14.1.2.2.** Electrical Car Position Indicator shall be provided in the upper portion of the elevator cab. An audible signal shall sound prior to elevator arriving at, or passing, any landing.
- 3.14.1.2.3.** Car Riding Lantern shall be provided with a fixture mounted in the jamb, or soffit, of the elevator cab entrance to notify waiting passengers by means of electrically illuminated direction arrows and audible gong as to which direction the elevator will be traveling.
- 3.14.1.2.4.** Door Hold-Open Timer shall be a modification to the elevator control circuitry combined with a solid state timer which is wired to the door open button in the elevator car.
- 3.14.1.2.5.** Corridor Hall Stations shall be surface mounted and have a modular design to allow for quick and easy installation of all components, including key switches, etched instructions, and signage. Hall stations shall be made of anodized aluminum in stainless tones and mirror finished in frame.

3.14.1.3. Elevator Hoistway

- 3.14.1.3.1.** Where the equipment is subject to loud or sudden vibrations, sound-deadening material shall be provided to isolate sounds and vibrations from the supporting floor or wall.
- 3.14.1.3.2.** A hoistway door unlocking device shall be installed at all landings. One emergency door key for each elevator shall be furnished to the College

3.14.1.4. Elevator Machine Rooms

- 3.14.1.4.1.** Provide smoke detectors in all elevator machine rooms, using ionization detectors for the traction type and photoelectric detectors for the hydraulic type.
- 3.14.1.4.2.** Smoke detectors in the elevator machine room and each elevator lobby shall be on a separate zone.

3.21. Division 21 - Fire Suppression

3.21.1 Automatic Sprinkler Systems

Automatic sprinkler systems shall be provided as follows:

- 3.21.1.1. Fire protection systems shall be designed in accordance with the requirements of the National Fire Protection Association (NFPA).
- 3.21.1.2. Fire protection systems shall comply with all current regulations for State-owned facilities.
- 3.21.1.2. Dry pipe systems shall be used anywhere that freezing conditions may occur. The minimum pipe size in a dry pipe system is one-and-one-quarter inch (1-1/4").
- 3.21.1.2. Specify that sprinkler heads be centered in ceiling tiles.
- 3.21.1.2. Fire Department connections shall be on the street side of buildings and shall be located and arranged so that hose lines can be readily and conveniently attached to inlets.
- 3.21.1.2. Fire protection and domestic waterlines should be designed with parallel lines and separate shut-off valves to each building.

3.22. Division 22 – Plumbing

All piping shall be routed as to remain clear of transformer vaults, refrigerated spaces, electrical rooms, elevator shafts, data and telecommunication rooms, or other critical areas, and vault spaces over same.

No piping except soil, waste, or drain piping shall be installed in, or below, concrete slabs on grade.

All main piping shall have accessible shut-off valves for isolation purposes. All branch piping from main shall have isolation shut-off valves.

3.22.1. Domestic Water Piping

Domestic Water piping related items shall be provided as follows:

- 3.22.1.1. Water piping inside the building and above grade shall be Type L hard drawn copper.
- 3.22.1.2. Water piping inside the building and below slab shall be Type K soft annealed copper tubing with no joints below the slab. Water service shall be stubbed above floor as near the exterior wall as practical, rather than running below slab to an interior space.
- 3.22.1.3. Cold water and hot water plumbing piping is not permitted in exterior walls, except to supply hose bibs.
- 3.22.1.4. Hose bibs shall be provided in all mechanical equipment rooms, kitchens, rooms that require wash down, and rooms with floor drains. All hose bibs shall be provided with vacuum breakers. Frostproof hose bibs shall be used in the exterior walls of all buildings.

3.22.2. Sanitary Sewer Waste & Vent Piping

Sanitary sewer waste and vent piping related items shall be provided as follows:

- 3.22.2.1.** Sanitary sewer piping shall be PVC.
- 3.22.2.2.** Vent piping shall be PVC.
- 3.22.2.3.** Drain, waste, and vent piping for acid waste systems shall be of high silicon cast iron, borosilicate glass (above grade only), or polypropylene piping.
- 3.22.2.4.** Roof drain leaders above grade shall be PVC. All roof drain piping below grade shall be PVC.
- 3.22.2.5.** Undersides of roof drains and horizontal storm water drains or roof leaders inside the building shall be insulated to prevent the formation of condensation.
- 3.22.2.6.** Floor drains connected to the sanitary sewer shall be provided in all mechanical equipment rooms, custodial closets, toilet rooms, and locker rooms.
- 3.22.2.7.** Infrequently used drains shall have traps resealed by a trap primer from clear water fixtures.
- 3.22.2.8.** Drain lines at exterior stairwells shall be a minimum of four inches (4") with a twelve inch (12") square drain well and grate-type cover.

3.22.3. Back-Flow Prevention Devices

Back-flow prevention devices shall be installed in all buildings, sprinkler systems, and make-up water lines in accordance with the EPA Safe Water Act. They shall be installed in the mechanical rooms where they are accessible for testing and maintenance. Tank-type vehicles filling from the Rowan-Cabarrus Community College water supply shall have back-flow prevention devices.

3.22.4. Water Meters

Water meters shall be installed for all buildings in accordance with the State of North Carolina and local water service provider regulations. Water meters shall be touch-read, have a 1,000-gallon multiplier, and be easily accessible for reading and maintenance.

3.22.5. Grease Traps

Grease traps shall be installed in accordance with state and local regulations for food service facilities. Floor drains serving food service areas are required to flow into a grease trap.

3.22.6. Plumbing Fixtures

Plumbing fixtures shall be designed to reduce water consumption. Designers should consider the following when specifying fixtures:

- 3.22.6.1.** Automated controls in public spaces.
- 3.22.6.2.** Low flow toilets with a siphon jet.
- 3.22.6.3.** Dual flush water closets.
- 3.22.6.4.** Waterless urinals.

3.22.6.5. Low flow faucets and shower heads.

3.22.7. Drinking Fountains & Water Coolers

Drinking fountains and water coolers shall be wall-hung, semi-recessed type and accessible. At least one water fountain in each building shall be equipped with a bottle filling station.

3.25. Division 23 - Heating, Ventilation, and Air Conditioning

3.23.1. Mechanical Design Requirements

3.23.1.1. Maintainability: Mechanical systems and systems components shall be durable and easy to maintain. The Designer shall incorporate into equipment and system design sufficient access and clearance for maintenance, repairs, and replacement. Incorporate instrumentation necessary for balance and initial adjustment, as well as for service and monitoring.

3.23.1.2. Reliability: Systems shall have a high degree of reliability. If an entire building system will be affected by lesser reliability of a component (for example, a pump serving building chilled water system), then a redundant piece of equipment shall be provided to increase overall system reliability.

3.23.1.3. Accessibility: All serviceable equipment (fans, valves, reheat coils, VAV boxes, clean-outs, junctions, etc.) to be installed behind an inaccessible finished surface shall be made accessible by the installation of suitable access doors. All equipment provided shall be accessible either from the exterior or by elevator.

3.23.1.4. Design Conditions: All mechanical systems and equipment should be designed based on the ASHRAE Climate Recommendations for Rowan and Cabarrus Counties.

3.23.1.5. Energy Conservation: The energy efficiency of building systems and equipment is an essential part of the College's design philosophy. Any new project shall be designed with state-of-the-art energy efficiency. Design standards published by the American Institute of Architecture (AIA), American Society of Heating Refrigeration and Air Conditioning Engineers (ASHRAE), and the State of North Carolina shall be met or exceeded.

3.23.1.5.1 Major energy consuming systems and equipment shall be specified and purchased based on Life Cycle Cost Analysis. All projects ten thousand (10,000) square feet or larger shall require a Life Cycle Cost Analysis.

3.23.1.5.2 Building functions that require twenty-four hour a day operation, such as libraries, laboratories, computer rooms, and others as identified by the College, shall be served by a system separate from that of offices or classrooms that are subject to different operating schedules.

3.23.1.5.3 Economizer Cycle that allows the use of outdoor air for free cooling during the winter and intermediate seasons without the use of mechanical refrigeration equipment shall be provided. The Designer shall provide heat recovery for all systems using one hundred percent (100%) outdoor air with both a supply and return air fan. In addition, careful attention should be given to designing a system in which the air stream is properly blended.

3.23.1.5.4 All mechanical systems shall be controlled by a direct connection to the building automation system.

3.23.1.5.5 Three-phase electric motors for mechanical equipment shall be specified to be premium efficiency and a service factor of 1.0.

3.23.1.5.6 The Designer shall use variable volume air handling systems and variable volume pumping to optimize energy efficiency. Fans and pumps shall be selected with the highest efficiency available. Wire-to-water efficiency shall be evaluated for pumps, prior to making the final selection.

3.23.1.5.7 The thickness of insulation for chilled water, hot water, steam, and condensate shall be geared toward conserving energy. Insulation thickness shall be selected for optimum cost versus efficiency.

3.23.1.5.8 Cooling towers shall be selected with motors equipped with variable frequency drives to allow for energy efficient capacity control. Hydronic systems shall be designed with two-way valves to prevent energy waste.

3.23.1.5.9 The Designer shall evaluate mechanical systems energy efficiency not only at full load, but also at partial load conditions. The Designer shall submit a report indicating energy use for new facilities expressed in BTUs per square foot per year. The total energy consumption shall indicate monthly use of electricity, steam, water, cooling, heating, and gas.

3.23.1.6. Commissioning: Commissioning will be provided by an independent, third-party consulting agency. The commissioning agent will be responsible for ensuring that building systems perform in accordance with the design intent and the College's operational needs. The College considers the following elements as a minimum requirement for building acceptance:

3.23.1.6.1. Installation Verification

3.23.1.6.2. Startup and Checkout

3.23.1.6.3. Performance Testing and Demonstration

3.23.2. Sound and Vibration Control

Sound and vibration shall not produce noise levels that will be objectionable to facility occupants. The Designer will specify the dB level required to meet this goal.

3.23.2.1. HVAC equipment located in the building shall be carefully evaluated for sound level. If sound levels are expected to be higher than recommended in ASHRAE guidelines, sound control devices are required.

3.23.2.2. In general, all larger air-handling units will require sound attenuation in ductwork downstream from the fan for both the supply and return. Some mechanical equipment rooms might require lightweight acoustic materials for walls to isolate equipment noise from the rest of the building.

3.23.2.3. Acoustic lining is not an acceptable standard for duct systems.

3.23.2.4. Air noise from a supply outlet is not acceptable.

3.23.2.5. There shall be no objectionable transmission of vibration from equipment to the building structure.

3.23.2.6. Mechanical Equipment Rooms shall be placed preferably at ground level and away from occupied spaces to minimize transmission of vibrations and noise into the building.

3.23.3. Piping Insulation

3.23.3.1. The Designer shall evaluate thermal insulation properties and moisture migration to prevent surface condensation.

3.23.3.2. Adequate protection for underground piping against ground water and electrolytic forces shall be provided.

3.23.3.3. All valves and fittings shall be insulated with preformed fitting insulation.

3.23.4. Piping and Valves

3.23.4.1. Appropriate devices for piping expansion shall be provided.

3.23.4.2. The Designer shall provide for a positive means of draining and venting piping systems. Valves shall be provided to allow for isolation of branch piping and risers.

3.23.4.3. Balancing valves shall be provided to facilitate system testing and balancing.

3.23.4.4. Pressure taps on each flow measuring device shall be extended outside of the insulation.

3.23.4.5. Butterfly valves shall be of the positive shut-off type.

3.23.5. Pumps & Pump Systems

3.23.5.1. Pumps shall have a minimum clearance of twenty-four inches (24") on sides and end of pumps and motors to allow access for service and repair.

3.23.4.2. Pumps shall have isolation valves to allow pumps to be removed and repaired.

3.23.4.3. Pumps shall have bleed valves and gauge ports at accessible locations.

3.23.4.4. All pumps shall be serviceable without removing the volute from piping connections.

3.23.4.5. Pumps use considerable amounts of energy. Select pumps with the highest efficiency available for the particular application.

3.23.4.6. Pumps shall be installed in mechanical equipment rooms.

3.23.4.7. Outdoor pump installation shall be avoided. Pump packages should be avoided.

3.23.6. Chilled Water Systems

3.23.6.1. The desired cooling medium for air conditioning systems is chilled water. For new construction and renovation projects, the Designer shall verify that the existing chilled water system will support the new load.

3.23.6.2. The Designer shall consider using a water side economizer to meet winter cooling loads in applications where the use of 100 percent (100%) outdoor air for free cooling is not possible. Plate, frame, shell, or tube heat exchangers are strongly recommended for this application.

3.23.7. Boilers

Where individual boilers are required:

- 3.23.7.1.** Gas-fired, stainless steel condensing, forced draft boilers will be utilized.
- 3.23.7.2.** Electric boilers are not acceptable.
- 3.23.7.3.** Temperature reset controls will be utilized on hot water systems.
- 3.23.7.4.** Provide sensors on hot water supply and return.

3.23.8. Refrigeration Equipment

Preference shall be given to chilled water production based on water-cooled centrifugal chillers. Trane is the current “Owner Preferred Alternate” for chiller equipment on campus. Other options may be considered if circumstances warrant and are approved by the College.

Generally, the Designer shall select water-cooled reciprocating or rotary chillers for cooling loads up to 190 tons. For cooling loads 200 tons and up, centrifugal chillers shall be specified.

- 3.23.8.1.** Air-cooled equipment shall be used for small renovation projects where physical limitations preclude the use of chilled water.
- 3.23.8.2.** Provide environmentally safe refrigerants that conform to the latest Environmental Protection Agency and OSHA requirements.
- 3.23.8.3.** Ventilation of all mechanical rooms with refrigeration equipment shall be provided. Ventilation shall be accessible for activation from an emergency switch located outside any of the mechanical room access doors. Mechanical room ventilation shall be negative to corridor or any other adjacent spaces.

3.23.9. Cooling Towers

- 3.23.9.1.** Cooling towers shall be located in such a way as to have sufficient unobstructed space to allow for adequate air supply for tower fans. Care shall be taken to prevent possible air recirculation.
- 3.23.9.2.** Cooling tower location shall be as near as practical to level conditions and as close as possible to the chillers and pumps to minimize pumping costs.
- 3.23.9.3.** Tower locations shall be as far as possible from trees and other foliage. Screens shall be provided on tower intakes to keep debris and leaves out of tower sump.
- 3.23.9.4.** Balancing valves at hot water basins, extended lube lines, and stainless steel cold water basins are required.
- 3.23.9.5.** Noise level shall be an important consideration in the selection of cooling towers. Cooling towers shall be selected with motors equipped with variable frequency drives to allow for energy efficient capacity control.
- 3.23.9.6.** A hose bib shall be provided at each cooling tower for cleaning.

3.23.9.7. Chemical testing shall be provided by a third-party consulting agency.

3.23.10. Air Handling Units

3.23.10.1. The use of multi-zone air handling units, spray coil systems, and ceiling-mounted fan coil units is not acceptable in new construction. For small renovation projects, an exception can be made, if the need is substantiated.

3.23.10.2. Air handling units that use one hundred percent (100%) outdoor air shall be equipped with preheat, cooling, and reheat coils with individual sensors to allow dehumidification control. Return air shall be ducted.

3.23.10.3. Supply air for the building should be designed for control by duct static pressure. Return air for the building should be controlled by the building static pressure.

3.23.11. Ductwork

3.23.11.1. Ductwork for air distribution shall be designed to yield minimum owning and operating costs by keeping the static and dynamic pressure levels of a duct as low as possible given the building's normal physical constraints.

3.23.11.2. The Designer shall provide ductwork that is free of heat gains or losses and excessive sound levels, has fire and smoke control, and in which air leakage does not exceed two to five percent (2-5%).

3.23.11.3. To allow for proper system balancing, all branch ducts shall be equipped with balancing dampers.

3.23.11.4. Variable air volume (VAV) boxes should be provided to adjust temperature demands on a space. Reheat coils should be located downstream of VAV boxes. Sensors should be provided where air is discharged.

3.23.11.5. Parallel fans are preferred for fan-powered boxes.

3.23.11.6. The use of flexible ductwork should be avoided. The maximum length of a flexible duct shall not exceed five feet (5'). Avoid offsets and curves in flexible duct connections to diffusers and other terminal devices.

3.23.11.7. Provide factory-built access doors large enough to allow service and inspection of control dampers, reheat coils, humidifiers, fire dampers, and all applicable system components. The minimum width for access doors will be twenty-four inches (24"). Doors shall have phenolic labels attached identifying the equipment for which they provide access.

3.23.11.8. All spaces should include both cooling and heating. Cooling only is not acceptable due to causing humidity issues.

3.23.11.9. All ductwork in unconditioned spaces shall be provided with vapor-retarding finish.

3.23.12. Building Automation System

3.23.12.1. Honeywell International's Tridium Niagara is the "Owner-Preferred Alternate" for Building Automation Systems (BAS).

3.23.12.2. The Designer shall provide building automation system drawings with the construction drawings. Copies shall be provided to the Rowan-Cabarrus Community College Facility Department, with no exception. The drawings shall clearly indicate the design and sequence of operation.

3.23.12.3. If humidity is a specific issue to be controlled in the design of a space, this information should be clearly communicated on the BAS drawings.

3.23.12.4. The control system shall be fully compatible with the existing Campus Facilities Automated Controls System.

3.23.12.5. The new system shall have full control capability through the existing server. All systems must be programmable.

3.23.12.6. Space Temperatures: In order to maintain reasonable comfort and lower energy expenditures, the College has established the following standards for comfort heating and cooling:

	Summer (air conditioning)	Winter (heating)
Occupied Space	74-76 degrees F	69-71 degrees F
Unoccupied Space	85 degrees F	55 degrees F

3.23.12.7. All chiller rooms require audio and visual monitoring of the refrigerant lines.

3.23.13. Labeling

3.23.13.1. All equipment shall have phenolic labels attached with the equipment number identified.

3.23.13.2. Access doors in walls or ceilings that provide access to concealed equipment will have phenolic labels with the equipment number identified. In acoustical ceilings the label will be affixed to the ceiling grid.

3.26. Division 26 – Electrical

All electrical work shall be in complete compliance with the North Carolina State Construction Office guidelines and policies.

3.26.1. Campus Primary Electric Distribution

The primary campus distribution system is rated 12,470Y/7200 volts, grounded neutral, and is direct-buried in the ground with pad mounted transformers and switches. The Electrical Designer shall contact the local power service provider for information regarding availability of service, location of nearest transformer, and available KVA. The Designer shall coordinate all services, provide load data, and shall make all applications on behalf of the College.

The incoming service (but not transformer size) shall be designed to have sufficient capacity for full design connected load plus twenty-five percent (25%) additional capacity for future growth.

Transformers

3.26.2. Transformers will be sized and installed by the local Utility.

Locate pad-mounted transformers at a suitable point outside the building in accordance with Utility regulations as to distance from buildings/windows, work clearances and pad sizes.

Vault mounted transformers are not acceptable.

Concrete pad for transformer shall be designed and installed per local Utility specifications. It may be poured in place or pre-cast (if acceptable to the Utility). Contract shall provide pad, grounding and all required conduits.

3.26.3. Emergency Generators

Emergency generators should be located in weather-protected enclosures adjacent to the building which the generator serves. Generator exhaust should be routed to discharge above the generator enclosure roof and remote from any air intake for the building. Code clearances shall be provided to access panels for maintenance.

3.26.3.1 Manufacturers: Generac, Kohler, Cummins.

3.26.3.2 Diesel or Natural Gas – no Propane. If Diesel is used, provide 72 hour fuel capacity.

3.26.3.3 1800 rpm.

3.26.3.4 Provide adequate heating for cold weather starting.

3.26.3.5 Provide for monitoring via Campus Network.

3.26.3.6 Increase size, as required, for non-linear loads.

3.26.4. Electrical Device Manufacturers

The following electrical device manufacturers are preferred due to compatibility with existing materials:

3.26.4.1. Panelboards: GE, Square D, Siemens. All equipment and devices shall be labeled on the panel. Panelboards shall be equipped with welded metal directory card holder, copper busses and Arc Flash warning label per NEC 70E. Show short circuit calculations for each panelboard.

3.26.4.2. Conduit (Steel): Republic Steel, Triangle, Allied Tube & Conduit, Wheatland. EMT must use compression type couplings and connectors, heavy wall or IMC shall use threaded fittings. Minimum size for data wiring = 1 inch.

3.26.4.3. Liquidtight Conduit: American Brass, Columbia Cable & Electric, International Metal Hose.

3.26.4.4. Outlet Boxes: Appleton Electric, Red Dot, Steel City, Thomas and Betts. All boxes shall be galvanized steel. Data boxes shall be 2 1/8 inch deep by 4 inch square with 5/8" deep mud ring.

3.26.4.5. Cable Supports: OZ Electric.

3.26.4.6. Insulating Bushings: OZ Electric.

3.26.4.7. Conduit Bodies and Fittings: Appleton Electric, Crouse-Hinds, Thomas and Betts, Steel City. Only compression type couplings should be provided.

3.26.4.8. Wire and Cable: Anaconda, Phelps Dodge, Triangle Conduit and Wire, Okonite. All wiring shall be copper – aluminum is not acceptable.

3.26.4.9. Solderless Connectors and Lugs: Burndy, Thomas and Betts, OZ Electric.

3.26.4.10. Wiring Devices: Arrow-Hart, Leviton, Pass and Seymour, Hubbell. All devices shall be specification grade, grade, with 302 brushed stainless steel plates. All devices shall be rated 20 amperes. Provide duplex receptacles with USB charging ports in common seating areas.

3.26.4.11. Safety Switches: GE, Square D, Siemens. All safety switches shall be Heavy Duty.

3.26.4.12. Lamps: GE, Sylvania, Phillips.

3.26.4.13. Life Safety Systems: Notifier, Pyrotronics, Edwards. Most campuses have Notifier equipment, new equipment must be fully compatible with the existing systems. Provide cellular phone reporting station, if not already installed on campus.

3.26.4.14. Circuit Breakers: Siemens, GE, Square D.

3.26.4.15. Fuses: Bussmann, Chase-Shawmut, CEFCO.

3.26.4.16. Generators: Generac, Kohler, Cummins.

3.26.5. Interior Lighting

Interior lighting levels should comply with recommendations of the EPA Green Lights and Illuminating Engineering Society Lighting (IES) Handbook.

The lighting design and layout should address accessibility for re-lamping, cleaning, and other maintenance procedures.

Do not locate fixtures directly over hazardous chemicals, mechanical equipment, and/or laboratory benches. Install fixtures on the perimeter of such equipment.

Stairway light fixtures should be mounted so that maintenance personnel can reach them safely from an eight foot (8') ladder.

All electrical installations shall be reviewed and approved by the Rowan-Cabarrus Community College Facility Department.

Require that the contractor provide any Utility company LED incentives in his bid.

3.26.5.1. Emergency Lighting Systems shall comply with the Electrical Guidelines and Policies of the State Construction Office.

