INTRODUCTION

The UAMS Division of Campus Operations is pleased to present the Guide to Consultants and Contractors (GCC). This Guide reflects the needs and issues of the Division of Campus Operations at UAMS related to construction projects on the campus or satellite spaces.

Information contained in the Guide is categorized in formats based on Construction Specifications Institute (CSI) organization 2004 format with a brief summary to provide some consistency within our buildings unless problems have occurred in our past. This Guide is put together to provide the construction team an understanding of the minimum requirements to be met when working in the UAMS system and is only the skeleton, with the design professional and contractor using their expertise to complete the package On Time and On Budget in a team approach. It is not meant to dictate design solutions, but rather guide design decisions to be in harmony with UAMS standards. It is the responsibility of the design professional to follow these guidelines in the preparation of their documents and ensure the construction techniques complies, unless UAMS DESIGN & CONSTRUCTION department waives in writing a requirement after it is brought to our attention during the design phase prior to construction. Failure to note a deviation during design reviews is not a waiver. Currently this campus has over 4,000,000sf in floor space being used with the oldest building built in 1955 and the campus continues to grow and renovate to keep up with the changes in medicine, but storage space for replacement materials is small. For those materials which require large storage space that are used frequently, we have identified the preferred materials, but alterations can be made only if sufficient reason is given and approved by the Vice Chancellor for Campus Operations prior to construction.

The Guide to Consultants and Contractors will remain posted on the DESIGN & CONSTRUCTION website. Campus Operations will provide, update, and monitor information to specific projects and long-term UAMS goals on a regular basis. All comments are welcome concerning the content of the Guide and we have used suggestions from our design professionals in preparation of this guide. We strive to know the unknowns, and to plan for the unexpected. Therefore, with help from all parties involved, the Guide will continue growing and becoming a tool that will assist everyone. Questions or comments concerning this guide can be addressed to GCCComments@uams.edu

Our goal is to provide energy efficient projects that will survive a minimum of 50 years with minimum repairs and has a smooth flow of information that is completed On Time and On Budget. We hope that you can help us as a team meet our goal.
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   UAMS CAPITAL CONSTRUCTION POLICIES AND PROCEDURES

2. Reference UAMS policies under the Design & Construction website and the end of this document for additional forms.

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Space Planning Guidelines

UAMS will utilize the Council of Educational Facility Planners International (CEFPI) Guidelines in conjunction with program needs analysis as a means of determining space needs for the University’s organizational units. This standard will be utilized to allocate office, conference, auxiliary, and lounge space for both new construction and relocation / renovation projects.

UAMS uses these categories to describe office space:

1. **E / A (Executive/ Administrative)** this designation applies to persons with management responsibilities for the institution, a college, or a division of the institution; who are directly responsible for management policies and general business operations. This includes all officers of UAMS with titles such as: Chancellor, Vice Chancellor, Dean, or Executive Director.

2. **F / M (Faculty / Managerial)** this designation applies to persons whose normal duties include instruction or research, or who have significant management or budgetary responsibility for a division, or a department. These positions require a college education or specialized knowledge. This includes officers of UAMS with titles such as: Associate Vice Chancellor, Associate Dean, Assistant Dean, Chairman, Professor, Assistant Professor, Instructor, Director.

3. **PNF (Professional Non Faculty)** this designation applies to persons whose normal duties include mid management activities, public service, or whose duties require a college education, or specialized knowledge and training. This group includes: Associate (or Assistant) Director, Department Managers, Department Administrators, Program / Project Managers, Nurse Managers, Administrators, Associate Administrators, etc.

4. **T/PP/C (Technical / Paraprofessional / Clerical)** this designation includes those whose duties are associated with technical and professional functions. It includes those
responsible for internal and external communications, computer programmers and operators, data recording and retrieval, engineering aides, drafters, nurses (licensed, practical, or vocational), dieticians, photographers, research assistances, technicians (medical, dental, electronic, physical sciences), therapists, graduate assistants, secretarial or clerical, etc. These positions require some advanced education or training.