3.26.5.2. Interior Lighting Level Guidelines: Unless safety and security requirements dictate greater illumination, or specific visual tasks require either more or less illumination, lighting designs shall conform to the following guidelines, shown in foot candles (fc):

Area	Foot Candles (fc) Required
Lobbies and Lounges	20-30
Offices and Classrooms, general use	50
Offices and Classrooms, special use	60-75
Conference Rooms	30
Laboratories and Libraries (close task areas)	75-100
Toilet Rooms	20
Corridors and Stairways	10
Storage and Janitor Closets	20
Mechanical Equipment Rooms	30
Shop Areas, general use	30
Shop Areas, special use	Task lighting as required
Gymnasium, general recreation	50
Gymnasium, competition level	75
Gymnasium, televised athletic events	100

3.26.5.3. Interior Lighting Sources: All interior lighting shall be high efficiency LED, with a color temperature rating of 3500-degree K. All lighting fixtures shall be DLC labeled.

3.26.5.3. Interior lighting fixtures shall be:

Interior corridors, classrooms, offices, etc. shall be 2-foot by 4-foot regressed equal to Columbia #LCAT24 with step dimming (50/50). Designer to determine lumen package for each space. Note: step dimming not required for areas that do not have multiple level switching. See **APPENDIX** for details.

Interior toilets, use same as above in flange-type installation, if space has hard ceiling. Step dimming is not required.

Where required, provide LED downlights with clear Alzak reflector and white trim.

3.26.5.4. Occupancy Sensors shall be provided to control ceiling light fixtures when room is not occupied, unless room function dictates otherwise. Provide all required components (power packs, etc.) to effect a complete and satisfactory installation. Locate and adjust sensors to provide reliable switching with 3 feet of the entry door. Detectors shall have manual override with sensor types as listed below:

Area	Sensor Type
Classrooms and Conference Rooms	Dual Technology
Laboratories	Dual Technology
Offices	Dual Technology
Toilet Rooms	Dual Technology
Corridors and Stairways	Dual Technology
Storage and Janitor Closets	Dual Technology
Equipment/Data Rooms	Switches only

3.26.5.5. Daylighting shall be considered in the design of new construction. Daylighting is the use of direct, diffuse, or reflected sunlight to provide full or supplementary lighting. Daylighting systems combine technology and architecture to increase building energy efficiency and occupant well-being. Some keys to successful daylighting include the following:

- 3.26.5.5.1.** Maximum southern exposure (orient building on an east-west axis).
- 3.26.5.5.2.** Concentrate on the most heavily used spaces.
- 3.26.5.5.3.** Use roof monitors and light baffles to increase winter radiation, reduce summer radiation, and eliminate glare from direct sunlight.
- 3.26.5.5.4.** Use glass on the roof equal to ten to twelve percent (10-12%) of the building floor area.
- 3.26.5.5.5.** Consider using photocells and dimmable ballasts in perimeter rooms to turn off lights when the available daylight augments lighting.

3.26.6. Exterior Lighting

The lighting design and layout should address accessibility for re-lamping, cleaning, and other maintenance procedures.

Exterior recessed light fixtures (sometimes used for exterior stairs, ramps, or walkways) are not recommended due to problems associated with winter weather conditions. If required, do not locate exterior recessed light fixture below twenty-four inches (24") from walking surface.

All electrical installations shall be reviewed and approved by the Rowan-Cabarrus Community College Facility Department.

Engineer shall provide a point-by-point layout showing maintained foot candle levels throughout area to be lit, using a 10 foot by 10 foot grid at ground level. This shall be submitted to and approved by the Owner.

Unless safety and security requirements dictate greater illumination, campus lighting shall avoid light pollution and light trespass, in order to reduce inefficiency, sources of glare, and light that may be harmful to the nighttime environment, and shall conform to the International Dark-Sky Association. Lighting designs shall conform to the following guidelines, shown in foot candles (fc):

Area	Foot Candles Required
Campus Courtyards	2.5 (not \leq 1)
Campus Walkways	2.5 (not \leq 1)

Campus Streets	3.0 (not \leq 1)
Campus Parking Lots	2.0 (not \leq 1)
Campus Parking Decks	2.0 (not \leq 1)

3.26.6.1. Exterior Lighting Sources: All interior lighting shall be high efficiency LED, with a color temperature rating of 4,000-degrees K. Exterior wall mounted lights shall be full cutoff LED of a design selected by the Architect.

3.26.6.2. Exterior Lighting Luminaires:

Parking Lots: Similar to Ratio Model RAR2, with proper lumens and distribution, dark bronze finish. Luminaires must be furnished with a 7-pin photo control receptacle.

Walks and Pedestrian areas: To be selected by Architect, and approved by the Owner. Mount on a 14 foot pole. All finishes shall be dark bronze.

3.26.6.3. Exterior Lighting Control:

Parking Lots: Use wireless control system. Owner preference: Hubbell wiSCAPE Enterprise. If campus does not have a gateway, one must be provided under this contract.

Walk and low-level controls: For smaller fixtures, provide control by the campus Building Automation System – coordinate with the Owner.

3.26.6.4. Exterior Pole: For **parking areas**, luminaire shall be Pole shall be 30 foot tapered aluminum pole with dark bronze finish. For **pedestrian areas**, poles shall be 14 feet tall .

3.26.6.4.1. Run one inch (1”) Schedule 40 PVC from the appropriate sized lighting circuit breakers to each base in series. Stub the conduit up 1 inch above top of concrete pole base at each location. Center the conduits in the concrete base. Sized wiring based on length of run and voltage drop. Include properly sized ground wire.

3.26.6.4.2. Install a concrete base for each type of pole – see **APPENDIX** for suggestion.

3.27. Division 27 – Communications

3.27.1. Emergency Telephones

Emergency telephones shall be Talk-a-Phone model (or current campus standard equipment). The emergency phone will be programmed and connected with the Rowan-Cabarrus Community College Call Center to include:

3.27.1.1. Blue Light Emergency Phones: The phone will have a blue light connected to it that will operate 24-hours a day, and will flash any time that the **EMERGENCY** button is pressed to make an automatic call to 9-1-1, where permitted, designer shall verify with local AHJ. This phone shall be equal to Talk-a-Phone Model VOIP-600E-ES. It shall be mounted in the specified blue light tower.

3.27.1.2. Academic Building Emergency Phones: The phone has a **BLACK** push button with auto-dial to the Rowan-Cabarrus Community College Call Center, and a second **RED** button to allow calls to 9-1-1. A red-to-green LED light will indicate the call has been answered. Talk-a-Phone Model VOIP-600EI. It shall be mounted flush in the wall. Do not locate phones too close to elevator openings.

3.27.1.3. Elevator Emergency Phones: Furnished with elevator, programmed to dial 9-1-1.

3.27.2. Data Infrastructure:

Contract shall include a complete data wiring infrastructure complete with cable (copper and fiber), pathways, racks with hinged wire management, punchdown panels, fiber cabinets and splice kits, all connections and testing, and rack mounted UPS system(s).

3.27.2.1. Cabling installer qualifications:

3.27.2.1.1. The Cabling Installer shall provide an on staff Registered Communications Distribution Designer (RCDD) to perform Project technical management. The RCDD shall provide onsite inspections at reasonable intervals to ensure compliance with applicable codes, standards and procedures. Evidence of the this shall be submitted with initial material submittal. In addition, installer shall have on staff one (1) BICSI Level 1 plus one (1) BICSI Level 2 installer.

3.27.2.1.2. The Contractor shall be an authorized Installer of the selected cabling system and can provide a 25-Year Permanent Network Performance Warranty. This certification shall be included with proposal submission.

3.27.2.1.3. The Contractor shall be an authorized Corning NPI (Network of Preferred Installers) member in good standing, or pre-approved equivalent. The Contractor shall be certified to design, install and offer the manufacturer held 25-year warranty, in accordance with the NPI Program, or pre-approved equivalent on all fiber optic products and solutions. The Contractor shall extend the warranty to the Owner at no additional charge. Warranty eligibility documentation for fiber and components shall be included with proposal submission.

3.27.2.1.4. The Contractor shall have worked satisfactorily for a minimum of five (5) years on systems of this type and size.

3.27.2.1.5. The Contractor must furnish a list of references with specific information regarding type of project and involvement in providing of equipment and systems. A minimum of three references must be provided for Category 6 projects completed within the last three years involving more than 150 work area outlets.

3.27.2.1.6. The Contractor shall employ a job superintendent or project manager during the course of the installation to provide coordination of work of this specification. This person shall maintain current RCDD® (Registered Communications Distribution Designer) registration and shall be responsible for quality control during installation, equipment set-up, and testing. This registration shall be included with proposal submission. Installation personnel shall meet manufacturer's training and education requirements for implementation of extended warranty program.

3.27.2.1.7. Contractor shall possess, or obtain prior to installation, a NC Specialty Low-Voltage License (NC-SP-LV). Provide evidence of this in the proposal response.

3.27.2.2. Warranty:

3.27.2.2.1. Materials and workmanship hereinafter specified and furnished shall be fully guaranteed by The Contractor for *twenty-five years* from transfer of title against any defects. Defects which may occur as the result of faulty materials or workmanship within *twenty-five years* after installation and acceptance by The Owner shall be corrected by The Contractor at no additional cost to The Owner. The Contractor shall promptly, at no cost to The Owner, correct or re-perform (including modifications or additions as necessary) any nonconforming or defective work within *twenty-five years* after completion of the project of which the work is a part. The period of The Contractor's warranty(ies) for any items herein are not exclusive remedies, and The Owner has recourse to any warranties of additional scope given by The Contractor to The Owner and all other remedies available at law or in equity. The Contractor's warranties shall commence with acceptance of/or payment for the work in full.

3.27.2.2.2. This warranty shall in no manner cover equipment that has been damaged or rendered unserviceable due to negligence, misuse, acts of vandalism, or tampering by The Owner or anyone other than employees or agents of The Contractor. The Contractor's obligation under its warranty is limited to the cost of repair of the warranted item or replacement thereof, at The Contractor's option. Insurance covering said equipment from damage or loss is to be borne by The Contractor until full acceptance of equipment and services.

3.27.2.3. General Requirements:

3.27.2.3.1. Wiring topology shall be star with "home run" cables from the telecom room(s) to the telecom outlets. The RCCC premise wiring is designed to support high-speed data applications, using unshielded twisted pair cabling. The telecom outlets and distribution frames are arranged according to the service being provided.

3.27.2.3.2. Jack and Cable Specifications and Colors:

Data Cable: Approved 4-pair UL Category 6 CMP or DMR,
Commscope Uprise, Panduit or Siemon.

Cable: BLUE for data, GREEN for PoE circuits, cameras and access control.

Outlets: Category 6 BLUE, GREEN depending on service.

Wireless Cable: Approved 4-pair UL Category 6a CMP or DMR,
Commscope Uniprise, Panduit or Siemon.
Color shall be GREEN for PoE wireless.
Outlets: Category 6a GREEN.

Point-to-Point Cable: Approved **SHIELDED** 4-pair UL Category 6 CMP or DMR,
Commscope Uprise, Panduit or Siemon.
Category 6 BLUE

3.27.2.3.3. Conformance:

RCCC premise wiring shall conform to or exceed EIA/TIA standard 568-B, the appropriate UL standard requirement for each category, as well as comply with the National Electrical Code, NFPA 70 (latest applicable edition), Article 800, and all applicable State codes and local building codes. All cable must be UL listed for the intended purpose. All cabling types installed by the Contractor shall be one of the approved types as listed below. The Contractor shall make no substitutions in cable types unless he has written approval for the RCCC project manager prior to the installation of any substitute cable. Cable types shall be consistent throughout the Project.

Contractor may be required to move furniture and other items in order to install outlets, raceways and wiring. When furniture is moved, it shall be immediately returned to its original location when that particular operation is completed. Furniture shall not be left from its original location for any extended period of time, especially overnight.

3.27.2.3.4. Labeling:

All labeling shall be typed or electronically printed – hand lettering is not acceptable.

All termination, protection, splice, patch panel hardware, etc., shall be labeled with the distribution and feed points.

All wireless access points shall have an ID label attached to the unit so that it is visible without disturbing the unit.

3.27.2.3.5. Standard Configurations:

Area/Item/Device	Quantity	Cable	Color
Office Areas	2	Cat 6 (Data)	Blue/Green
Classrooms:			
Smart Podium/Media Cabinet	1	Cat 6 (Data)	Blue
75" Flat Panel Display	1	Cat 6 (Data)	Blue
Podium to Display	3	Cat 6 (Data)	Blue
Computer Classrooms: Per Student	1	Cat 6 (Data)	Blue
Surveillance (CCTV)	1	Cat 6 (Data)	Green
Stand Alone Network Printers/Multifunction Devices	1	Cat 6 (Data)	Blue
Wireless	2	Cat 6a (Data)	Green

Fire Alarm	1	Cat 6 (Data)	Blue
Building Automation System	1	Cat 6 (Data)	Blue
Point-to-Point	1	Cat 6 (Data) SHIELDED	Blue

3.27.2.3.5. Wall Plates:

Plates shall be single gang with up to 6 device openings, except where detailed otherwise on the drawings. For 8 devices, provide a 2-gang plate. Plates shall be 302 brushed stainless steel. Show plate details on drawings. **Data plates shall match the electrical plates in size, material and design.** See **APPENDIX** for labeling details.

3.27.2.3.6. Data Terminations:

Data terminations shall be on patch panels mounted in 19-inch telecom racks as per room layout diagram, 48 ports. All data stations shall be labeled per RCCC labeling standard with typed or electronically printed strips – hand lettering is not acceptable.

Category 6 and 6a cables shall be terminated so as to maintain their twist to within ½" of the IDC contact. No splices will be allowed between the workstation outlet and the telecommunications wiring room.

Installer shall terminate jacks and patch panels with non-impact tool.

Patch cords by Owner.

3.27.2.3.7. Panels and Terminating Equipment:

Equipment rack(s) for data shall accept nineteen (19) inch rack mountable, patch panel frames.

Equipment racks shall be Chatsworth 2- post 7-foot by 19" (black) with, Chatsworth, or equal, 19" upper transition tray for fiber optic cables, Chatsworth, or equal, 7-foot high by 6" double-sided wide vertical cabling sections, and Chatsworth, or equal, 12" cable runway radius drops. All equipment shall have BLACK finish.

Telecom room ladder rack/cable tray shall be 12" black (unless otherwise specified). The section that lies directly over the tops of the racks shall be Chatsworth, or equal, "alternate space cable runway." Rods and anchors shall support ladder rack from ceiling, wall plates shall support all ends that meet walls. End caps shall be utilized on both ends. Each equipment rack shall be secured to the ladder rack with clamps and rods.

Cable tray shall be continuous from entrance point of the conduit(s) or sleeve(s) into the telecom room over to the top of the cabling racks. Refer to room layout diagram(s) provided by RCCC for additional detail.

Sleeves shall be 4" EMT into the room for horizontal cable access per telecom room layout diagram provided by RCCC. Sleeves shall have non-conductive bushings on each end and shall

be attached to the ceiling using metal struts and supports, except when “FlameStopper” devices are used.

3.27.2.3.8. Intra-building Backbone Requirements:

When fiber optic cable passes through a vertical riser room, it should be secured to the wall every 48", or follow manufacturer's recommendations.

Contractor must adhere to all manufacturer requirements regarding pulling tension and allowable lubricants for fiber and copper cables.

Fibers must comply with EIA/TIA 492 specifications and IS 11801 standards.

3.27.2.3.9. Fiber Patch Panels:

The PATCH PANEL shall be wall or rack mountable depending on location requirements. The units must fit into 19" frame arrangements

The PATCH PANEL shall consist of a modular enclosure with front and rear access and can be fully administered from the front or rear.

The PATCH PANEL shall have a removable cover over the connector panels and connector panels that snap into the front of the shelf and accommodate SC connectors.

The PATCH PANEL shall provide terminating capability of 24, 48, 72 or 144 fibers.

The manufacturer must be ISO 9001 certified.

3.27.2.3.10. Fiber Optic Connectors:

All newly installed fiber optic cable shall have 10G-rated SC connectors installed

3.27.2.3.11. Fiber Optic Cable:

Fiber: Corning as specified elsewhere in this document.
Single-mode 8.3 micron.

Sizing: Provide 12 strands of Single-mode at a minimum per IDF room, 24 strands building entry to MDF room.

Panels: Corning as specified elsewhere in this document.

3.27.2.3.12. Cable Installation:

This applies to all data/alarm/fax/circuits, etc. that operate over the copper/fiber systems that reside in the building:

3.27.2.3.12.1. The length of each individual run of horizontal cable from the telecommunications room on each floor to the telecommunications outlet on that floor shall not exceed 295 feet (90 meters).

3.27.2.3.12.2. Each run of cable between the termination block and the telecommunications outlet shall be continuous, without any joints or splices.

3.27.2.3.12.3. If the interiors of walls are not obstructed, the Contractor shall conceal horizontal distribution wiring internally within these walls.

3.27.2.3.12.4. The Contractor shall be responsible for installing all required cable entrance/exit holes, vertically and horizontally, up to and including 4" in diameter. Most of these penetrations will be for station type cabling and shall have the appropriate size sleeve. All penetrations shall be firestopped per NEC, NFPA, UL, and all State and local Codes. All sleeves and conduits shall consist of EMT (unless noted otherwise) with non-metallic bushings on both ends.

3.27.2.3.12.5. Surface mounted raceways may only be used where specifically noted or detailed on the Drawings.

3.27.2.3.12.6. Horizontal wiring from telecom rooms to telecom outlets shall be 4-pair cables the Contractor shall maintain distances from power and lighting conductors as specified below; station cables and tie cables installed within ceilings/walls/floor/riser spaces shall be routed through these spaces at right angles to electrical power circuits.

3.27.2.3.12.7. Copper cables shall be routed so as to maintain a minimum bending radius of 4 times the cable diameter. Velcro wraps used to bundle cables shall be pulled snug, but not "cinched" so that the cables in the bundle are not compressed. The length of the Velcro tie wrap shall overlap the size of the cable bundle being wrapped by 8" to allow for growth. Plastic tie wraps shall not be used.

3.27.2.3.12.8. Cable bundles run on J-hooks shall be wrapped at intervals of 18". Cables run in cable trays shall be wrapped at intervals of 48". All cable runs shall be parallel or parallel to walls and floors. When crossing corridors, cables shall be tied in a bundle and supported over the corridor crossing so that removal of any ceiling tile will not cause the bundle to drape below the ceiling line. No loose cables shall be laid on the suspended ceilings. Cables must be at least 4" above all removable ceiling tiles. Limit bundles to 24 cables.

3.27.2.3.12.9. At no time, except during actual pulling operations, shall cables be left "hanging" out of ceilings or coiled in corridors, offices, etc. If required, Contractor shall leave slack/coils above accessible ceilings, properly maintaining their bending radius. In telecom Rooms, the Contractor shall not leave cables on the floor or allow cables to hang in coils. All slack in cables shall be coiled and left, properly supported, above ceiling. Do not lay data cables directly across ceiling tiles, grids, light fixtures, conduit, etc. Use cable tray or other methods to support the cables and keep them at least 4 inches above ceiling grids.

3.27.2.3.12.10. During installation, Contractor shall protect cables from being stepped on, or abused. This applies to all areas, including corridors and telecom rooms. The Contractor shall use cones and warning tape when working in occupied areas and corridors during class and office time. No ladders shall be left open without direct supervision by the Contractor.

3.27.2.3.12.11. All wiring, including copper and fiber jumpers, running along the wall or plywood backboard shall be secured to the wall or backboard of the telecom rooms, corridors, etc. using a method approved by RCCC. Cable supports shall be used to prevent strain on the conductor assemblies, supplemented by strain relief at connector termination points. Support horizontal cable bundles using broad supports like J-hooks or cable trays. Bridle rings are not acceptable and shall NEVER be used, since they tend to crush the cables.

3.27.2.3.12.12. All station and cable bundles shall have at least 24" of slack coiled up and stowed in an area that is accessible and hidden from view. This 24" of slack will be as close as possible to the station end of the run. At the telecom room end, the

Contractor shall leave three (3) meters of slack cable located at or near the telecom room.

3.27.2.3.12.13. To avoid stressing cable assemblies, limit pulling tension to 25 pounds or less as specified by the EIA/TIA 568-B standard. In addition, pull cables gradually and with constant tension, taking care not to crush or pinch bundles. Be particularly careful when pulling cables around corners, watching out for nails and sharp edges that could damage the insulation.

3.27.2.3.12.14. The Contractor shall mark each cable sheath at the end of each cable. Only indelible, clearly electronically printed labels or markings shall be used.

3.27.2.3.12.15. When cable lubricant is used, read instructions carefully to be sure it is compatible with the cable's jacket material (PVC-Riser, FEP or Composite).

3.27.2.3.12.16. Do not splice or repair damaged cables between the telecom room and the outlet locations. If required, pull new cables.

3.27.2.3.12.17. When required, use grommets to protect the cable where it passes through metal studs or anything that can possibly cause damage to the cable.

3.27.2.3.13. Field Quality Control

Comply with inspection and testing requirements of specified installation standards.

Visual Inspection:

Inspect cable jackets for certification markings.

Inspect cable terminations for color coded labels of proper type.

Inspect outlet plates and patch panels for complete labels.

Inspect patch cords for complete labels.

Testing - Copper Cabling and Associated Equipment in accordance with TIA 568.2

Test backbone cables after termination but before cross-connection.

Test backbone cables for DC loop resistance, shorts, opens, intermittent faults, and polarity between connectors and between conductors and shield, if cable has overall shield.

Test operation of shorting bars in connection blocks.

Category 5e and Above Links: Perform tests for wire map, length, attenuation, NEXT, and propagation delay.

Testing - Fiber Optic Cabling:

Backbone: Perform optical fiber end-to-end attenuation test using an optical time domain reflectometer (OTDR) and manufacturer's recommended test procedures; perform verification acceptance tests and factory reel tests.

Multimode Backbone: Perform tests in accordance with TIA-526-14.

Single Mode Backbone: Perform tests in accordance with TIA-526-7.

Links: Perform optical fiber end-to-end attenuation tests and field reel tests.

Final Testing: After all work is complete, including installation of telecommunications outlets, and telephone dial tone service is active, test each voice jack for dial tone.

3.27.2.4. Manufacturers:

3.27.2.4.1. Cabling:

3.27.2.4.1.1. Data/Voice: Commscope P/N 8773614/10, or equivalent. Data/voice cabling shall be BLUE.

3.27.2.4.1.2. Wireless Access Point: Commscope P/N 874014104/10, or equivalent. Wireless Access cabling shall be GREEN.

3.27.2.4.1.3. Video Surveillance: Commscope P/N 8774104/10, or equivalent. Video Surveillance cabling shall be GREEN.

3.27.2.4.2. Patch Panels:

3.27.2.4.2.1. Commscope P/N 760077842 or equivalent.

3.27.2.4.3. Data Work Area Outlets:

3.27.2.4.3.1. Single Gang Metallic, Stainless Steel: **Match electrical faceplates**, up to 6 gangs (single gang), up to 8 gangs (two gang). Provide blank inserts where required.