### Space guideline

1. **E/A Category**  
   Work Space – Between 170 and 300 net s.f.
2. **F/M Category**  
   Work Space – Between 120 and 160 net s.f.
3. **PNF Category**  
   Work Space – Between 100 and 120 net s.f.
4. **T/PP/C Category**  
   Work Space – Not To Exceed 100 net s.f.
5. **Auxiliary Spaces**  
   Conference Space – approximately 22 s.f. per person accommodated  
   Auxiliary / service space (file rm., work rm., etc.)– 15 s.f. per person  
   Lounge Space – 7 s.f. per person

**NOTE:**

1. Any deviation from these guidelines for office sizes must be approved in advance by the UAMS Space Committee.
2. The term “office” should not be taken to mean “hard walled space” but rather is a definition of the square foot area assignable to a function. An “office space” may be a systems furniture (panel enclosed) workstation or a hard walled office. Specific space allocations and design should be determined by these guidelines, programmed needs, building geometry and UAMS building standards. Newer buildings on the UAMS campus are designed with limited hard walled offices.
3. For Wet Lab space refer to UAMS Policy 16.1.16

### Project Sequence

#### Design Phase
**Schematic Design Phase:** A/E to review and evaluate the program and budget requirements and discuss alternative approaches to the design and construction of the project based on those requirements. As mutually agreed upon, the A/E prepares conceptual design documents for approval. These documents will include preliminary drawings and other graphic and written documents that illustrate the general scope, scale, relationship of project components, and describe in general the type of construction and equipment proposed. During schematic design, area relationships may be defined, the general size, shapes and massing of building elements determined. In new construction, site plans, elevations and exterior finishes are defined. In all projects, a conceptual design criterion defines structural, mechanical, and electrical systems. UAMS defines a security system concept jointly with the A/E, and appropriate UAMS departments. A/E will issue preliminary cost and schedule projections to DESIGN & CONSTRUCTION. After a reasonable time for UAMS review, the Schematic Design will be jointly approved (as is or with minor modifications) by the involved departments of Campus Operations, and the User Group. At this time, all core team members agree to project concept, fee structure and responsibilities of the parties. This is the second checkpoint for continuity of the project.

**Design Development Phase:** The emphasis shifts from overall relationships and functions to more technical issues of constructability and integration of systems and components. Design development documents fix and describe the size and character of the entire project, including architectural, structural, mechanical and electrical systems. Drawings at this phase include plans, elevations and sections that provide more detail of the various systems and components. The structural, mechanical and electrical systems are presented by the type of system, and show the preliminary sizes of equipment and the proposed routing of services. Architectural floor plans are developed, elevations are refined, and typical construction details worked out. Product and material selections are determined in conjunction with the DESIGN & CONSTRUCTION Interior Design Manager. Room data sheets are completed. Room numbers and equipment numbers are assigned thru a meeting with DESIGN & CONSTRUCTION. Preliminary furnishings systems are designed. If major usage of existing UAMS systems will be required, the Engineer is required to perform a load analysis on the system to determine the impact using a program called AFT Mercury and provide UAMS an electronic version of that study. Outline specifications, in accordance with current CSI guidelines, are prepared to describe the materials, products, and systems selected, as well as any special construction conditions or special contract requirements. These graphic and written review documents serve as the basis for revised cost and schedule projections, and the outline specifications serve as a checklist for Campus Operations to provide the appropriate information to the A/E. After a reasonable time for UAMS review, the Design Development documents will be jointly approved (as is or with minor modifications) by the involved departments of Campus Operations and the User Group. At this time the concept of the project, fee structure and responsibilities of parties is signed and dated by all core team members. This is the third checkpoint for continuity of the project.

**Construction Documents Phase: (Final Design Phase):**

i) **In-House Construction:** The A/E prepares the final review set of documents and specifications. Utility locations are coordinated with modular furnishings plans through the DESIGN & CONSTRUCTION Interior Design Manager. The DESIGN & CONSTRUCTION Project Coordinator and Project User Contact will work with the
In-House Crew to help establish means and methods of the Work. After a reasonable time for UAMS review, the Construction Documents will be jointly approved (as is or with minor modifications) by the In-House Crew, the involved departments of Campus Operations and the User Group. At this time the updated budget for each discipline, scope narrative for each discipline, fee structure and responsibilities of parties is signed and dated by all core team members. This is the fourth checkpoint for continuity of the project.