3.27.2.4.3.2. Data Outlet: Commscope P/N CC0020917/1 (BLUE), P/N CC002867/1 (GREEN), or equivalent.

3.27.2.4.3.3. Blank Opening: As required.

3.27.2.4.4. Two Post Equipment Rack:

3.27.2.4.4.1. Equipment rack(s) for data will accept nineteen (19) in. Rack mountable, patch panel frames. Equipment racks shall be Chatsworth 7' x 19" (black) with, Chatsworth 19" upper transition tray for fiber optic cables, Chatsworth 7'h x 6" double sided wide vertical cabling sections, and Chatsworth 12" cable runway radius drops. All equipment will be colored black. Unit shall be equipped with two (2) Chatsworth #13239-755 power strips, located where directed in rack

3.27.2.4.5. Telecom Room Ladder Rack:

3.27.2.4.5.1. Ladder rack shall be 12" black (unless otherwise specified). The section that lies directly over the tops of the racks shall be Chatsworth "alternate space cable runway". Rods and anchors will support rack from ceiling, wall plates will support all ends that meet walls. End caps will be utilized on both ends. Each equipment rack shall be secured to ladder rack via clamps and rods. Cable tray will be continuous from the entrance point of the conduit(s) or sleeve(s) into the telecom room over to the top of the cabling racks.

3.27.2.4.6. Cable Management:

3.27.2.4.6.1. Horizontal: Chatsworth P/N 30139-719 or equivalent

3.27.2.4.5.2. Vertical: Chatsworth P/N 11729-703 or equivalent.

3.27.2.4.7. Approved Equivalent Manufacturers:

- 3.27.2.4.7.1.** Copper Cables: Commscope, Siemon or Panduit. Copper Panels &
- 3.27.2.4.7.2.** Cabinets: Commscope, Siemon or Panduit.
- 3.27.2.4.7.3.** Data Work Area Outlets: Commscope, Siemon or Panduit.

3.27.2.5. Grounding and Bonding:

3.27.2.5.1. All service equipment's, conduit systems, supports, protectors, cabinets, cable sheaths, etc., shall be properly grounded in accordance with the latest issue of the National Electric, Local Codes and ANSI/TIA/EIA 607 Grounding and Bonding Practices. Contractor will provide all bonding wire, jumpers, grounding bushings, clamps, etc., as required for complete grounding. Ground wire will be routed to provide the shortest and most direct path to ground. All ground connections shall have clean contact surfaces. All ground wires will be labeled (tagged), colored and sized in accordance with ANSI/TIA/EIA 607, and the National Electric Code.

3.28. Division 28 - Electronic Safety and Security

3.28.1. Alarm and Detection System

The College does not currently require alarm and detections systems in the buildings.

3.28.2. Fire Alarm and Mass Notification System

All new buildings shall be installed with 24-hour addressable monitor systems. Alarm systems will be voice annunciated. Significant renovations (more than 50%) of existing buildings will trigger the same requirements.

3.28.2.1. The design and layout of Fire Alarm Systems shall comply with all current regulations for State-owned facilities and applicable sections of the NFPA.

3.28.2.2. Speakers and strobes shall be placed no more than thirty to forty feet (30'-40') apart so that they can be heard from any location. Speakers shall be heard clearly and **distinctly**, 15dBA above the normal ambient level in all areas.

3.28.2.3. New systems shall be fully compatible with the Campus fire alarm network. Most campuses currently have Notifier equipment connected to a multi-mode fiber network. Designer shall verify.

3.28.2.4. Each campus currently has a reporting station. If the system being installed does not have a reporting station, a cellular phone with VoiP backup communicator shall be installed. One year of 3rd party monitoring shall be included in the contract.

3.28.2.5. Mass notification system shall be an integral part of the fire alarm system and shall have its own series of **AMBER** strobes, which shall be combined with the fire alarm speaker and strobes where practical. Both systems shall use the common speaker system, with fire alarm taking precedence. In addition to the strobes, the mass notification system shall have LED programmed signs locations in corridors and large areas to display pre-programmed messages. Signs shall be equal to LED "Mega-Dot" as manufactured by Light Engineered Displays, Inc. See **APPENDIX** for details. Where signs are ceiling mounted back-to-back, a custom bracket shall be provided to cover up all connection and wiring. The unit can be seen in Building 200 at the College's North Campus.

Bracket was fabricated by Irvan-Smith, Inc., Concord, NC. Bracket to be powder coated to match color of sign.

3.28.3. Access Controls

The building access and monitoring system shall match existing College system, which is Avigilon. All new devices shall be compatible with this system.

3.28.3.1. One (1) multi-tech card reader shall be provided for each building.

3.28.3.2. If there is an entry vestibule, the card reader shall be placed adjacent to the exterior doors and shall control the exterior doors only.

3.28.3.3. Locate the power supply for the exit device and the access controller above the accessible ceiling near the door being controlled. If there is no ceiling, locate in the nearest closet or storage room.

3.28.3.4. Exterior doors normally open during the day shall have electronic hardware, power transfer device, door position switch and latch bolt monitoring. Doors that have motorized door operators shall have isolating relay to disconnect control wiring when the door is locked.

3.28.3.5. Exterior doors normally locked during the day, shall be monitored only.

3.28.3.6. Each building shall have a lock-down button that will lock all controlled doors when pushed. Very location of button with the Owner. Button shall be equal to STI Model SS2429LD-EN (push to activate, turn to reset).

3.28.3.7. Interface system with Campus Avigilon server, provide 8 hours of on site training.

3.28.4. Closed Circuit Television System (CCTV)

Provide a complete CCTV system for the building and surrounding property, consisting of VoiP 108p fixed cameras, pan-tilt-zoom cameras are not acceptable. In lieu of PTZ cameras, use multiple element cameras to provide up to 360 degrees of coverage.

3.28.4.1. Interior cameras:

- Entrances
- Corridors, entrances to toilets
- Areas where groups may gather
- Financial areas where safes are installed
- Stairs
- Elevators

3.28.4.2. Exterior cameras:

- Entrances
- Areas around building
- Parking lots (mounted on blue light towers)

3.28.4.3. Cameras and system:

Operating system:	Ipconfig using Orchid Fusion VMS Management System Provide license for each camera furnished
Cameras:	Owner preferred: AXIS cameras: Fixed interior single sensor cameras: Axis M3065-V Fixed Interior multi-element cameras: Axis P3717-PLE Fixed exterior single sensor cameras: Axis M3065-V Fixed exterior multi-element cameras: Axis P3717-PLE Elevator cameras: Axis P3905-R Mk II (2.8 mm)
Accessories:	Specify all necessary mounting hardware. Depending on the distance, blue light tower cameras may need to be fed by fiber cable.

3.31. Division 31 – Earthwork

3.31.1. Excavating

3.31.1.1. General: Excavation is to be unclassified and is to be performed as Authorized Excavation regardless of type, nature or condition of the material encountered as necessary to establish the lines and grades to be shown on the drawings. Once subgrade elevations have been reached, Architect is to inspect and determine suitability of subgrade material for intended purpose. If unsuitable, additional excavation can proceed the same as authorized and paid for at the same unit price established in the bid. It is to be stipulated that excavations beyond the limits needed to establish required grades without the specific direction of the Architect will be regarded as unauthorized. Unauthorized excavations and any required remedial work will be at the contractor's expense. Remove vegetation, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placement of fills. Plow strip, or break up, sloped surfaces steeper than twenty-five percent (25%) so that fill material will bond with existing surface.

3.31.1.2. Trenches: Excavations shall be the same as that for general site excavation except that width shall be only to the extent normal for the utility system being installed. Trench widths and restoration limits, with appropriate details, will be per the plans. For excavation beyond normal widths, Designer is to define special backfill requirements. Trenching shall establish bottoms to the required lines and grades such that proper bedding of the utility can be accomplished in accordance with the material manufacturer's recommendations. All trench bottoms are to be maintained dry until properly backfilled and compacted. All applicable safety codes are to be followed for sheeting, shoring and side slope requirements. Trench excavations shall be guarded at all times. It is to be stipulated that if trenches are to be left open while unattended for any reason, or beyond work hours, they shall be barricaded with orange safety net adequately staked no less than four (4) feet from the trench edges.

3.31.1.3. Spoil: Excess excavation and material not suitable for backfill and embankment operations shall be removed from the College with the exception that the College reserves the right to select and claim up to the first 2,000 cubic yards. It is to be stipulated that the contractor shall deposit said material, if owner elects, to a location on the campus designated by the Owner at no additional cost. Provisions for maintaining workmen safety within excavations is the sole responsibility of the Contractor.

3.31.2. Backfill

3.31.2.1. General: For Site and Structures: A non-plastic, clean, granular material composed of sand, fractured rock, or gravel obtained from the excavation activities or, if necessary, from off-site borrow shall be provided. The material shall be substantially free of clays, organics including loam, peats and wooden materials and trash, which may be compressible. Quality backfill shall also be void of masonry, rubble and roadway products. Blending of admixtures to improve gradation uniformity and stability is permissible. Provide laboratory verification that intended backfill materials are suitable for the intended purpose and are not in any way contaminated. Backfill materials shall be generally placed in six-inch (6") maximum lifts, loose measure when compacted by heavy equipment. Specify lifts not more than four inches (4") in loose depth for material compacted by hand-operated tampers. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.

3.31.2.2. Backfill: To avoid subsurface problems during the life of a new building, particular emphasis must be placed upon the selection of backfill material around the walls of buildings.

3.31.2.3. Compaction: Control soil and fill compaction, providing minimum percentages of maximum density, in accordance with ASTM D 1557, specified for each area classification indicated below:

3.31.2.3.1. Under structures, building slabs and steps, and pavements, compact top twelve inches (12") of subgrade and each layer of backfill or fill material at ninety-five percent (95%) maximum density.

3.31.2.3.2. Under lawn or unpaved areas, compact top six inches (6") of subgrade and each layer of backfill or fill material at ninety percent (90%) maximum density.

3.31.2.3.3. Under walkways, compact top six inches (6") of subgrade and each layer of backfill or fill material at ninety-five percent (95%) maximum density.

3.31.2.4. Excavation and Backfilling of Utilities Trenches: All trenching and backfilling work shall conform to the North Carolina Department of Labor, OSHA Trenching, and other Safety Standards.

3.31.2.4.1. All trenches four feet (4') and deeper require shoring.

3.31.2.4.2. Trenches shall be excavated to a depth that will provide a minimum cover of three feet (3') above the top of the pipe, and which will avoid interference with other utilities.

3.31.2.4.3. The width of the trench at and below the top of the pipe shall be such that the clear space between the pipe barrel and the trench wall shall not exceed eight inches (8") on either side of the pipe.

3.31.2.4.4. Prior to any digging below eighteen inches (18"), utility lines in the area must be marked on site.

3.31.2.4.5. Trenches shall not be backfilled until all required pressure tests have been performed and until the installed system conforms to the requirements of the specifications. Materials shall be deposited in six-inch (6") layers and rammed carefully and thoroughly until the top of the pipe has a cover of one foot (1').

3.31.2.4.6. Marking tape shall be placed twelve to eighteen inches (12-18") below ground level directly above the underground facilities. The marking tape shall correspond to the following color code:

Lines	Color
Electric Power	Red
Gas, Oil, or Steam	Yellow
Telephone, Data, Cable TV	Orange
Water, Slurry	Blue
Sewer	Green

3.31.2.4.7. All backfilling under streets, sidewalks, and drives shall be compacted above and allowed to settle for three days. The asphalt shall conform to the North Carolina State Highway Commission requirements. The concrete shall be rated at three thousand (3,000) psi and shall conform to the general construction portion of the specification for concrete.

3.31.3. Termite Control

The soil in the entire building area shall be poisoned or termite-treated with a five-year guarantee provided. Do not use any chemical which has been banned in any state.

3.31.4. Site Drainage

Site drainage is to be designed with minimal visual impact. The storm drainage system shall be designed for an assumed minimum rainfall intensity of two inches (2") per hour for a five hour storm. In addition, the minimum runoff value to be used in the storm drainage design shall be two (2) cubic feet per second per acre.

3.31.4.1. Surface Drainage

3.31.4.1.1. The site, including paved areas, loading docks, maneuvering areas adjacent to docks, and landscaped areas, shall be graded in such a manner that gravity runoff occurs at all points, and all areas shall slope away from the building on a minimum gradient of one-quarter inch (1/4") per foot. All terrain surrounding the building, including loading and parking areas, shall be graded in such a manner that, if storm drains serving the area become stopped up, water will flow away from the building.

3.31.4.1.2. The maximum permissible horizontal distance that storm water shall be permitted to flow over the site before entering a catch basin or other inlet shall be seventy-five feet (75'). This applies to grassed areas, paved areas, and elevated parking areas.

3.31.4.1.3. Lawns and mulch areas are encouraged, when possible, around new building areas to increase natural percolation and decrease impervious runoff.

- 3.31.4.1.4.** Surface drainage shall be directed away from planting areas when possible. Subsurface drainage may be required in new planting areas with poor soils.

3.31.4.2. Natural Drainage

- 3.31.4.2.1.** Natural drainage shall be utilized and maintained wherever possible.
- 3.31.4.2.2.** The vegetative area fifty feet (50') from each side of the centerline of the swale or stream shall be maintained whenever possible to provide for greater natural percolation and pollutant filtering.
- 3.31.4.2.3.** When a natural drainage course is required to be diverted due to site improvements the following shall be considered, the vegetative area adjacent to the new drainage course shall be replanted to its original condition or improved with lawn and/or tree plantings.

3.31.4.3. Subsurface Drainage

- 3.31.4.3.1.** An underground storm sewer system shall be provided to accommodate the roof drainage system.
- 3.31.4.3.2.** The minimum size grate acceptable shall be eight inches (8") square.
- 3.31.4.3.3.** Drainage grates in lawn areas within twenty-five feet (25') of a walkway shall be designed to have a two percent (2%) slope from the edge of the walk to the storm drainage rim.
- 3.31.4.3.4.** Beehive type drainage grates shall be used in mulched planting areas.

3.31.4.4. Headwalls

- 3.31.4.4.1.** Headwalls shall be veneered stone.
- 3.31.4.4.2.** Slope and creek bed stabilization methods other than riprap should be considered.

3.31.4.5. Drain Opening Protection

- 3.31.4.5.1.** Install removable bars or grilles at open end of culverts, drains, and pipes ten inch (10") diameter or larger.
- 3.31.4.5.2.** In exterior stairwells, areaways, and similar locations, where leaf clogging of conventional drains would be expected, provide scupper or dome type drains.

3.32. Division 32 - Exterior Improvements

3.32.1. Walks, Steps, and Ramps

- 3.32.1.1.** Walks shall be constructed identical to existing walks and of equal widths as appropriate. Walk surfaces shall be left one inch (1") above finish grade.
- 3.32.1.2.** Steps should be minimized where possible and replaced with ramps. Steps shall ideally have a six inch (6") rise and twelve inch (12") tread with one-quarter inch (1/4") wash across the tread.
- 3.32.1.3.** Ramps shall be constructed on a gradient not to exceed one foot (1') in twelve feet (12') and a minimum of six feet (6') wide for removal of snow.

- 3.32.1.4.** See Section 3.3 Division 03 – Concrete for concrete requirements and Section 3.4 Division 04 – Masonry for brick pavers.

3.32.2 Asphalt Paving

- 3.32.2.1.** Streets and Driveways with Bus Traffic: Paving shall consist of a minimum of five inches (5”) of Type HB asphalt base or six inches (6”) of compacted coarse aggregate, two inches (2”) of Type H asphalt binder, and two inches (2”) of Type I-2 asphalt surface course properly crowned to allow for drainage.

- 3.32.2.2.** Parking Lots: Paving shall consist of a minimum of six inches (6”) of coarse aggregate stone base fully compacted. The surface course shall be Type I-2 asphalt concrete placed in a minimum thickness of two inches (2”) and properly crowned to allow for drainage.

- 3.32.2.3.** Curbs and Gutters: All curbs and gutters shall be Portland cement concrete and shall conform to North Carolina Department of Transportation standards – six inch (6”) curb and twenty-four inch (24”) gutter.

3.32.3 Landscaping

The campus landscape environment consists of plant materials that form a canopy layer, a focus layer, and a floor layer. The canopy is an outdoor ceiling that provides unobstructed visual movement throughout the campus. Collectively, the layers give structure and order to the campus. The established landscape pattern of canopy trees and lawn should be reinforced and maintained.

- 3.32.3.1.** Plant materials are used to:

- 3.32.3.1.1.** Add visual interest to the outdoor environment.
- 3.32.3.1.2.** Accentuate building and campus entrances at eye level.
- 3.32.3.1.3.** Enclose special areas, such as plazas and courtyards.
- 3.32.3.1.4.** Screen unappealing elements, such as dumpsters, service areas, and parking.
- 3.32.3.1.5.** Control access and circulation.

- 3.32.3.2.** Tree Protection: Prior to the start of construction, any existing trees located within the proposed construction site are to be evaluated by the Rowan-Cabarrus Community College Facility Department Landscape Services to determine the location of a safety barrier fence around the root zone of the trees. At no time is the area directly under the drip line of the tree to be used for storage or disturbed by machinery. Barrier fencing shall be installed on a radius of at least eighteen inches (18”) for each inch of trunk diameter [12-inch trunk diameter = 18 feet tree protection zone radius].

- 3.32.3.3.** Subsoil shall be permeable and shall be brought to a friable condition by harrowing or otherwise loosening and mixing with mulch (40 bales per acre) to a depth of at least four inches (4”). Lumps and clods are to be thoroughly broken and stones larger than four inches (4”) are to be removed.

- 3.32.3.4.** Topsoil shall be stripped from all areas to be graded (either excavated or filled) and shall be stockpiled during construction. Topsoil shall not be stockpiled under trees. At the

completion of the job, the topsoil shall be spread on the ground around the building to establish the finish grade. The areas shall be scarified one-and-a-half feet (1.5') deep and all construction debris picked out and hauled off before spreading the topsoil. Topsoil shall be placed in six inch (6") layers and compacted by normal movement of equipment over area to a final depth of four inches (4"). After the topsoil is spread, the entire area shall be left smooth. All debris, roots, and rocks measuring one inch (1") and larger shall be removed.

3.32.3.4.1. Topsoil should not exceed the grade which existed prior to construction.

3.32.3.5. Mulching and Weeding: New planting beds should be weed free and mulched with two to four inches (2-4") of hardwood mulch. Individual trees should have a minimum five foot (5') diameter circle of hardwood mulch. All mulched areas should be treated with pre-emergent herbicide at a rate of one hundred fifty pounds (150 lb.) per acre of actual material, or three pounds (3 lb.) of active ingredient per acre. The finish grade of any shrubbery beds not planted or mulched, should be three inches (3") lower than the existing finish grade of sidewalks.

3.32.4. Xeriscaping

Xeriscaping promotes water conservation by using drought-tolerant plant materials that thrive in the environment within a landscape carefully designed for maximum use of rainfall runoff and minimum care. Xeriscaping principles can significantly reduce water use and save money.

Xeriscaping principles also stress the aesthetics of using native vegetation, reduction in turf, water harvesting techniques, the use of mulches, and proper maintenance practices.

Buildings shall be landscaped for energy efficiency and water conservation. Bushes and large trees provide shading and act as a wind break.

3.32.5. Large Trees Recommended for Campus

Species	Common Name	Salt Tolerance	Remarks
<i>Acer Saccharum</i>	Sugar Maple	Not	Wonderful fall color is one of the main trees in the local forest, but does not perform in urban settings. The species should be used sparingly throughout campus
<i>Aesculus Hippocastanum</i>	Horse Chestnut	Tolerant	Fruit may be considered messy
<i>Betula Alleghaniensis</i>	Yellow Birch	Not	Nice tree for a parking setting, beautiful yellow fall color
<i>Carya Aquatica</i>	Water Hickory	Not	Does well in wet areas, nuts eaten by wildlife
<i>Carya Cordiformis</i>	Bitternut Hickory	Not	Tolerates wet soils.
<i>Fraxinus Americana</i> 'Skycole' P.P4256	White Ash	Tolerant	Borers may become an issue
<i>Fraxinus Pennsylvanica</i>	Green Ash	Tolerant	Borers may become an issue
<i>Ginkgo Biloba</i>	Maindenhair Tree	Tolerant	Select male clones

<i>Gleditsia Triacanthos</i> 'Inermis'	Thornless Honey Locust	Moderate	Tolerates urban soils. May require pesticide applications to control pest. (Plant bugs, mites, and webworms)
<i>Gymnocladus Dioicus</i>	Kentucky Coffee Tree	Tolerant	This tree needs adequate room, fruit may be messy, list cultivar
<i>Liquidambar Styraciflua</i>	Sweet Gum	Not	Fruit may be considered messy
<i>Liriodendron Tulipifera</i>	Tulip Tree	Not	Sooty mold may be an issue
<i>Metasequoia Glyptostrobooides</i>	Dawn Redwood	Not	Tolerates urban soils
<i>Nyssa Sylvatica</i> 'Wildfire'	Black Gum	Not	Great fall color, tolerates acid soils
<i>Picea Abies</i>	Norway Spruce	Not	Give plenty of room
<i>Picea Pungens</i> 'Royal Blue', 'Fat Albert'	Colorado Blue Spruce	Not	Give plenty of room
<i>Platanus x Acerifolia</i>	London Plane Tree	Tolerant	Needs adequate space; Anthracnose may be an issue
<i>Quercus Alba</i>	White Oak	Moderate	Needs adequate space
<i>Quercus bicolor</i>	Swamp White Oak	Moderate	Great for wet soils.
<i>Quercus Lyrata</i> 'QLFTB' P.P 13470	Overcup Oak	Not	Tolerates wet soils
<i>Quercus michauxii</i>	Swamp Chestnut Oak	Moderate	Tolerates Wet Soils
<i>Quercus Palustris</i>	Pin Oak	Not	Tolerates urban soils well, give adequate room to grow
<i>Quercus Phellos</i> 'QPSTA'	Hightower Willow Oak	Not	Tolerates urban soils well
<i>Quercus Rubra</i>	Red Oak	Tolerant	Needs adequate space
<i>Quercus Shumardii</i> 'QSFTC'	Panache Shumard Oak	Tolerant	Urban tolerant
<i>Quercus Nuttallii</i>	Highpoint Nuttall Oak	Not	Good winter leaf drop
<i>Quercus Virginianus var. fusiformis</i>	Escarpment Live Oak	Tolerant	Give adequate room to grow. At the northern limit of its range
<i>Sophora Japonica</i>	Japanese Pagoda Tree	Tolerant	Tolerates urban soils, may be considered a messy tree
<i>Taxodium Distichum</i> 'Sofine'	Autumn Gold Bald Cypress	Moderate	Tolerates urban soils, will produce knees if roots are kept wet
<i>Tilia cordata</i> 'Corzam'	Corinthian Little Leaf Linden	Moderate	Tolerates urban soils; other Genera of Tilia may be used
<i>Ulmus parvifolia</i> 'Emer II', 'Allee', 'Emerald Vase'	Alee Lacebark Elm	Not	Tolerant of urban soils

3.32.6. Medium Trees Recommended for Campus

Species	Common Name	Salt Tolerance	Remarks
<i>Acer Rubrum</i>	Red Maple	Not	Tolerates wet compacted soils, needs regular pruning until mature