ii) **Outside Contractors:** When the In-House Construction Crew is not going to do the work, the A/E prepares documents that will be used to obtain bid prices or upon which a lump sum or negotiated contract can be based. The bidding documents package includes detailed drawings and specifications, bid requirements, and the general and supplementary conditions of the contract. Bid requirements include the invitation to bid, instructions to bidders, bid forms and attachments, bid security forms, and other forms as required. After a reasonable time for UAMS review, the Construction Documents will be jointly approved (as is or with minor modifications) by the involved departments of Campus Operations and the User Group. At this time the updated budget for each discipline, scope narrative for each discipline, fee structure and responsibilities of parties is signed and dated by all core team members. This is the fourth checkpoint for continuity of the project.

a. **Submission Requirements:**
   i. Each stage will require Five (5) sets of documents for UAMS review.
   ii. Consultant shall review UAMS remarks and either make the corrections or explain within 10 working days why the change should not occur.
   iii. Change orders as a result of the requested changes not being made prior to bidding shall be the responsibility of the consultant.

**Construction Phase**

a. **Bidding/Contract Negotiation Phase:**
   i. **Bidding:** Sets of the bidding documents are distributed by the A/E. Bids are solicited by advertisement or invitation. For most projects, a Pre-Bid Conference will be scheduled to allow all interested Contractors to ask questions to the Consultants and UAMS personnel prior to finalizing their bids. A/E may issue addenda as needed to clarify, interpret, modify, add to, or delete from the information contained in the bidding documents not later than 48 hours before bid. All bid openings for UAMS projects occur at the UAMS Procurement Services office. A Pre-Construction Conference will be held concurrent with the Notice to Proceed to discuss project specific requirements with the successful bidder, UAMS Campus Operations, and the User Group department(s). Purchasing is to receive a complete set of documents prior to bidding and will make any necessary modifications to the front end.
   
   ii. **In-House Construction:** A Pre-Bid Conference will be scheduled to allow all the In-House construction Crew to ask questions of the Consultants and UAMS personnel, prior to all parties agreeing to the final construction budget. A Pre-Construction Conference will be held concurrent with the Notice to Proceed to discuss project specific requirements with the In-House Construction Crew, UAMS Campus Operations, OH & S, and the User Group department(s).
iii. **JOC:** JOC’s (Job Order Contractors) are primarily used where time is important and as such UAMS has set up multiple JOC’s of different disciplines. The JOC’s are set up on an hourly rate to supplement our maintenance staff as needed and to do projects turn-key. For turnkey the contractor deemed in our best interest will be asked for a price for that project, if they cannot make budget a second JOC will be brought in, if they can’t make budget the project will be bid. UAMS bids these JOC packages on an average of every four (4) years and they cannot under current state law exceed $750,000 per project.

b. **Construction Phase:** Includes all of the contractor's planning and scheduling activities; mobilization of equipment; material purchasing; on-site and off-site construction and fabrication of components by the contractor and subcontractors; contract administration by UAMS, the A/E, and the contractor; and general implementation of the contract document requirements through project closeout. During the construction phase, the contractor produces many documents, such as contractor’s schedules, shop drawings, operation and maintenance manuals, and warranties. The A/E will review shop drawings and submittals and forward one copy of all shop drawings and submittals to the UAMS Project User Contact as the submittal is being submitted to the A/E. In the event a contractor submits a substitution request, the A/E will confer with UAMS before approval. All of these documents become part of the administrative records, and will be kept in the project file. The A/E will prepare contract document modifications, such as change orders, as approved by UAMS. The Contractor shall notify the UAMS Project User Contact (3) working days in advance of all testing and start-ups.

c. **Post-Construction Phase:** Following Punch List, Substantial Completion, UAMS Commissioning, and User Group move-in, the A/E and contractor will assist UAMS with start-up operations if necessary. UAMS Commissioning activities is required to adjust the operation of systems and equipment to needs different from those anticipated during design may require assistance from the A/E and contractor. The fee for this assistance will be negotiated separately either during design or construction phases. There will be a minimum of (7) days set aside for out-gassing of new projects from acceptance of UAMS before a user group may occupy the facility.