<i>Betula Nigra 'Heritage'</i>	River Birch	Not	Bark makes a nice winter interest. Aphids may make this tree a little messy (shedding)
<i>Carpinus Betulus 'Fastigiata'</i>	Fastigate European Hornbeam	Moderate	Is not considered salt tolerant but has worked well for Rowan-Cabarrus Community College. Nice street tree. Only issues susceptible to Calico scale and is grafted
<i>Carpinus Caroliniana</i>	American Hornbeam	Not	Prefers moist well drained soils
<i>Koelreuteria Paniculata</i>	Golden Raintree	Tolerant	Very urban tolerant
<i>Larix Decidua</i>	Common Larch	Moderate	Nice yellow fall color
<i>Magnolia Grandiflora 'TMGH'</i>	Alta Southern Magnolia	Moderate	One of the most cold hearty varieties, worth a try in a protected spot
<i>Magnolia Virginiana</i>	Sweetbay	Moderate	Protect from winter winds
<i>Robinia Pseudoacacia 'Purple robe'</i>	Black Locust	Tolerant	Considered messy only select thornless cultivars
<i>Salix Babylonica</i>	Willow	Tolerant	Agressive, shallow roots, messy tree, nice around natural water
<i>Salix Pentandra</i>	Laurel Willow	Not	Great lustrous green leaves, almost look fake, may be hard to find but worth planting
<i>Sciadopitys Verticillata</i>	Japanese Umbrella Pine	Not	Protect from winter winds
<i>Sophora Japonica 'Princeton Upright'</i>	Japanese Pagoda Tree	Tolerant	Good street tree
<i>Sorbus aucuparia</i>	European Mountain Ash	Tolerant	Showy fruit, grows best on northern exposures, keep away from sidewalks fruit is messy
<i>Thuja (Standishii x Plicata) 'Green Giant'</i>	Green Giant Arborvitae	Not	Select good central leader

3.32.7. Small Trees Recommended for Campus

<i>Species</i>	Common Name	Salt Tolerance	Remarks
<i>Acer Griseum</i>	Paperback Maple	Not	The bark is a great winter interest
<i>Acer Palmatum</i>	Japanese Maple	Not	Great specimen plants, protect from early spring freezes
<i>Amelachier x Grandiflora 'Autumn Brilliance'</i>	Serviceberry	Tolerant	Check for good branch structure, minimal crossing limbs
<i>Cedrus Atlantica 'Glauca'</i>	Blue Atlas Cedar	Moderate	Mice specimen tree with good winter interest
<i>Cedrus Atlantica 'Glauca Pendula'</i>	Weeping Blue Atlas Cedar	Moderate	Nice specimen tree
<i>Cercis Canadensis</i>	Eastern Redbud	Not	Can tolerate a wide PH range

<i>Chamaecyparis Obtusa</i>	Hinoki Cypress	Not	Nice specimen plant, does well in containers
<i>Chamaecyparis Pisifera</i> 'Filifera Aurea'	Gold Mop	Moderate	Nice winter interest
<i>Chioanthus Retusus</i>	Chinese Fringetree	Moderate	Standards are preferred
<i>Chioanthus Virginicus</i> 'CVSTF'	Prodigy Fringetree	Moderate	Foliage darker more lustrous, than the Chinese fringe tree
<i>Cornus Kousa</i>	Kousa Dogwood	Not	More tolerant to Urban Soils than the Cornus florida
<i>Cornus Mas</i>	Cornelian Cherry	Not	Early bloomer
<i>Corylus Avellana</i> 'Contorta'	Harry Lauder's Walking Stick	Not	Great specimen plant especially in the winter
<i>Crataegus Crus-Galli</i> 'Inermis'	Thornless Hawthorne	Tolerant	Beautiful spring flowers
<i>Crataegus Phaenopyrum</i>	Washington Hawthorne	Tolerant	Beautiful spring flowers
<i>Hamamelis x Intermedia</i> 'Arnold Promise'	Witch Hazel	Tolerant	Early bloomer
<i>Ilex Opaca</i> 'Judy Evans'	Judy Evans American Holly	Moderate	Outstanding fruit production
<i>Ilex x 'Nellie R. Stevens'</i>	Nellie Stevens Holly	Not	Good performer protect from winter winds
<i>Juniperus Chinensis</i> 'Hetzii Columnaris'	Hetzii Columnaris Juniper	Moderate	Nice specimen plant
<i>Juniperus Virginiana</i> 'Idyllwild'	Idyllwild Red Cedar	Moderate	Excellent screening plant
<i>Lagerstromia Indica</i> 'Centennial Spirit'	Crape Myrtle	Not	Tolerates wet soils. May be killed to the ground during harsh winters. Protect from drying winter winds. Only plant on southern exposures. Other species may be chosen. Crape myrtles grown in colder nurseries perform
<i>Malus</i>	Flowering Crabapple	Tolerant	Tolerates urban Soils. Fungal diseases; Japanese beetles may be an issue. Don't plant near patios fruit may be a house keeping issue. Plant resistant varieties
<i>Prunus Serrulata</i>	Kwanzan Cherry	Not	Beautiful spring flowers
<i>Prunus x Cistena</i>	Sand Cherry	Tolerant	Red leaves are nice
<i>Prunus x Yedoensis</i>	Yoshino Cherry	Not	Bores may infect this species don't overplant
<i>Rhus Typhina</i>	Staghorn Sumac	Tolerant	Nice specimen plant

3.33. Division 33 – Utilities

3.33.1. Underground Utilities

3.33.1.1. Identification: Contractor is to consult with the Owner and Designer, and review files to establish a general working knowledge of the extent, type, and probable

locations of all existing utilities. All existing utilities, proposed alterations thereto and new utilities lines are to be shown on the Civil Site Plans. Contractor to properly notify all utility service provider and the College directly prior to any digging.

3.33.1.2. Connection to Existing Systems: Any connection to existing utility systems must first be scheduled with the Facilities Operations & Maintenance Department so disruption of services is minimized. Contractor is not authorized to operate any valve of an existing utility system. When needed, such activity is to be requested of the Facilities Operations & Maintenance Department who will perform the necessary operation. Ample advanced notice is to be required to schedule this service. Two days is the normal minimum notice period, but could be longer depending on complexity and extent of impact on services and operations.

3.33.1.3. Water Distribution:

3.33.1.3.1. Quality Assurance: It is required that all new and relocated water main pipe, fittings, valves, fire hydrants, and related products that will come into contact with drinking water be in conformance with the American National Standards Institute (ANSI)/NSF International Standard 61 and comply with the applicable American Water Works Association (AWWA) Standards.

3.33.1.3.2. Pipe: Pipe provided is to be Ductile Iron Pipe (DIP) conforming to ANSI A-21.51 and AWWA C-151. For pipe to be buried, provide Pressure Class 350 for less than twelve (12) inches and Pressure Class 250 for pipe equal to and larger than twelve (12) inches. For pipe to be above ground, provide Class 53. The interior of the pipe shall have a standard thickness cement mortar lining with seal coat conforming to ANSI A-21.4 and AWWA C104. The exterior is to have a factory applied bituminous or coal tar varnish coating.

3.33.1.3.3. Fittings: Fittings are to be either cast iron or ductile iron and of a pressure class compatible with the pipe. Fittings are to also have the same interior and exterior treatments as required for the pipe.

3.33.1.3.4. Joints: Joints for below grade DIP and fittings shall be push-on or standard mechanical joint type with rubber gaskets complying with AWWA C111. All fitting joints and pipe joints below grade where needed shall be mechanically restrained. Joints for above grade piping shall be flanged.

3.33.1.3.5. Valves:

3.33.1.3.5.1. Gate Valves: For valves three (3) inches and larger, provide resilient seat gate valves complying with AWWA C509 such as U.S. Pipe Metroseal. Minimum working pressure shall be 150 psi. The interior and exterior shall be epoxy coated in compliance with AWWA C550. Where installation is below grade, valves are to have a two (2) inch operating nut housed in a cast iron slip sleeve valve box.

3.33.1.3.5.2. Check Valves: Provide Iron-body, bronze mounted swing check, horizontal installation conforming to AWWA C508.

3.33.1.3.5.3. Backflow Preventers: Backflow preventers are to be double check valve assembly for low hazard applications and reduced pressure (RP) assemblies for high hazard conditions.

3.33.1.3.5.4. Water Meters: Each new building service connection shall include an inline, full flow meter for measuring domestic consumption. The meter is to be ahead of and coupled with the backflow prevention assembly. The design of the full assembly is to give due regard to subsequent maintenance operations

including ease of disassembly via use of unions, couplings or other appropriate fittings.

3.33.1.3.5.5. Water Sampling Ports: For new and extended potable water distribution systems requiring permit and Health Department clearances, sample ports shall be provided as required for Code compliance.

3.33.1.4. Sanitary Sewers:

3.33.1.4.1. Quality Assurance: It is required that the design of wastewater collection and transmission systems be in accordance with the Building Code as well as any specific requirements of the local utility provider.

3.33.1.4.2. Piping:

3.33.1.4.2.1. Gravity Systems: Gravity sewer piping and fittings are to be plastic polyvinyl chloride (PVC) conforming to the requirements of ASTM Designation D3034, SDR-35. Joints for gravity systems are to be push-on elastomeric gasket type.

3.33.1.4.2.2. Force Mains: For sanitary force mains, provide ductile iron pipe, DIP, conforming to the requirements of ANSI A21.51 and Class 50. The pipe and fittings shall have a minimum pressure rating of 150 psi, utilize standard push-on or mechanical gasket sealed joints and be coated inside and out with a factory applied bituminous or coal tar epoxy sealant.

3.33.1.4.2.3. Valves: Valves are to be acid resisting bronze body eccentric plug valves. The plug shall be resilient (NBR) rubber coated suited for wastewater applications. Sizes three (3) inches and smaller shall have lever actuators and NPT connections. Sizes four (4) inches and larger shall have gear reduced handwheel actuators and be flanged or mechanical joint connected. Below grade installations shall be placed in a vault.

3.33.1.4.2.4. Manholes: Specify manholes to be precast concrete manholes conforming to ASTM Designation C478. Wall thickness shall be eight (8) and the bottom barrel section is to be monolithic with the bottom. Pipe connections shall be made watertight with rubber boots casted integral into the wall sections. Specify an asphaltic seal coating to be applied to the interior and exterior surfaces. Invert channels are to be provided to facilitate smooth directional changes in flow. Manholes to be properly bedded on gravel consisting of crushed granite or blast slag stone.

3.33.1.5. Storm Water Systems

3.33.1.5.1. Pipe: Stormwater drainage pipe shall be round reinforced concrete culvert pipe conforming to ASTM Designation C76; reinforced concrete horizontal elliptical pipe conforming to ASTM Designation C507; HDPE Type II, dual wall corrugated exterior/smooth interior pipe conforming to ASTM F2648; or, PP, dual wall corrugated exterior/smooth interior pipe conforming to ASTM F2736, ASTM F2881 and AASHTO M330 for their respective sizes. The pipe joints for concrete pipe are to be rubber O-ring gasket type conforming to ASTM C 1628. Specify special bedding requirements where warranted.

3.33.1.5.2. Structures: Specify stormwater structures at all changes in pipe direction, points of drainage entry and connection points of branch piping. Stormwater structures are to be constructed of either precast or cast-in-place reinforced concrete conforming to ASTM F2648. Where grates are required in

bicycle and pedestrian use areas, stipulate that the grates shall be reticulate steel. Cast iron grates are to be used in all other areas outside of pedestrian and bicycle ways. When structures are placed in vehicle use areas, grating, if used, is to be specified as traffic bearing. Where steel grating is used, it shall be hot dipped galvanized coated.

3.33.1.6. Gas Service: Gas lines to be constructed as shown on the Civil Site Plans to ensure coordination with other site improvements and prevention of conflict. The associated work is to be indicated as provided by others on the plans.

3.33.1.7. Hot/Chilled Water: See Section 3.16 - Division 22 Plumbing for specific requirements regarding piping, valves, fittings, manhole materials, and placement. Site related mechanical improvements shall be constructed as shown on the Civil Site Plans for proper coordination with other utilities and resolution of conflicts.

3.33.1.8. Site Electrical: See Section 3.18 - Division 26 Electrical for specific requirements regarding conduits, cabling, manholes, site lighting, transformers and switching materials, and placement. Site related electrical improvements shall be constructed as shown on the Civil Site Plans for proper coordination and resolution of conflicts.

3.33.1.9. Systems Testing and Connection:

3.33.1.9.1. Pressure Pipe Installations: All pressure pipe systems are to be hydrostatically tested to verify integrity of piping materials and installation. Develop and specify testing procedures consistent with AWWA Standard C600-93. Test pressures should be set at the rated working pressure of the piping material for a duration of two (2) hours. Designer is to witness the testing conducted by the Contractor, record the results in acceptable format, and certify the test results to the appropriate regulatory authorities for clearance to place the system into service.

3.33.1.9.2. Gravity Pipe Installations: Stipulate that all gravity piping systems are to be inspected/tested to verify material and material installations are sound and suitably leak free. Develop infiltration/exfiltration-testing procedures consistent with respective regulatory requirements. Designer is to witness the testing activities to be conducted by the Contractor, record the results in acceptable format, and certify the test results to the appropriate regulatory authorities for clearance to place the system into service.

3.33.1.9.3. Potable Water System: Where health codes and permits require bacteriological testing for clearance approval to utilize a new or modified water system, the Contractor is to provide, setup, and conduct all operations in accordance with local water utility guidelines, to sterilize, flush, and make the system ready for sampling and connecting. The Contractor will collect and transport the samples to the laboratory.

3.33.1.9.4. The Contractor shall ensure that no new or modified system is put into service until the agency approval/clearance letter has been received.

3.33.1.10 Irrigation:

3.33.1.10.1. Quality Assurance:

- 3.33.1.10.1.1.** Manufacturer Qualification: Provide underground irrigation system as a complete unit produced by acceptable manufacturer, including heads, valves, controls, and accessories.
- 3.33.1.10.1.2.** Location of heads shown in Landscaping Plans is approximate. Make minor adjustments as necessary to avoid plantings and other obstructions. Do not decrease number of heads indicated unless otherwise acceptable to Designer.
- 3.33.1.10.2.** Piping and Fittings:
 - 3.33.1.10.2.1.** Pressure Pipe: PVC plastic pipe, ASTM D 1785, Schedule 40, four (4) inches or smaller; four (4) inches or larger Class 200.
 - 3.33.1.10.2.2.** Circuit Pipe (downstream from circuit valves): PVC plastic pipe, ASTM D 1785, Schedule 40, not to be smaller than ¾ inch in size; reduce if required at the swing joint at the head.
 - 3.33.1.10.2.3.** Pipe Fittings: ASTM D 2466 socket fittings with ASTM D 2564 solvent cement.
- 3.33.1.10.3.** Valves: Automatic Circuit Valves: Glove valves operated by low-power solenoid, normally closed, manual flow adjustment.
- 3.33.1.10.4.** Sprinkler Heads: Manufacturer's standard unit designed to provide uniform coverage over entire area of spray shown on drawings at available water pressure, as follows:
 - 3.33.1.10.4.1.** Pop-Up Spray: Fixed pattern, with screw-type flow adjustment and stainless steel retraction spring. 1800 series plastic nozzles shall be used.
 - 3.33.1.10.4.2.** Pop-Up Rotary Spray: Gear drive, full circle and adjustable part-circle type.
 - 3.33.1.10.4.3.** Bubblers: Adjustable, point source flooding emitter, on flexible pipe. Bubblers to be on zone separate from sprays or rotors.
- 3.33.1.10.5.** Valve Box: South Eastern Meter Boxes or equal. Metal box two (2) inches x ten-and-a-half (10 ½) inches x ten (10) inches (2" x 10-½" x 10") with a foundation of cement block or equal. (Carson boxes acceptable.)
- 3.33.1.10.6.** Automatic Control System
 - 3.33.1.10.6.1.** General: Furnish low-voltage system manufactured expressly for control of automatic circuit valves of underground irrigation system. Provide unit of capacity to suit number of circuits as indicated, plus 20% extra stations for future use. (Not to exceed 80% of capacity.)
 - 3.33.1.10.6.2.** Rain Check: Auto interruption of watering cycle installed on timing device.
- 3.33.1.10.7.** Trenching and Backfilling:
 - 3.33.1.10.7.1.** General: Excavate straight and true with bottom uniformly sloped to low points.
 - 3.33.1.10.7.2.** Minimum Cover: Provide eighteen inches (18") minimum cover over top of main and twelve inches (12") cover over the lateral piping.
 - 3.33.1.10.7.3.** Backfill: Backfill with clean material from excavation. Remove organic material as well as rocks and debris larger than 1" diameter. Place acceptable backfill material in 6" lifts, compacting each lift.
 - 3.33.1.10.7.4.** Sleeving: Place sleeves under paving, walkways, and other obstructions during their construction. Jacking piping under sidewalks and paving shall only be done where the obstruction pre-exists the project.
- 3.33.1.10.8.** Installation:

- 3.33.1.10.8.1.** General: Unless otherwise indicated, comply with requirements of Uniform Plumbing Code.
- 3.33.1.10.8.2.** Connection to Main: Install a manual valve at every point of connection to main.
- 3.33.1.10.8.3.** Circuit Valves: Install in valve box, arranged for each adjustment and removal. A manual valve must be in front of each automatic valve.
- 3.33.1.10.8.4.** Wiring: Use multi-strand with a separate, 14-gauge neutral. Maintain a color coded wire to be run in purple or reclaimed water pipe with electrical type fittings and electrical type junction boxes or valve boxing.
- 3.33.1.10.8.5.** Electrical Connections: Use recommended weatherproof type wire connections.
- 3.33.1.10.8.6.** Piping: Lay pipe on solid subbase, uniformly sloped without humps or depressions. Install PVC pipe in dry weather when temperature is above 40 degrees F (4 degrees C) in strict accordance with the manufacturer's instructions, using purple primer on all pipes and fittings. Allow joints to cure at least twenty-four (24) hours at temperature above 40 degrees F (4 degrees C) before testing, unless otherwise recommended by the manufacturer.
- 3.33.1.10.8.7.** Piping not to be within one foot of sidewalks or curbing.
- 3.33.1.10.8.8.** Sprinkler Heads: Flush circuit lines with full head of water and install after hydrostatic test is completed. Install lawn spray heads at manufacturer's recommended heights, using flex pipe. An eighteen inch (18") length of flex pipe shall be used for each head to allow adjustments (swing joint). Locate all heads to maintain a minimum distance of four inches (4") from walls and four inches (4") from other boundaries, unless otherwise indicated. Exposed spray head risers to be painted dark green. Install rotor type sprinklers at manufacturer's recommended heights, using flex pipe. A twenty-four inch (24") length of flex pipe shall be used for each head to allow adjustments (swing joint). Upon completion of grading, sodding, and rolling of sod areas, carefully adjust lawn sprinkler heads so they will be flush with, or not more than ½ inch above, finish grade.
- 3.33.1.10.9.** Testing:
 - 3.33.1.10.9.1.** General: Notify Owner or his representative in writing when testing will be conducted. Conduct tests in Owner's presence.
 - 3.33.1.10.9.2.** Hydrostatic Test: Test water piping and valves before backfilling trenches to a hydrostatic pressure of not less than 150 PSI. Piping may be tested in sections to expedite work. Remove and repair piping, connections, and valves that do not pass hydrostatic testing. Test pressure must be held for a minimum of two (2) hours.
 - 3.33.1.10.9.3.** Operational Testing: Perform operational testing after backfill and sod is in place, and sprinkler heads are adjusted to their final position. Demonstrate to Owner or his representative that system meets coverage requirements and automatic controls function properly. Provide drawing to assist in demonstration.

Head to head coverage requirements are based on operation of one circuit at a time and the GPM of the valve system to maintain recommended five (5) feet per second. Maintain head-to-head coverage.

Table of Contents – Appendix

4. APPENDIX.....4-2

4.1. Drawings.....4-2

4.1.1. Classrooms4-2

4.1.2. Offices4-8

4.1.3. Conference Rooms.....4-14

4.1.4. Employee Break Room4-17

4.1.5. Work Room4-17

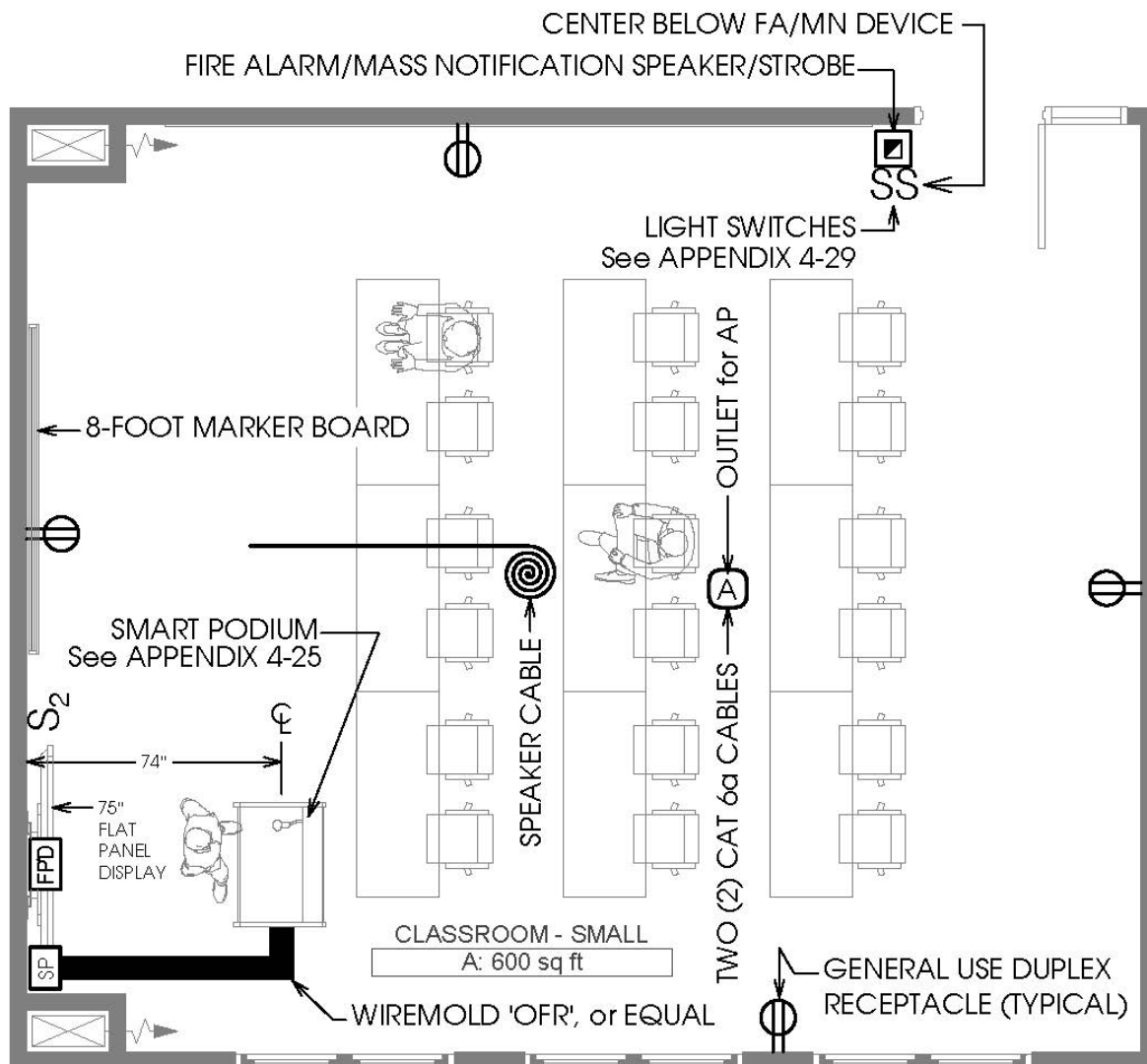
4.1.6. Electrical/Telecommunications/Security Details.....4-18

4. APPENDIX

4.1. Drawings

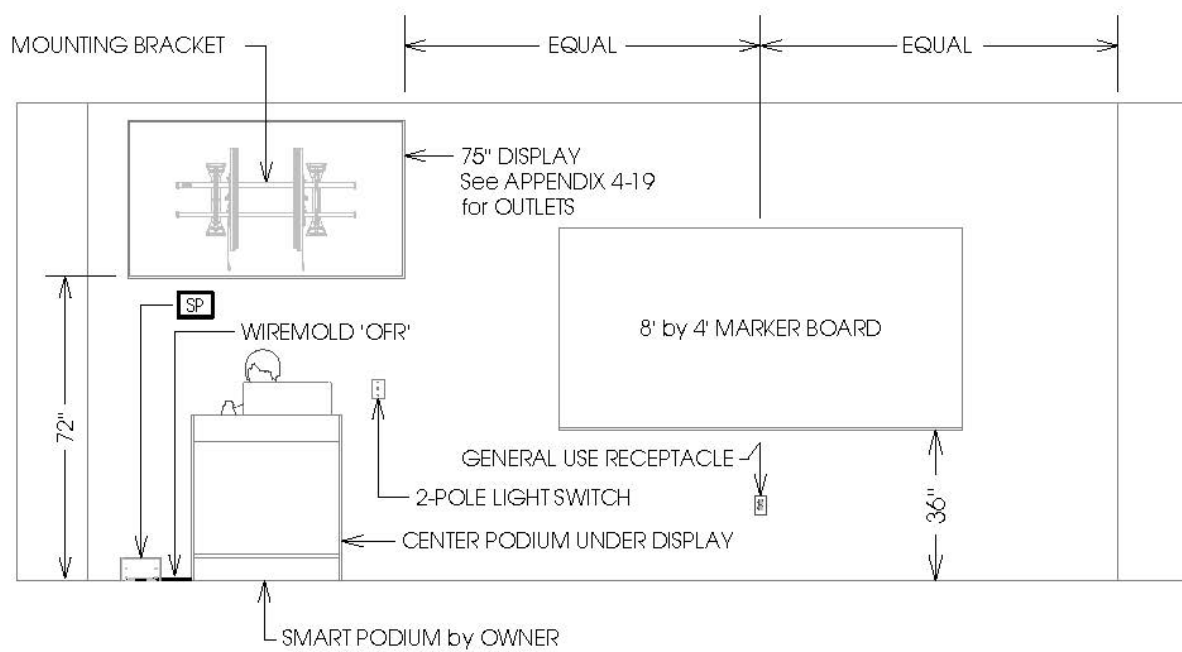
4.1.1. Classrooms

4.1.1.1. Small



PLAN: SMALL CLASSROOM

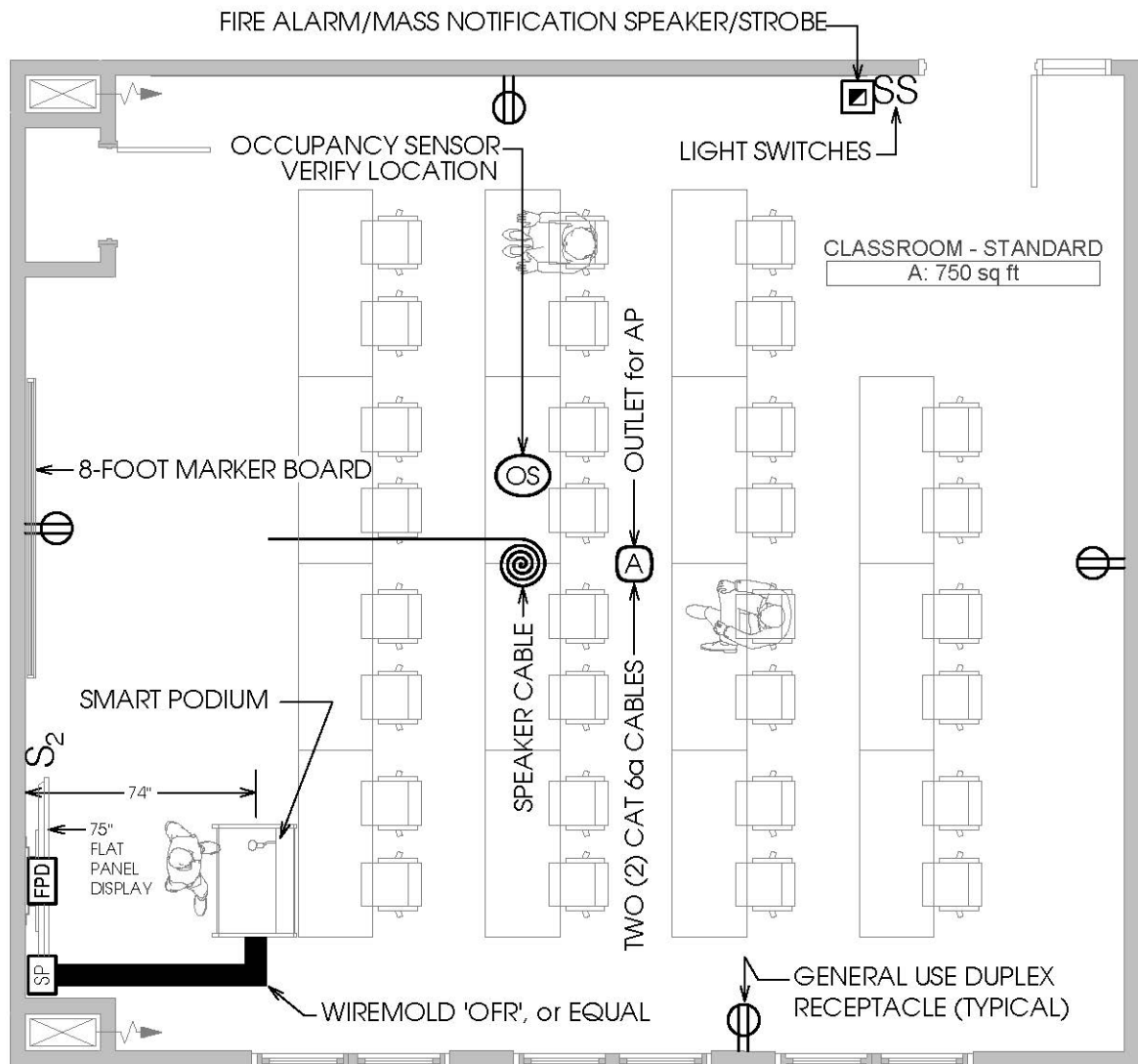
Not To Scale



ELEV: SMALL CLASSROOM

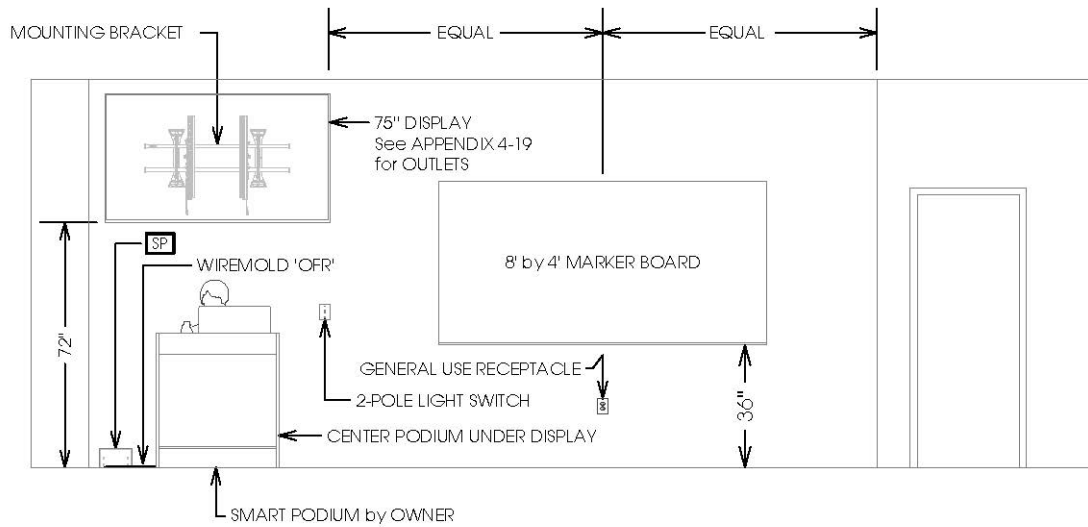
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4.1.1.2. Standard



PLAN: STANDARD CLASSROOM

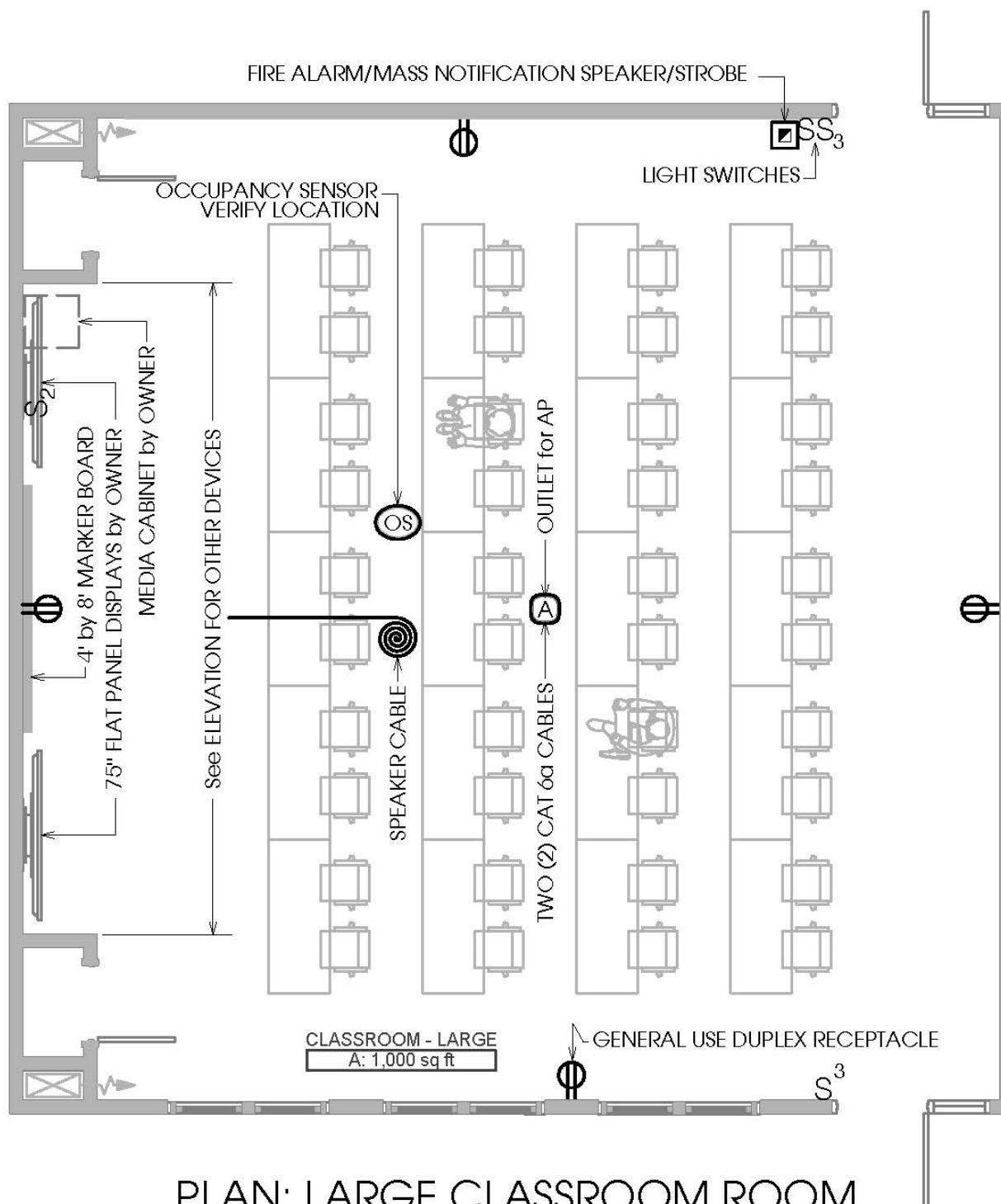
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ELEV: STANDARD CLASSROOM