d. **Substantial Completion** shall be in accordance with the Arkansas Health Department published regulations and UAMS Criteria, unless specifically exempted by UAMS construction department. Since UAMS is a state institution, a certificate of occupancy by a city building inspector is not required except at city tie-ins. Where items are not applicable, note NA. The Contractor is to perform a punch-list and give a copy to the Consultant and UAMS Project User Contact when he feels the work is ready for final acceptance. When the items are certified as complete by the design professional, UAMS will perform a walkthrough to verify those requirements and agree on the request for substantial completion. UAMS and the Consultant may add items to this list when they verify the Contractors list is complete. Should the work require additional trips due to not being ready for final acceptance as determined by the consultant or UAMS, the Contractor will reimburse UAMS and the Consultant for any added expenses from those trips. In the event the fire alarm system is not fully certified and
accepted by UAMS at substantial completion, the contractor shall provide 24 hour manual surveillance of the system at their expense until the system is in full compliance. At the point of Substantial Completion, the consultant is to give the contractor a complete copy of the punchlist, whether typed or handwritten notes, and the contractor will have a set number of days from this date as outlined in the front end to complete this punchlist, including closeout documents; or a second stipulated set of charges will be applied against the contractor for each calendar day incomplete beyond the required final completion date. At the completion of the project, the contractor shall provide the UAMS Project User Contact a designated representative based in the corporate office and easily reachable their name, phone number (office and cell), and email address for all warranty issues.

Coordination

Consultants

1. Consultants shall utilize this guide for their projects on the UAMS campus. Any deviations to this guide must be pointed out during design for approval prior to proceeding with that change.
2. All Consultants will coordinate all design and construction work through the DESIGN & CONSTRUCTION Project Delivery Team consisting of the Project Coordinator and the Project User Contact
3. Consultants are responsible for verification of existing plans, systems, equipment, conditions and dimensions. DESIGN & CONSTRUCTION will assist as needed.
4. Consultants are responsible for plan and specification submittals for review to applicable regulatory agencies. Forward notices of delivery to and copies of comments from all agencies to DESIGN & CONSTRUCTION.
5. Lead Consultant will submit review documents to DESIGN & CONSTRUCTION at the end of each design stage that will include current drawings, specifications if due, budget, scope narrative and schedule updates. Examples of narratives are available from the Project Coordinator.
6. Consultant is to be in attendance at the ICRA (Infection Control Risk Assessment) and ILSM (Interim Life Safety Measures) meeting for the project and make the necessary revisions to the project as required by the committee. The Project Coordinator is responsible for coordinating and conducting this meeting.
7. Consultants shall distribute to UAMS Insurance Carrier half-size drawings and specifications for the following systems:
   - Civil site plan with water main and hydrant layout
   - Roof details and plans
   - Fire/Smoke Walls
   - Fire Protection (automatic sprinklers, fire pump, etc including shop drawings)
   - Fire Alarm system
   The Consultant will mail these documents to the Insurance Carrier and the cost is to be accounted for in their reimbursable expenses. Include on the transmittal to the Insurance Carrier a date (allow 2 weeks) the review is needed by and add the note that if no remarks are received by that date the documents will be incorporated with no remarks. These requirements will be mailed to:
   FM Global
   5700 Granite Parkway Suite 700
8. Lead Consultant will record and distribute minutes from project meetings. Minutes will consist of bullet lists containing the item discussed and if applicable: the action required, the date due and the responsible party. Minutes shall be distributed within 5 working days of meeting.

9. The Design & Construction Team shall be invited to all meetings held between Architects, Engineers, and Contractors for that project. Changes made to the contract documents without UAMS approval is strongly discouraged, and can be grounds for removal of that change.

10. Design of sterile or semi-sterile environments must consider location of plumbing (cleanouts, floor drains, commodes, etc) when designing the suite so that the sterile or semi-sterile environments are not compromised.

11. Consultant is responsible for reviewing Contractors redlined as-built documents monthly for completeness. During Substantial Completion, Lead Consultant is to prepare documents on an electronic format as stated under Drawing Requirements. As-Builts is to include a hard and electronic copy of the project documents with all changes incorporated.

12. During planning insure that specific instructions are provided for Security. This will show locations for all cameras, door locks with respect to hardware, numbers of cameras is adequate but not excessive, and insure that all potential LSC issues have been reviewed.

13. If temporary wall are used for more than 2 weeks they will be painted and cove base installed (It is not necessary to tape and float).