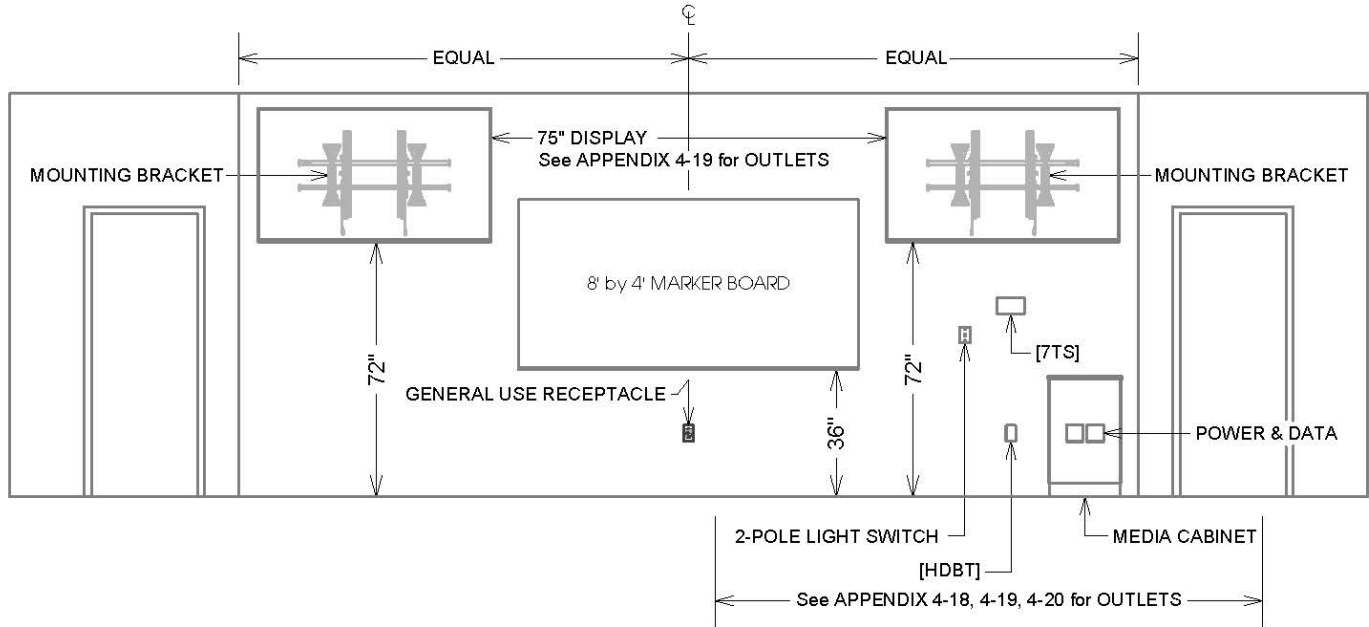
Not To Scale

4.1.1.3. Large



PLAN: LARGE CLASSROOM ROOM

Not To Scale

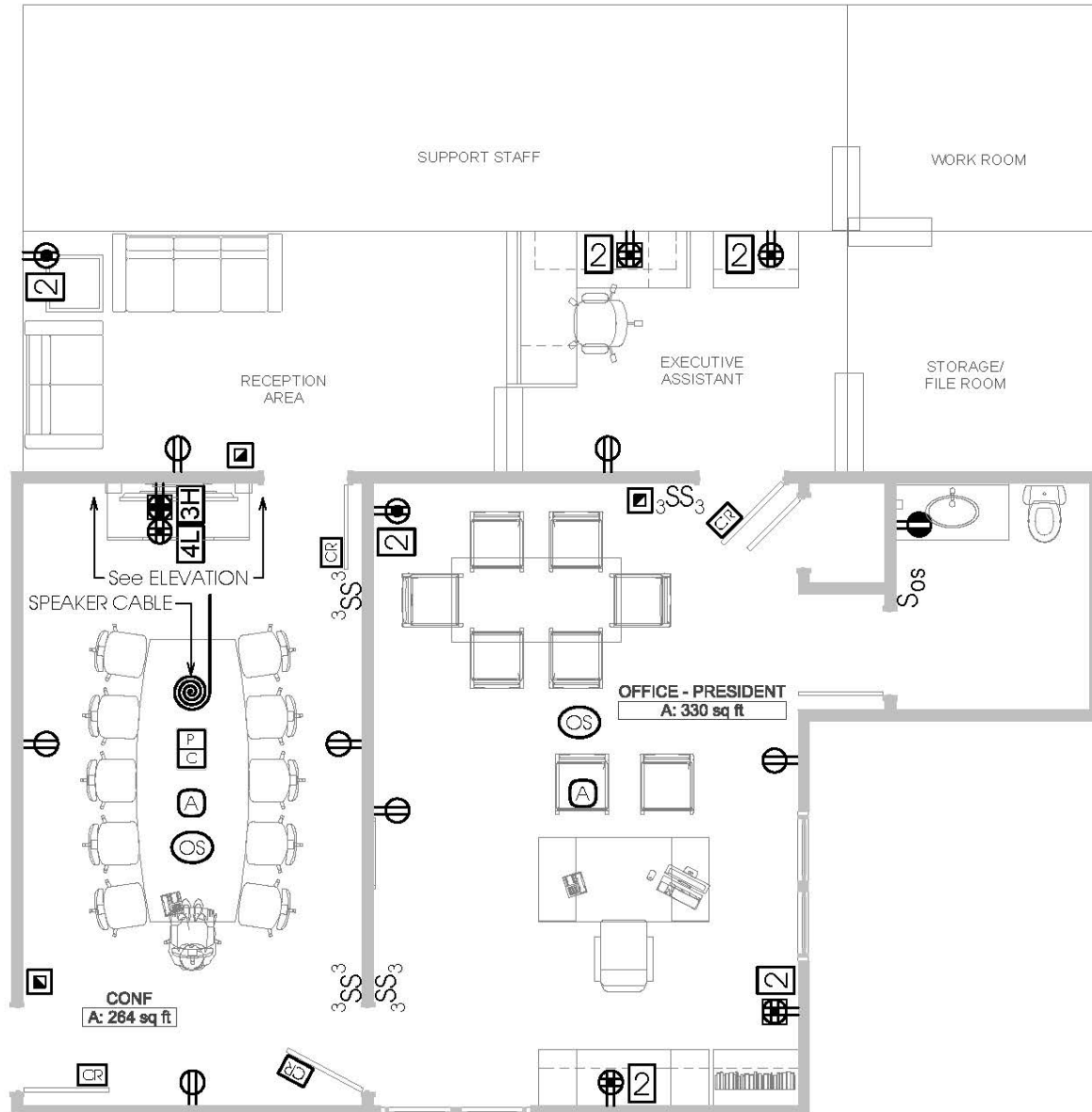


ELEVATION: LARGE CLASSROOM

Not To Scale

4.1.2. Offices

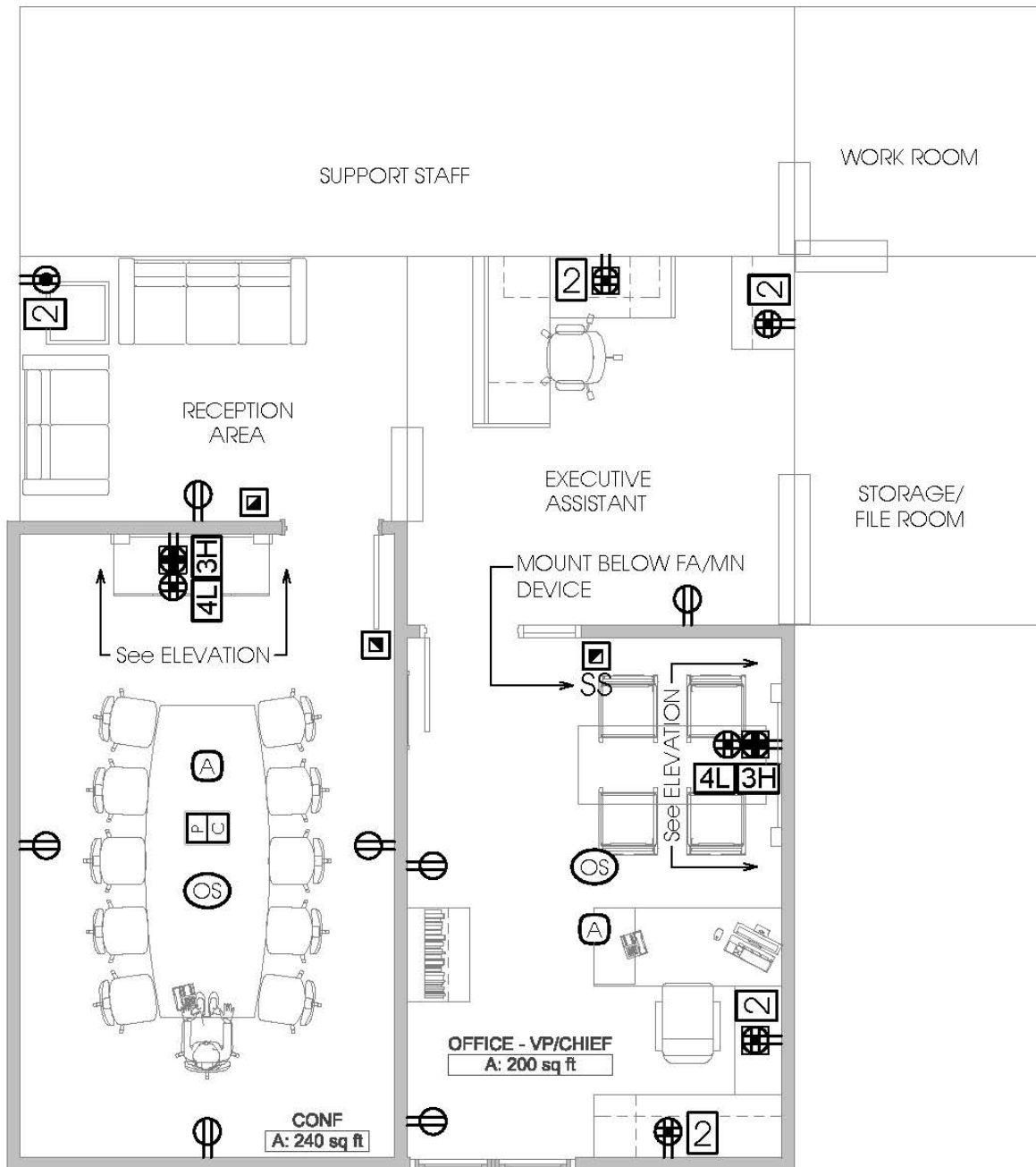
4.1.2.1. President Office



PLAN: PRESIDENT OFFICE

Not To Scale

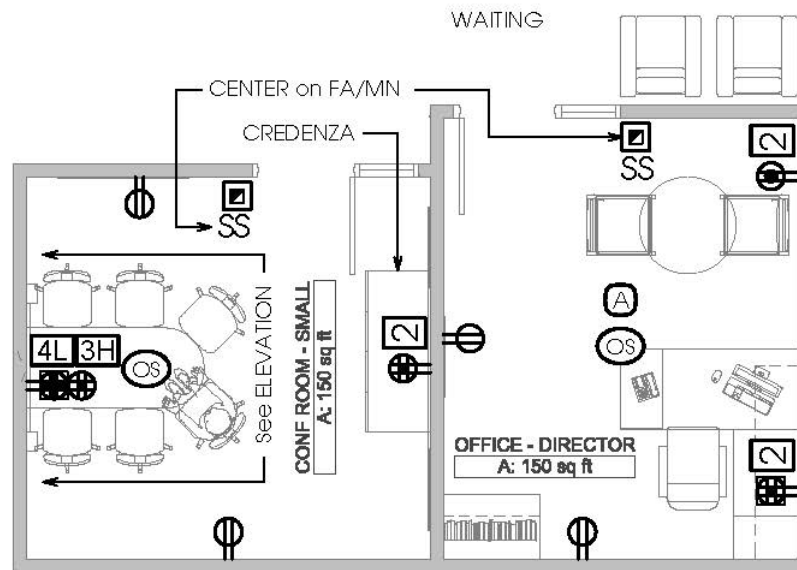
4.1.2.2. VP/Chief Office



PLAN: VP/CHIEF OFFICE

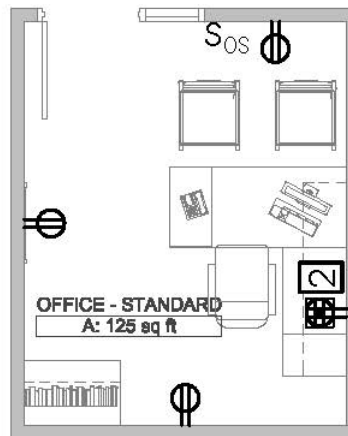
Not To Scale

4.1.2.3. AVP/Supervising Director/Dean Office
Standard (Sr Admin/Program Chair)



PLAN: AVP/SUPERVISING DIRECTOR/DEAN OFFICE

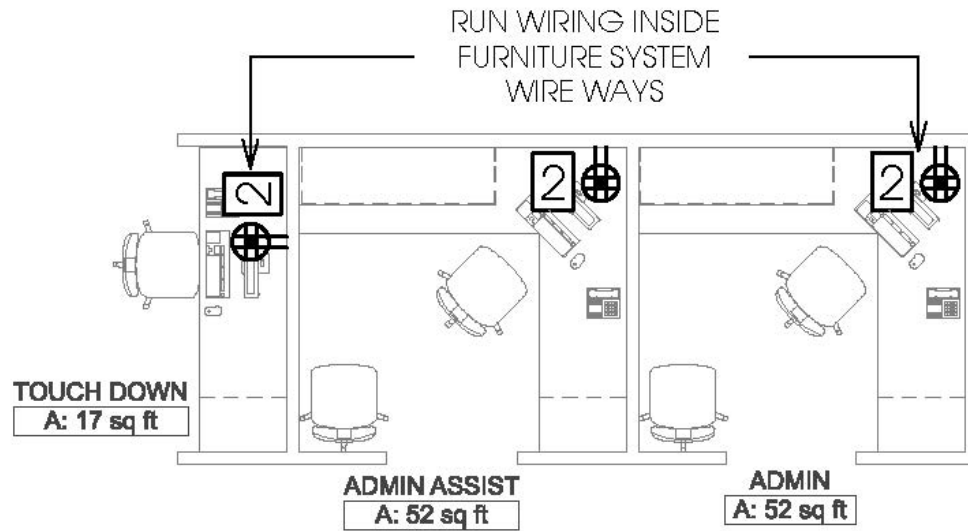
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PLAN: STANDARD (SR ADMIN/PROGRAM CHAIR)

Not To Scale

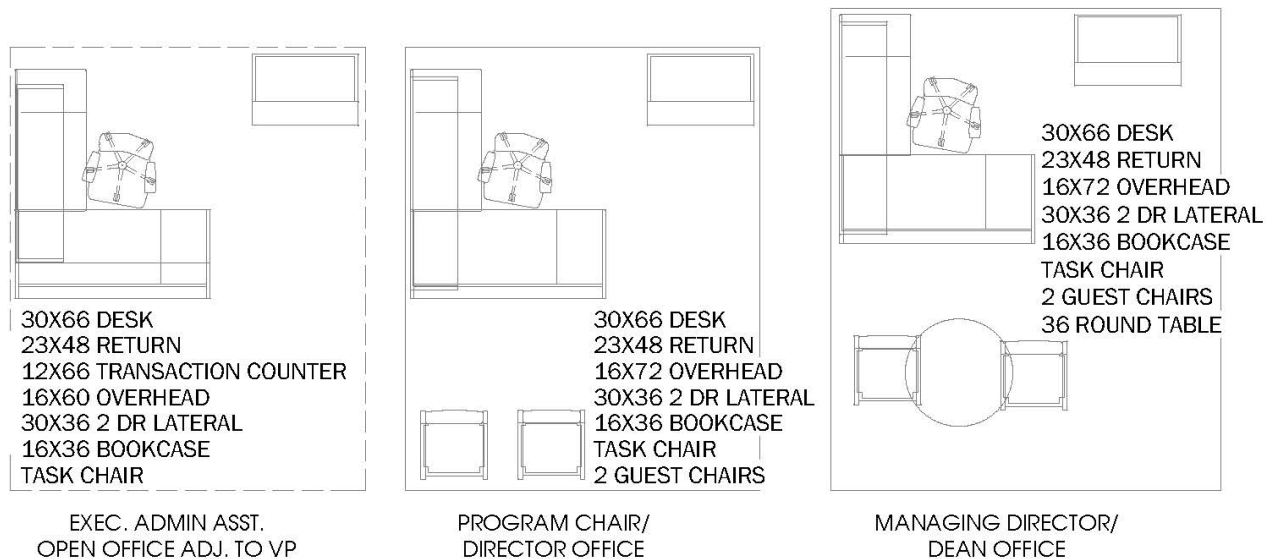
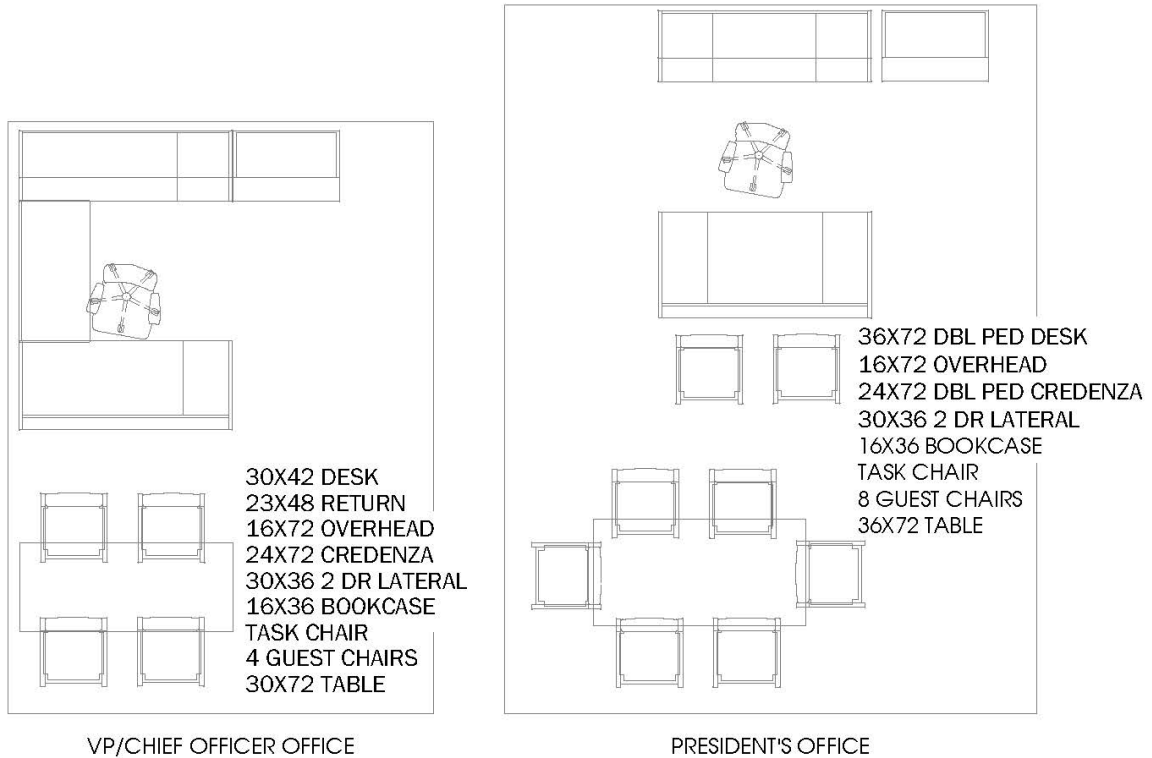
4.1.2.4. Open Office



PLAN: OPEN OFFICES

Not To Scale

4.1.2.5. Private Offices

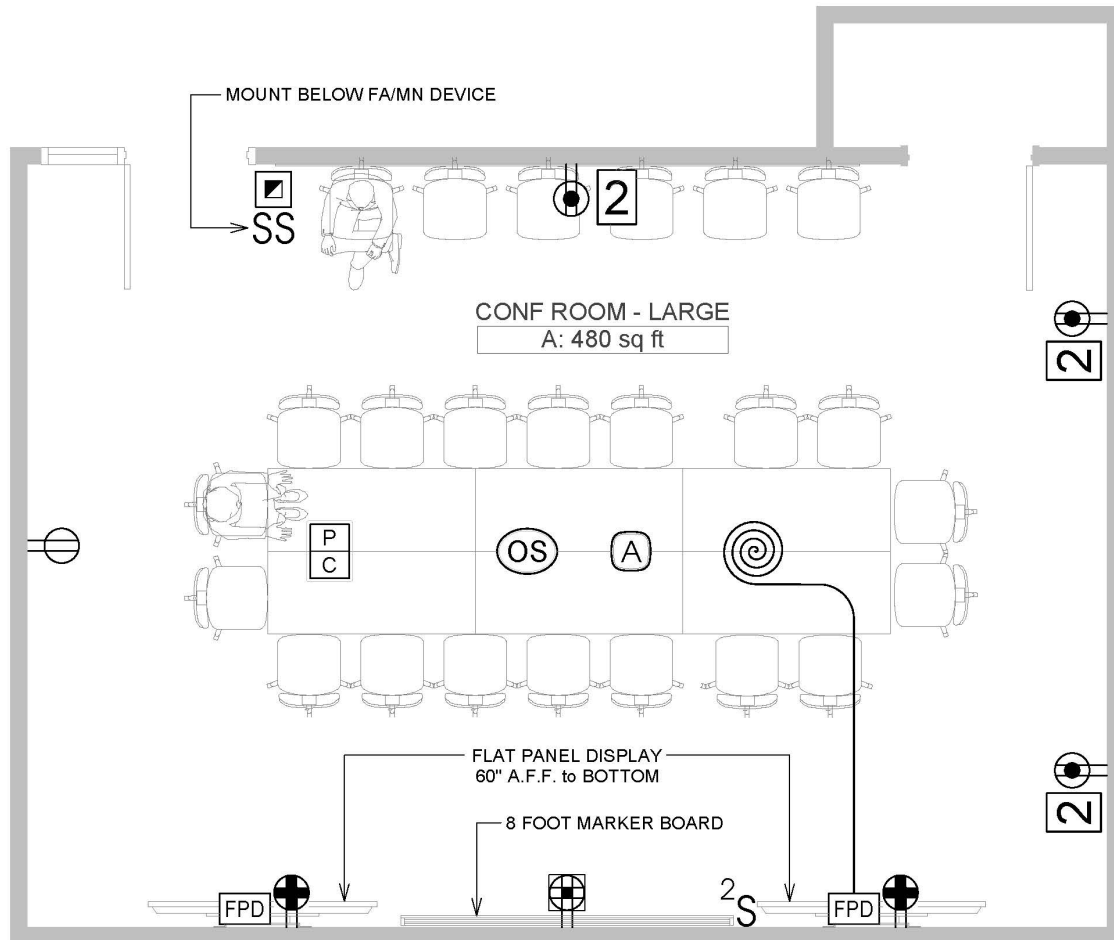


PLANS: PRIVATE OFFICES

Not To Scale

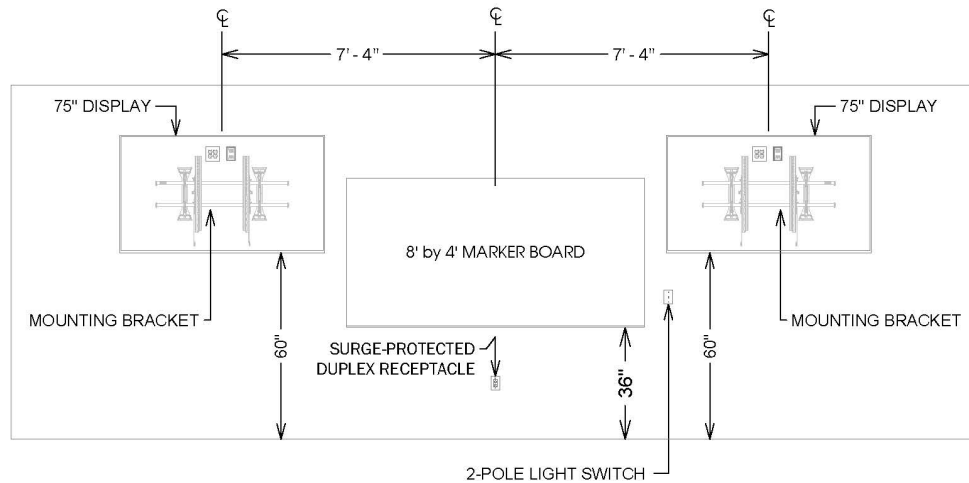
4.1.3. Conference Rooms

4.1.3.1. Large Conference Room



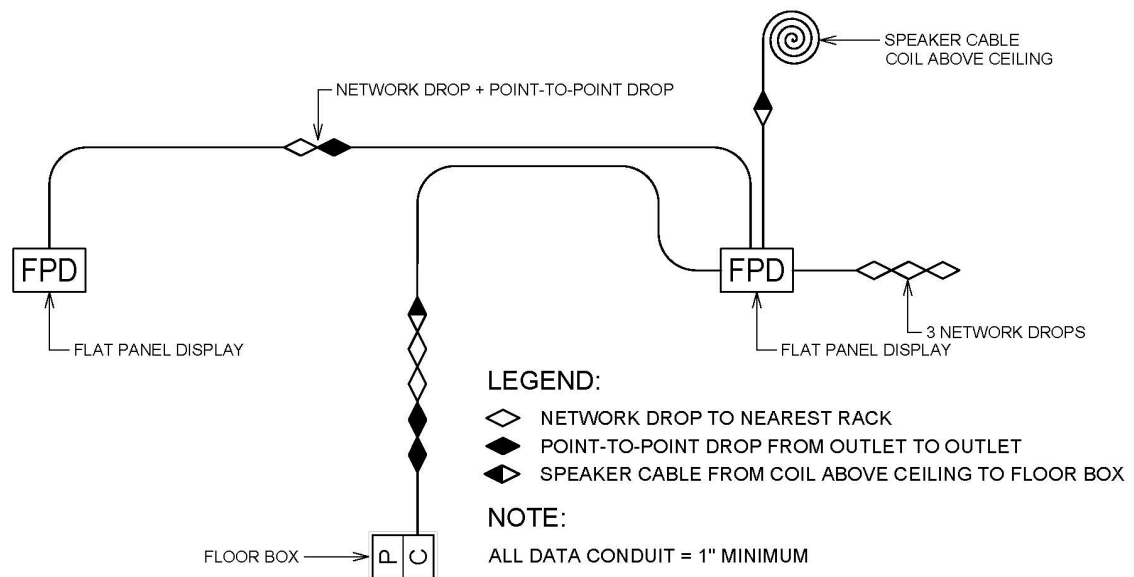
PLAN: LARGE CONFERENCE ROOM

Not To Scale



ELEVATION: LARGE CONFERENCE ROOM

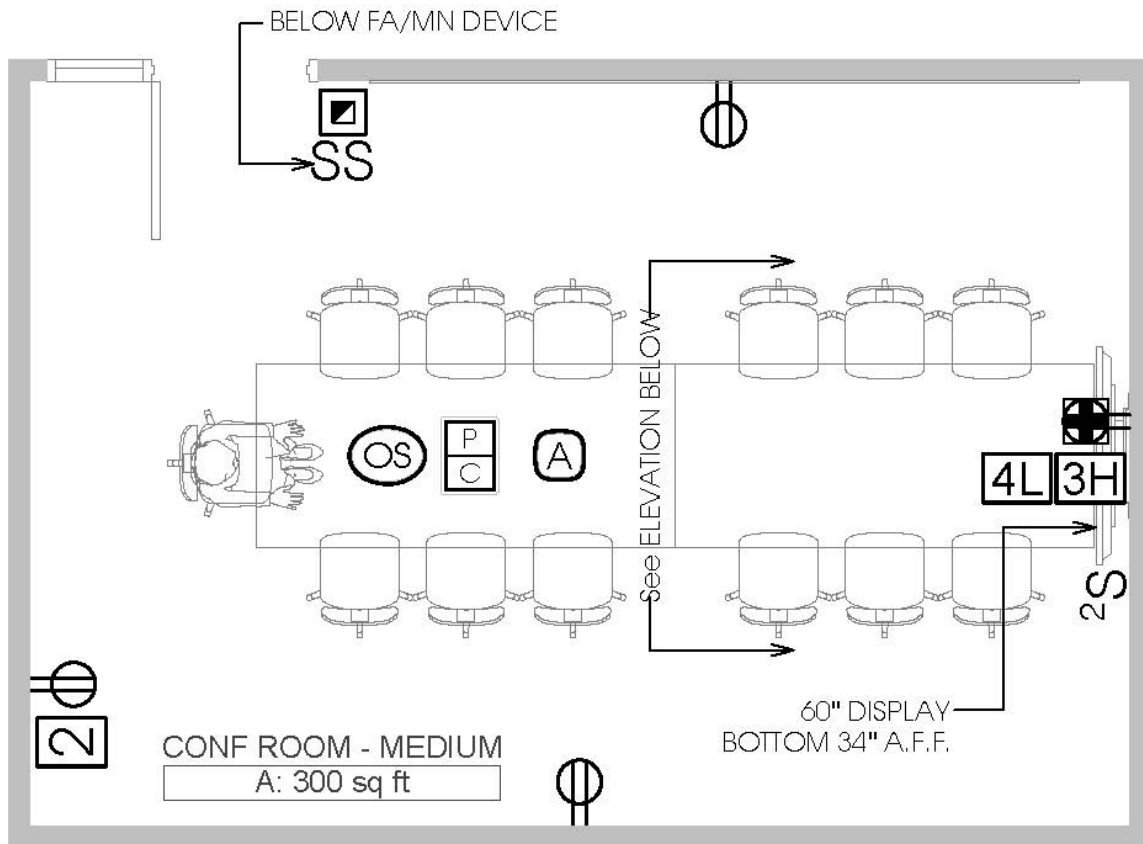
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DATA WIRING: LARGE CONFERENCE ROOM

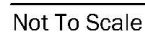
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4.1.3.2. Medium Conference Room

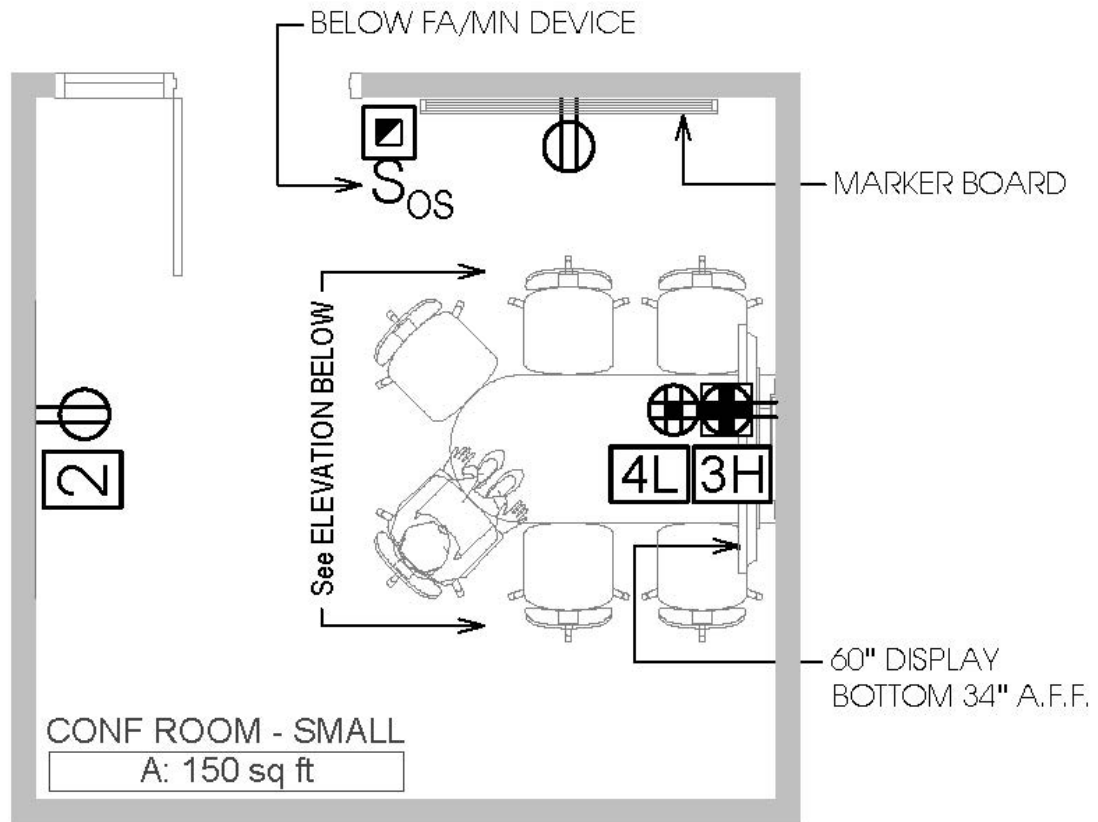


PLAN: MEDIUM CONFERENCE ROOM

Not To Scale

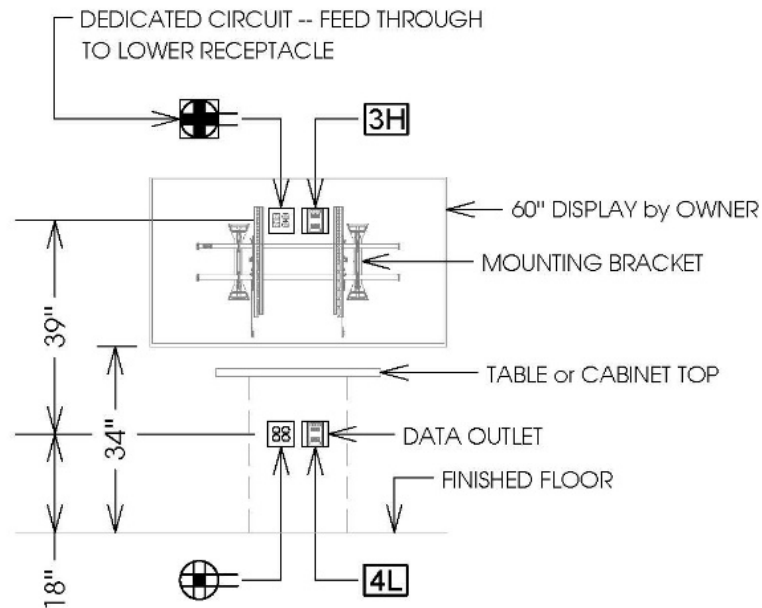


4.1.3.3. Small Conference Room



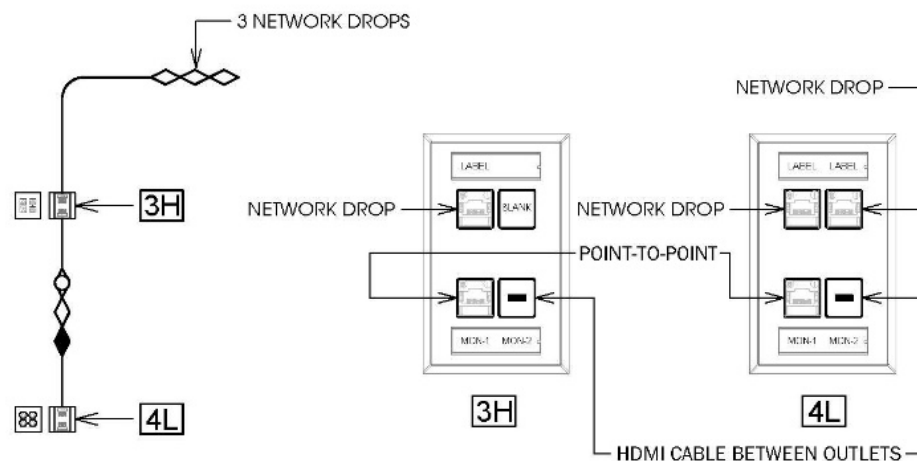
PLAN: SMALL CONFERENCE ROOM

Not To Scale



ELEV: SMALL CONFERENCE ROOM

Not To Scale



LEGEND:

- ◇ NETWORK DROP TO NEAREST RACK
- ◆ POINT-TO-POINT DROP FROM (3L) TO (4L)
- ◊ HDMI CABLE FROM (3H) TO (4L)

NOTE:

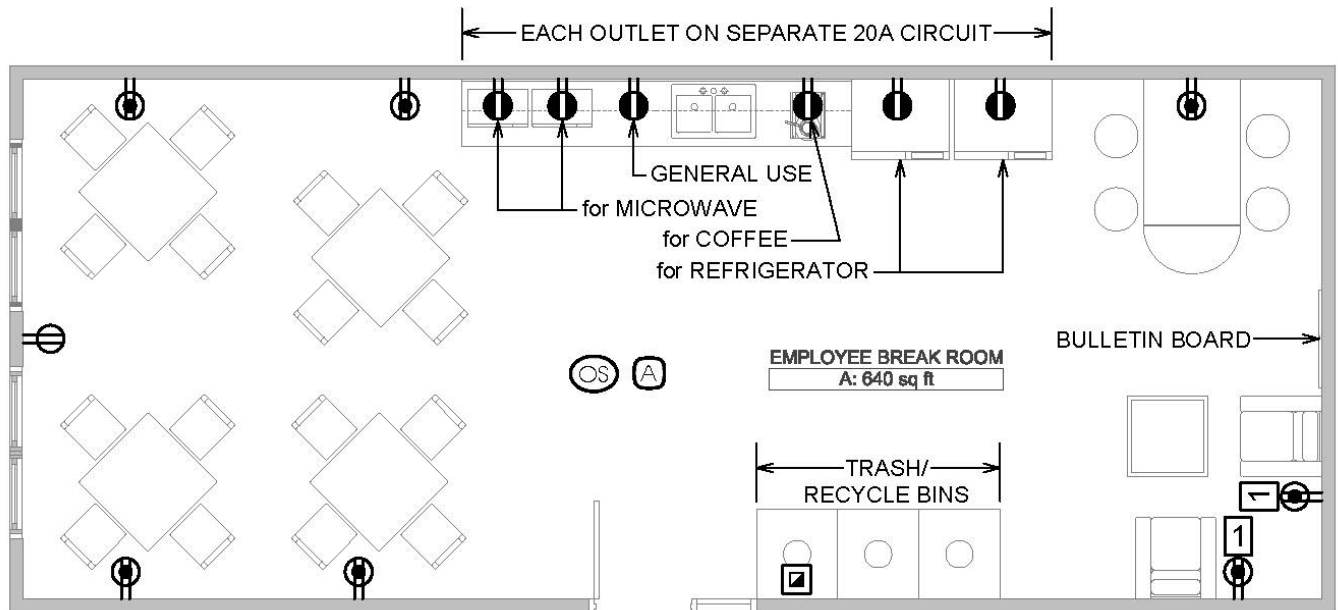
ALL DATA CONDUIT = 1" MINIMUM

DATA WIRING: SMALL CONFERENCE ROOM

Not To Scale

4.1.4. Employee Break Room

4.1.4.1. Employee Break Room

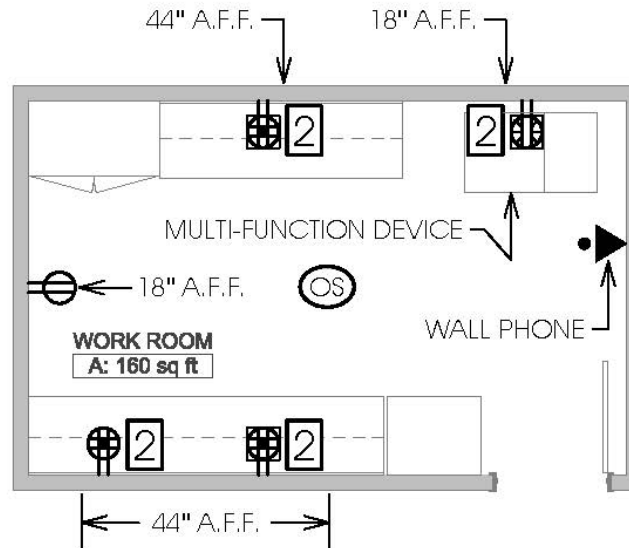


PLAN: EMPLOYEE BREAK ROOM

Not To Scale

4.1.5. Work Room

4.1.5.1. Work Room

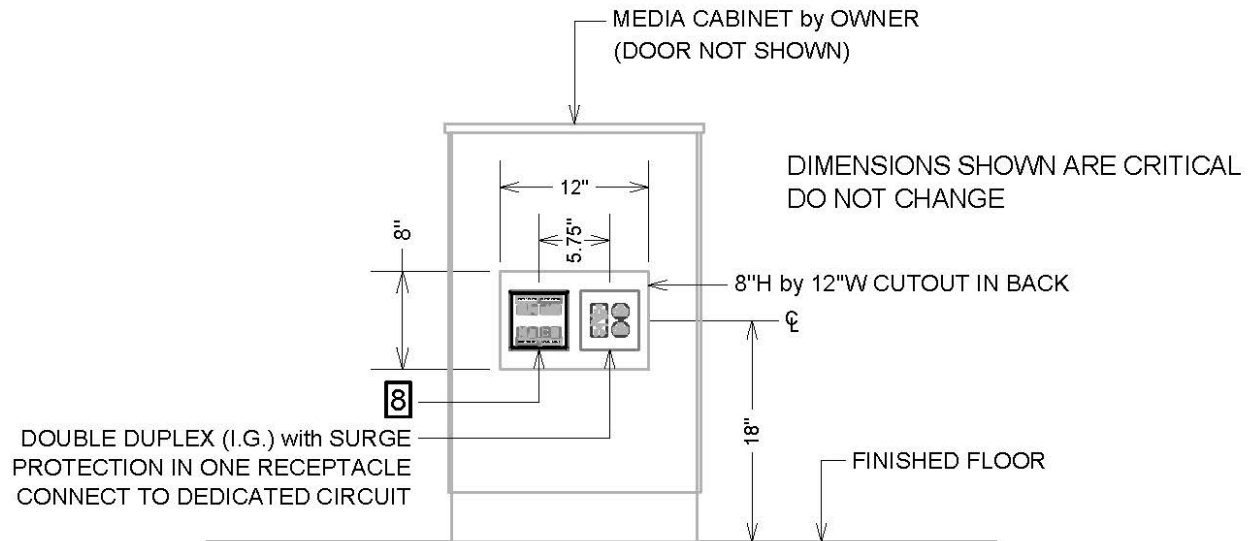


PLAN: WORK ROOM

Not To Scale

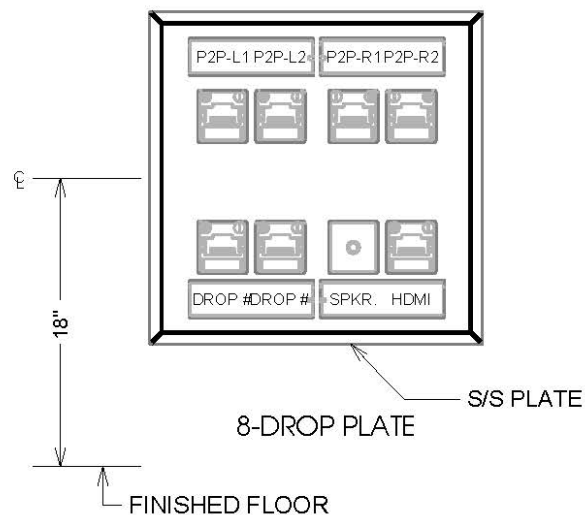
4.1.6. Electrical/Telecommunications/Security

4.1.6.1. Detail 1



DETAIL: MEDIA CABINET OUTLETS

Not To Scale



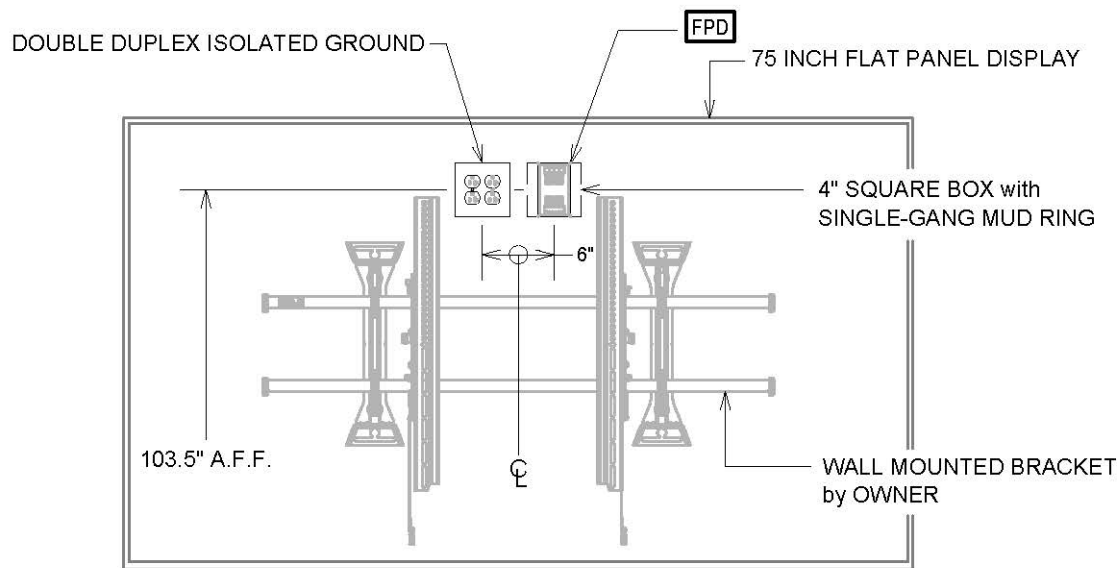
NOTE

OUTLET BOX & CONDUIT FURNISHED & INSTALLED by ELEC. CONTR.
2-GANG BOX WITH 2-GANG MUD RING & TWO (2) 1" C TURNED UP

DETAIL: MEDIA CABINET DATA OUTLET 8

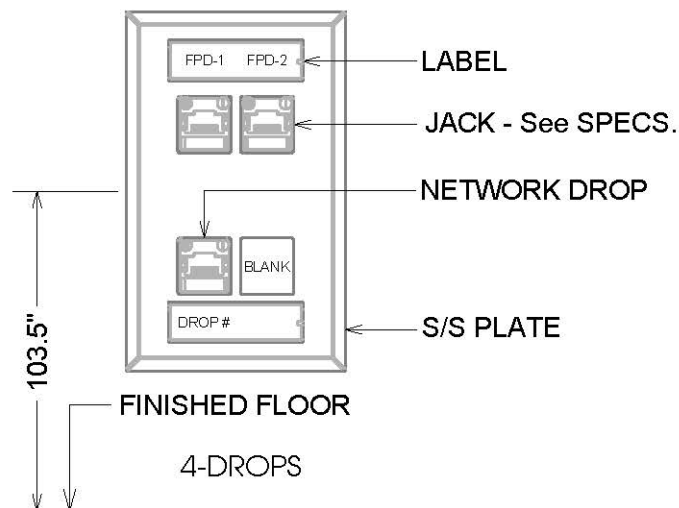
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4.1.6.2. Detail 2