14. Lead Consultant will provide to DESIGN & CONSTRUCTION record drawings in Revit format compatible with UAMS’s electronic media at the completion of the project.

15. Drawings shall contain the formal title of the project and UAMS project number on each sheet.

16. A survey is to be performed on each project unless waived by DESIGN & CONSTRUCTION. The survey is to contain property boundaries, topographical elevations, and all existing structures.

17. Lead Consultant to provide to DESIGN & CONSTRUCTION an updated scope of work at the end of each design phase that includes a performance based description of the MEP systems that illustrate the concepts of operations. Use current CSI UniFormat organization. Upon request by DESIGN & CONSTRUCTION, include systems energy recovery and payback.

18. Consultants will inform DESIGN & CONSTRUCTION of requirements we impose that may lead to discomfort, i.e.: noise from HVAC systems.

19. Do not design for live plants, waterfalls, or other unnecessary sources of microbiological contaminants where compromised patients reside.

20. Design electrical for offices to allow for computer equipment including laser printer and space heaters often found under desks.


22. When possible, do not specify chemical products that contain carcinogens as listed by OSHA, NIOSH, IARC, ACGIH, or AIHA.

23. UAMS will pay for travel reimbursement as outlined in a chart at the end of this document. If a consultant chooses to have additional services the difference will be paid by their company.
24. Once a new building or major modification to the grounds has been finalized, the Consultant shall modify the campus model located in the Chancellors conference room to reflect the changes. Wood is Bass wood, scale is 1” equals 40’.

25. Consultants are to submit their fees timely and include UAMS’s project name and number; any invoice without this information will be returned unpaid. Fees submitted after the project has been closed out will not be honored after one (1) year from project closeout.

26. Provide to DESIGN & CONSTRUCTION, as part of the scope narrative, a list of all codes used during design.

27. The Consultant and Contractor are cautioned to take no action on directions issued by other University staff or departments until approval is obtained from Design & Construction. Failure to obtain this approval either by the action itself or subsequent repair or realignment to the scope, will not be compensated by project funds or UAMS. The only exception is when safety is involved, which OH&S can shut down that portion of work.

**Contractors**

1. In the event of accidents, emergencies, and potential interruption of services on UAMS campus, the contractor shall immediately notify the UAMS Construction Manager or Central Control (686-6424) if the Project User Contact cannot be reached. If the event of an interruption in utilities, also contact the appropriate utility company.

2. UAMS will not entertain any request(s) for time extensions unless a Critical Path Method project schedule is established and agreed to by UAMS at the start of the project and maintained monthly for the project; schedule shall be done in Microsoft Project with an electronic copy emailed to the UAMS Project User Contact within 10 days of award. The CPM schedule is to accurately document all work so that any impacts can be properly addressed. Accelerated schedules are for the contractor use only and will not affect the contract completion or value.

3. Relocation of utilities costs necessary to perform the work are to be borne by the contractor within their bid pricing.

4. Review and monitor proposed penetrations through all walls, floor, and roof slabs. All penetrations shall be patched to maintain the integrity of the wall. Ask DESIGN & CONSTRUCTION for direction in all undocumented areas. Provide penetration information to DESIGN & CONSTRUCTION for records. All inspection and testing reports are to be sent to the UAMS Project User Contact when submitted to the A/E or contractor.

5. Tests, inspections and approvals of portions of Work required by the Contract Documents or by laws, ordinances, rules, regulations or orders of public authorities having jurisdiction shall be made at an appropriate time with reasonable notification. UAMS shall be allowed to witness any tests with appropriate notices as outlined in other sections.

6. If, after the contractor notifies the Owner / Design Professional that work is ready for inspection, the Owner / Design Professional deems that the work is not performed correctly or is not ready for inspection; the contractor shall bear the additional expense incurred by the Owner / Design Professional for such additional inspection. This additional expense shall normally be in the form of man-hours billed at the hourly rate including fringes for that professional / tradesman times the time wasted. Some or all of this expense will not be charged for items shown on the Contractors punchlist 24 hours prior to beginning the inspection.

7. UAMS shall receive an electronic copy of all submittals in pdf format with sufficient time for review without delaying the project. These submittals shall be reviewed concurrent
with the consultant. The consultant shall forward the review remarks to UAMS Project User Contact electronically prior to forwarding the response to the contractor through ebuilder. If the consultant disagrees with a review response from UAMS, notify the UAMS Project User Contact prior to preparing the response. When submittals are forwarded to UAMS for approval, it is imperative that the submittal include a copy of the operation and maintenance manuals to be evaluated.