DETAIL: 75 INCH DISPLAY INSTALLATION

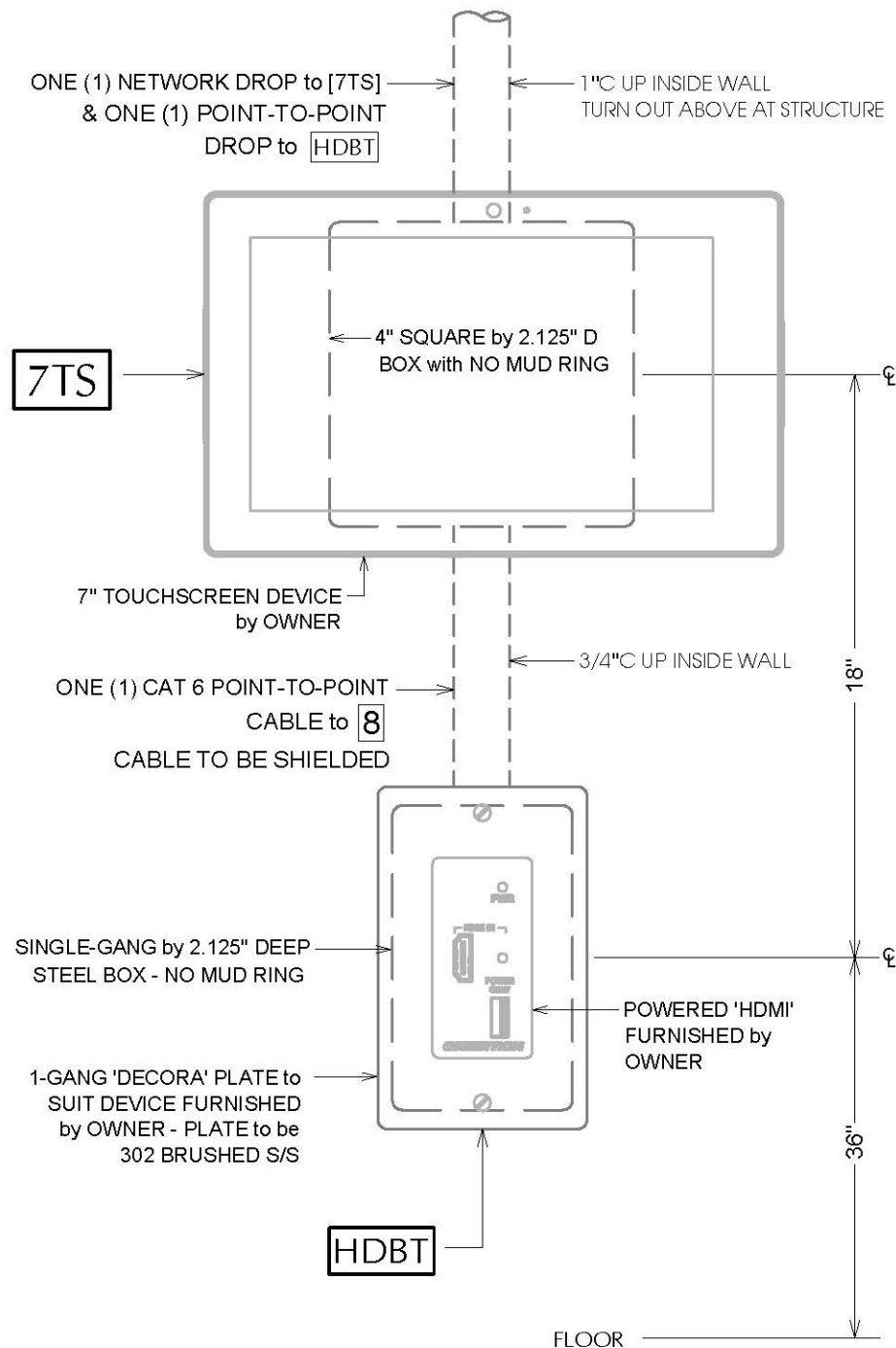
Not To Scale



DETAIL: FLAT PANEL DISPLAY DATA OUTLET FPD

Not To Scale

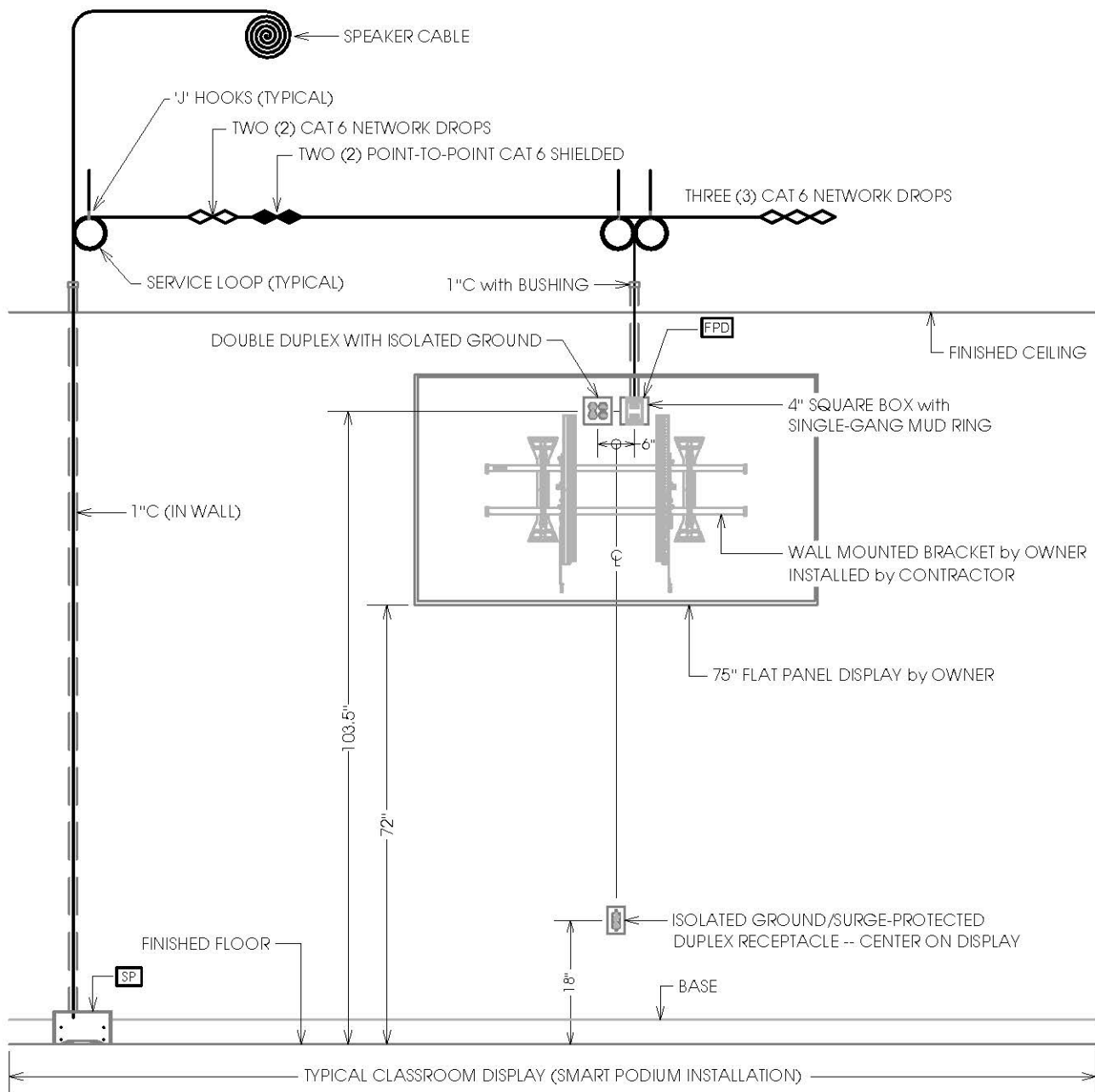
4.1.6.3. Detail 3



DETAIL: MEDIA CABINET

Not To Scale

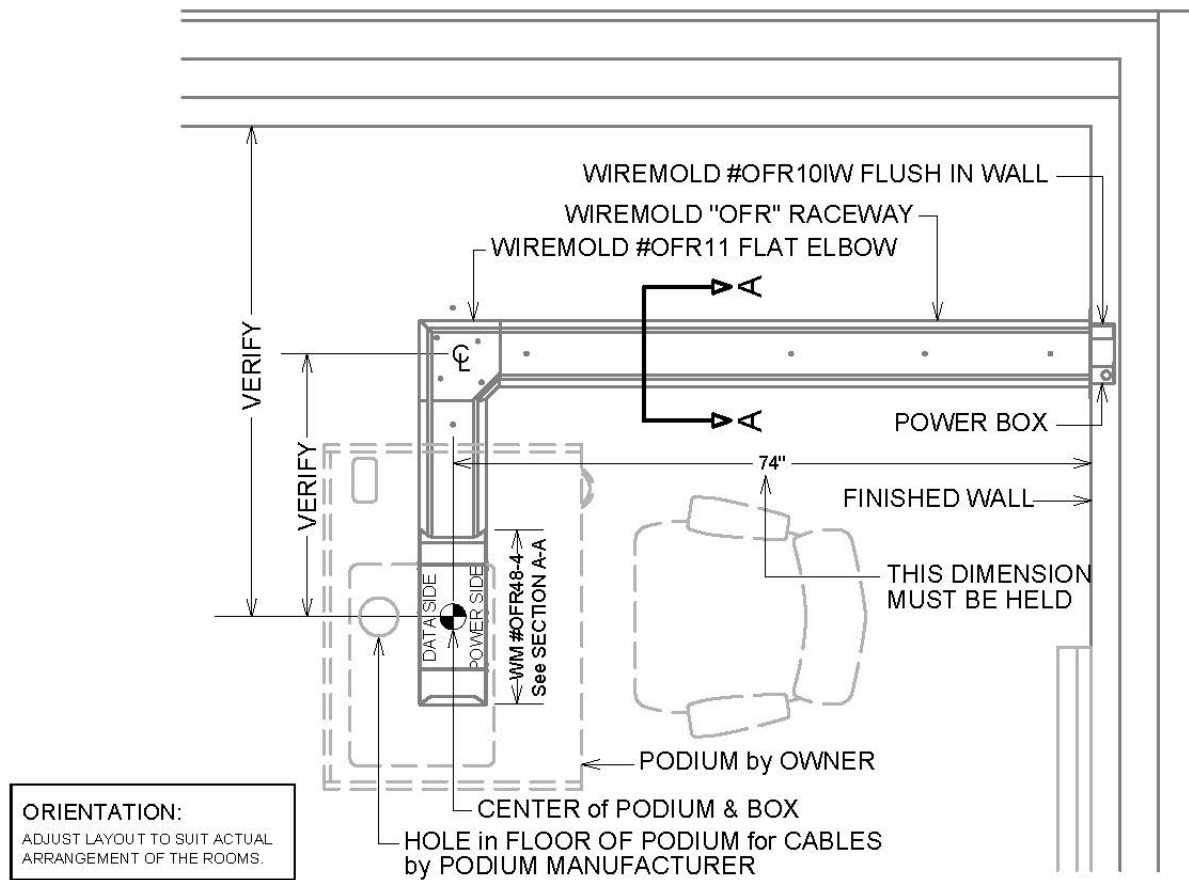
4.1.6.4. Detail 4



DETAIL: FLAT PANEL DISPLAY CONNECTIONS

Not To Scale

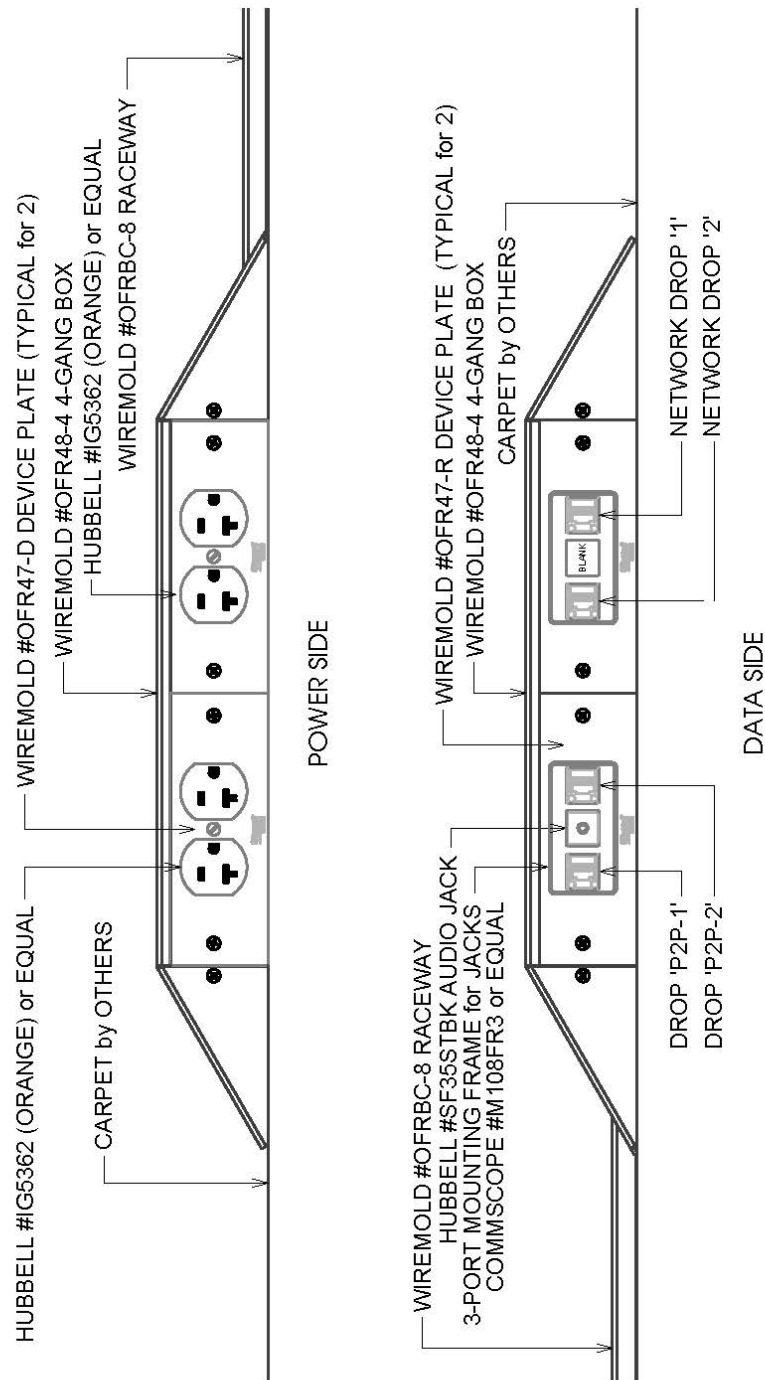
4.1.6.5. Detail 5



DETAIL: SMART PODIUM INSTALLATION

Not To Scale

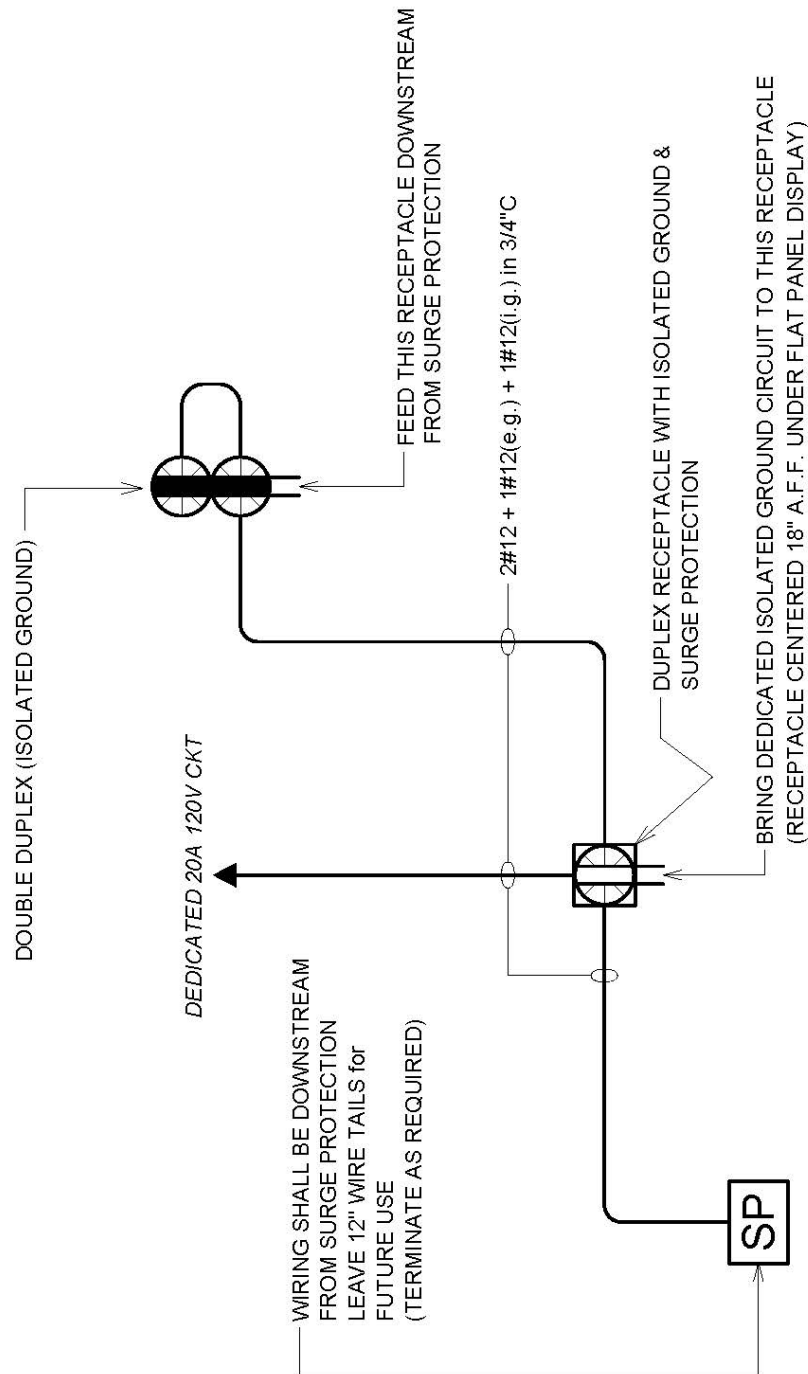
4.1.6.6. Detail 6



DETAIL: 4-GANG FLOOR BOX UNDER PODIUM

Not To Scale

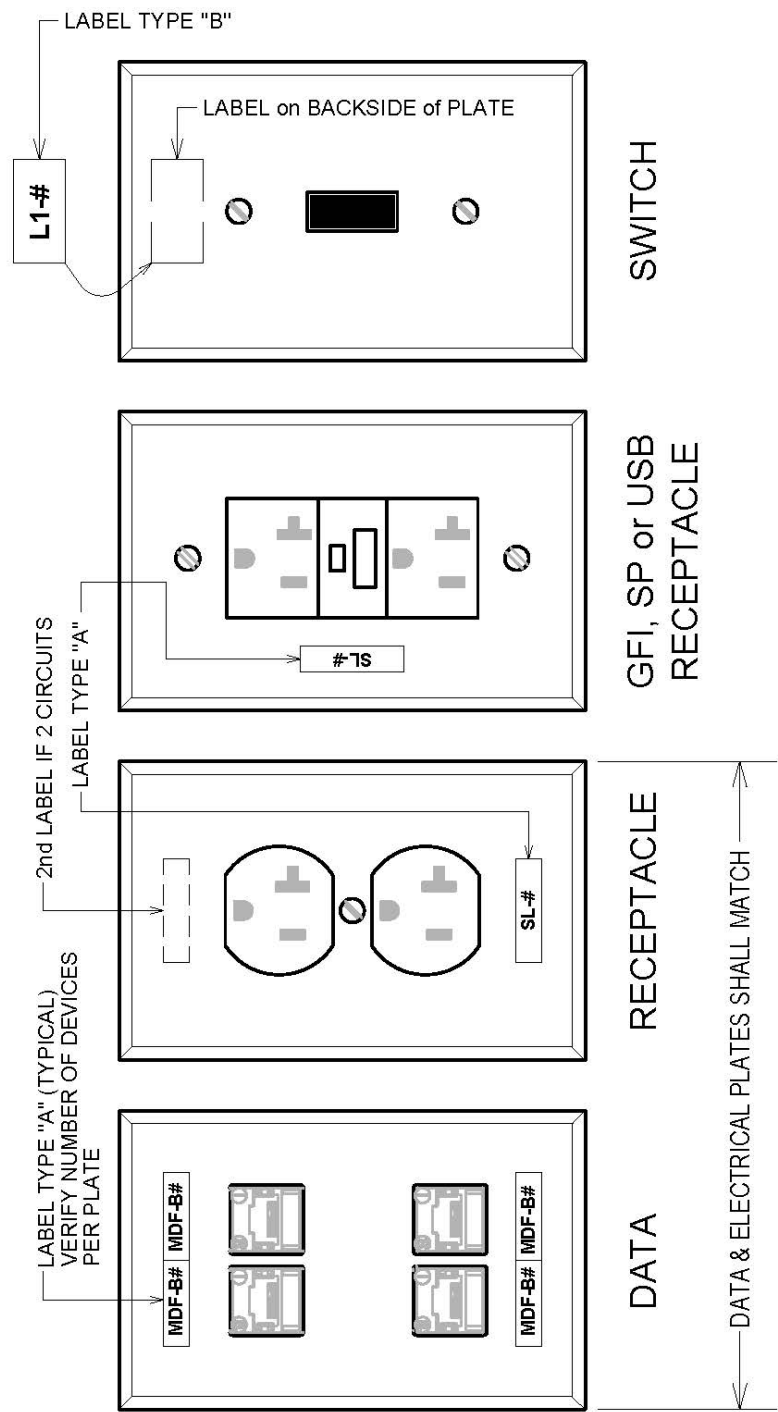
4.1.6.7. Detail 7



DETAIL: WIRING FOR CLASSROOM DISPLAY

Not To Scale

4.1.6.8. Detail 8



COLOR LEGEND

SYSTEM	COLOR
208GY120V	BLUE BASE with WHITE LETTERS
480GY277V	BLACK BASE with WHITE LETTERS
EMERGENCY	GREEN BASE with WHITE LETTERS
FIRE ALARM	RED BASE with WHITE LETTERS
DATA	WHITE BASE with BLACK LETTERS

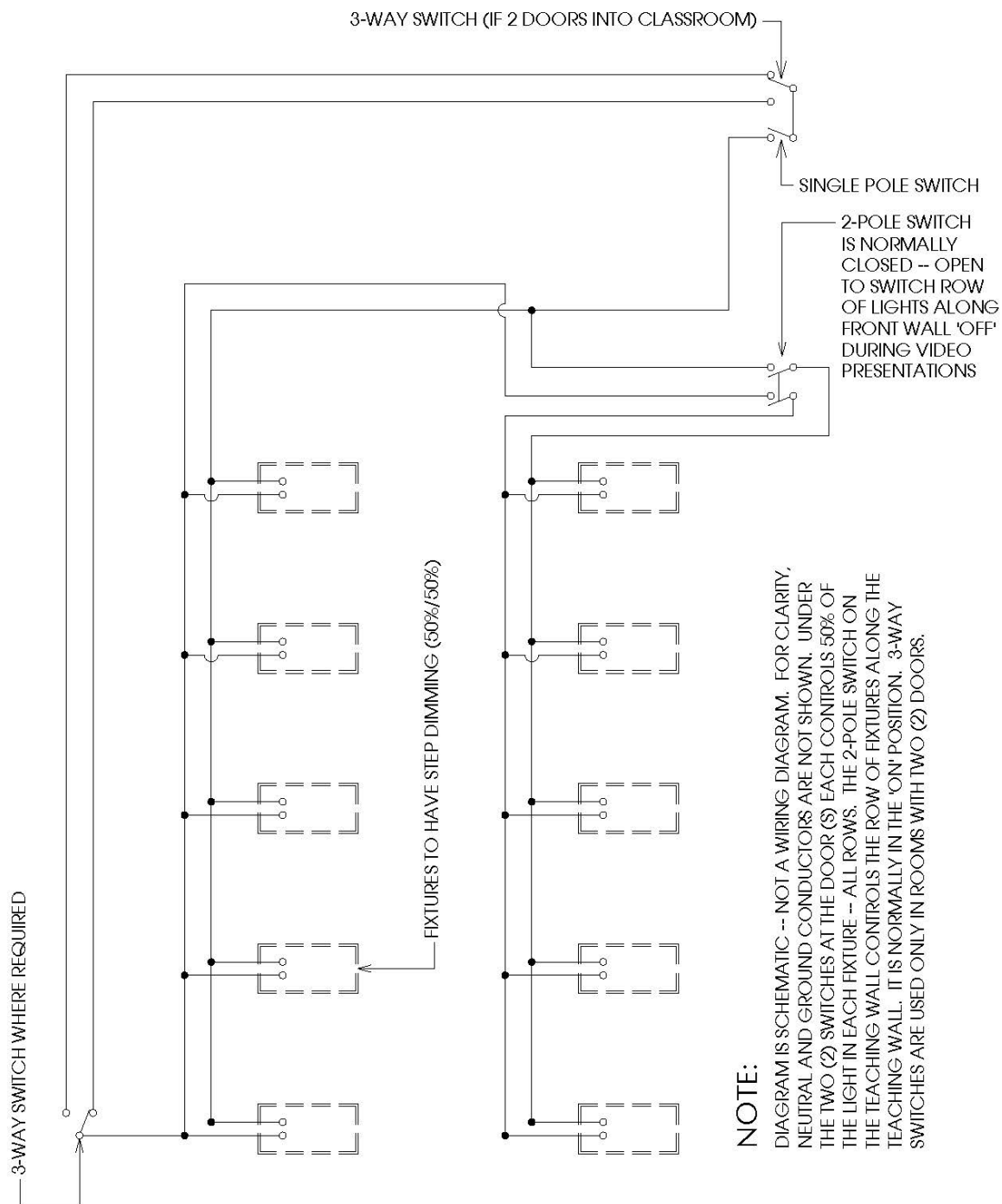
LABEL LEGEND

	L1-21 = TYPE "A" LABEL: ENGRAVED NAMEPLATE WITH 1/8" HIGH LETTERS ATTACH TO PLATE WITH UHB DOUBLE STICK TAPE (SUBMIT ULTRA-HIGH BOND TAPE TO BE USED) USE TEMPLATE or GUIDE TO CENTER & ALIGN LABEL PLATE SHALL BE 1/16" THICK WITH WHITE COOR PLATE COLOR SHALL MATCH COLOR CODE LEGEND.
	L1-33 = TYPE "B" LABEL: P-TOUCH (or EQUAL) NAMEPLATE WITH 3/16" HIGH LETTERS. ATTACH TO PLATE WITH ADHESIVE BACK. USE TEMPLATE or GUIDE TO CENTER & ALIGN LABEL. LABEL MATERIAL SHALL HAVE WHITE LETTERS. BACK- GROUND COLOR SHALL MATCH COLOR CODE LEGEND.

DETAIL: DEVICE PLATE IDENTIFICATION

Not To Scale

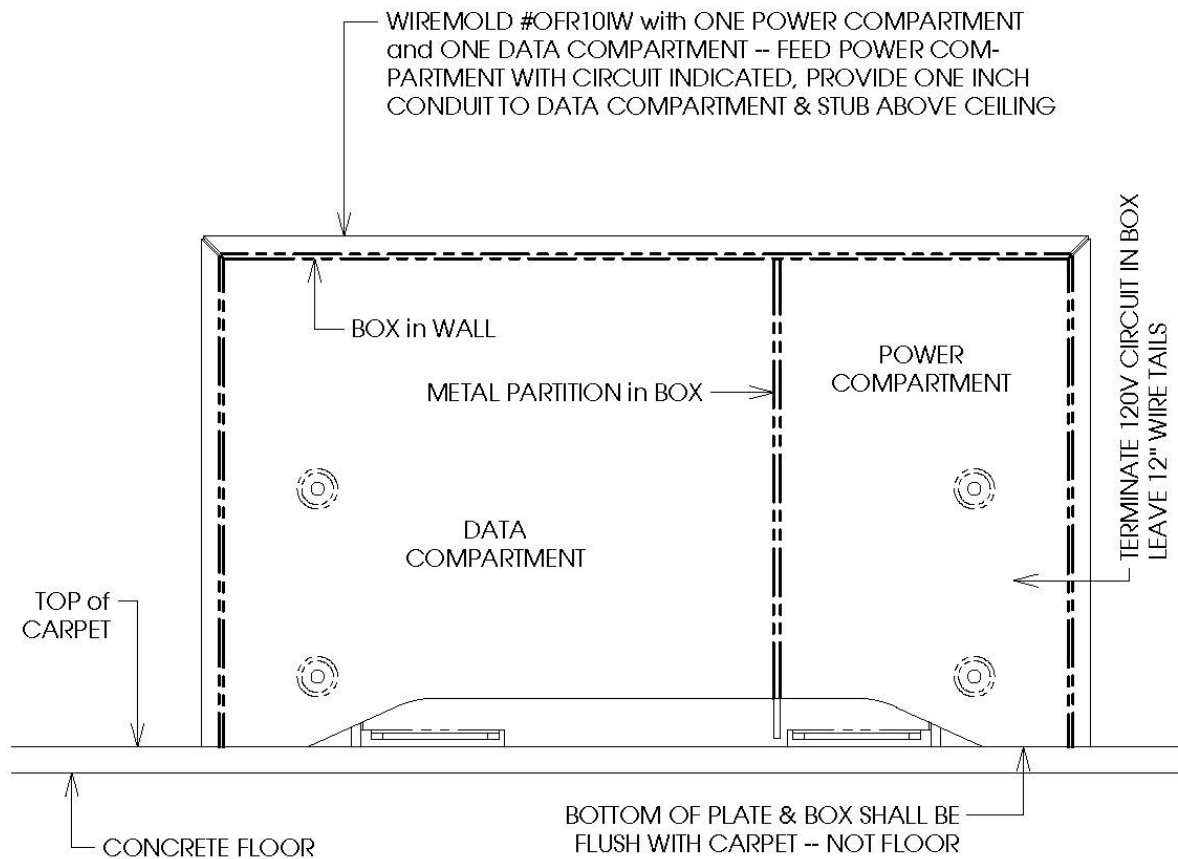
4.1.6.9. Detail 9



DETAIL: LIGHTING CONTROL FOR CLASSROOMS

Not To Scale

4.1.6.10. Detail 10



DETAIL: WALL CONNECTOR FOR 'OFR'

SP

Not To Scale

4.1.6.11. Legend

ELECTRICAL/TELECOMMUNICATIONS/SECURITY LEGEND:

	DUPLEX RECEPTACLE, GRAY, 20A, 18" A.F.F.
	DUPLEX RECEPTACLE, GRAY + GFIC, 20A, 42" A.F.F.
	DUPLEX RECEPTACLE, GRAY + USB, 20A, 18" A.F.F.
	DOUBLE DUPLEX RECEPTACLE, ISOLATED GROUND, GRAY, 20A, 18" A.F.F.
	SAME AS ABOVE EXCEPT 44" A.F.F.
	DOUBLE DUPLEX RECEPTACLE, ISOLATED GROUND, INTEGRAL SURGE PROTECTION, GRAY, 20A, 18" A.F.F.
	SAME AS ABOVE EXCEPT 44" A.F.F.
	DATA OUTLET FOR WALL PHONE, 1 CAT 6 DROP, 48" A.F.F.
	DATA OUTLET: 2 DROPS, 18" A.F.F. UNLESS NOTED OTHERWISE TWO (2) CAT 6 NETWORK DROPS
	CARD READER/HARDWARE: ALLEGION AD-300 in NEW BUILDINGS; AD-400 in EXISTING BUILDINGS
	FLOOR BOX with POWER & DATA WIREMOLD 'EVOLUTION' SERIES
	OUTLET for AP: 2 CAT 6a NETWORK DROPS
	1-POLE SWITCH, 10A, GRAY, 48" A.F.F.
	2-POLE SWITCH, 20A, GRAY, 48" A.F.F.
	3-WAY SWITCH, 20A, GRAY, 48" A.F.F.
	1-POLE SWITCH, 20A, GRAY with INTEGRAL OCCUPANCY SENSOR, 48" A.F.F.
	OCCUPANCY SENSOR, MULTI-TECHNOLOGY, CEILING MOUNTED
	OUTLETS FOR FLAT PANEL DISPLAY, 103.5" A.F.F. UNLESS NOTED
	WALL CONNECTOR FOR 'OFR' RACEWAY, See 4-22 for MOUNTING HEIGHT
	COIL OF SPEAKER WIRE ABOVE CEILING
	FIRE ALARM/MASS NOTIFICATION STROBE
	FIRE ALARM/MASS NOTIFICATION SPEAKER/STROBE