8. In order to expedite and cut down on paperwork, UAMS prefers the use of electronic data for submission.

9. All workers must wear conspicuously on their person an identification badge. Should the contractor provide their own badge the following minimum requirements must be on it: CONTRACTOR in big red letter at the bottom readable at 20 feet, the name of the company, employee name, and employee number readable at 10 feet, and a picture of the employee minimum size 1” by 1” integrated into the ID badge so that it cannot be changed out. Badge can be made of stiff stock paper laminated in plastic. Contractor’s own badge shall not have UAMS or our logo on the badge, nor is the project or job to be identified. Coordinate the badge with the UAMS Project User Contact prior to use. Workers working in sensitive areas of a building must wear a UAMS issued identification badge with security strip that must be worn while working on the project and turned in to the UAMS Project User Contact at the completion of the job. Contractors may also purchase at UAMS a Contractor badge, cost of UAMS badges are to be confirmed at bidding and the cost will be included in the contractor bid price. Workers will dress in an appropriate manner that is conducive to a professional working environment.

10. Smoking is not allowed on campus. At all times monitor the work to assure the workers do not use tobacco products in the UAMS Hospital or any of the other buildings on the UAMS campus. Failure to comply will result in a 6-month ban from the UAMS campus of the worker(s) involved.

11. At all times monitor the work to assure the workers do not use profanity nor harass the students, faculty members, employees, visitors, and/or patients. Failure to comply will result in a 6-month ban from the UAMS campus of the worker(s) involved.

12. Coordinate all shut down of utilities or systems with the Control Center and UAMS Project User Contact a minimum of 14 days in advance. The UAMS Project User Contact will coordinate a mandatory meeting with all involved personnel during these 14 days. It is imperative that the meeting establishes who is responsible to perform what, sequencing of the work, when each sequence will be performed and how long the system will be down or affected. The procedure will be written down and distributed to PP, contractor and DESIGN & CONSTRUCTION prior to the actual shutdown. The decision to notify affected personnel or not to notify should be addressed.

13. Claims for weather delays will be based upon the number of days exceeding 0.1” of rain per respective month as compared to the data in the table below, verification of actual days can be found at http://lwf.ncdc.noaa.gov/servlets/ACS. No other consideration for “after effects” on days following actual rain days will be given. This would unbalance the comparison to the table listed below since “after effect” days are not included therein. No additional days will actually be added to the contract period until major items of work, which could be impacted by precipitation and are on the critical path of the project schedule, are completed. Allowed weather days are excusable, but not compensable. In the interest of fairness, if the contractor elects to request credit for days exceeding the averages, they shall also deduct the number of days the weather was better than normal for each month of the project that the project critical path is affected by the weather as
agreed to by UAMS. However, the contract period will not be shortened by weather credits to the owner for such abnormal good weather. UAMS recognizes the following average to be used for every project requesting delays for weather:

<table>
<thead>
<tr>
<th>Month</th>
<th>Average Rain Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>6</td>
</tr>
<tr>
<td>February</td>
<td>6</td>
</tr>
<tr>
<td>March</td>
<td>8</td>
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<tr>
<td>April</td>
<td>6</td>
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<tr>
<td>May</td>
<td>8</td>
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<td>June</td>
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<td>July</td>
<td>4</td>
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<td>August</td>
<td>3</td>
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<td>September</td>
<td>5</td>
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<tr>
<td>October</td>
<td>5</td>
</tr>
<tr>
<td>November</td>
<td>6</td>
</tr>
<tr>
<td>December</td>
<td>7</td>
</tr>
</tbody>
</table>

An example would be the earthwork received 6 days of rain, the average is 7 days resulting in -1 days. The concrete received 4 days of rain, average is 6 days resulting in -2 days. Structural steel receives 14 days of rain, the average is 10 days resulting in 4 days. The skin and roof received 20 days of rain, the average is 22 days resulting in -2 days. The building is now in the dry and the inside work is not affected by outside conditions except those which are humidity controlled and which most consultant specifications control when those items can be installed and scheduled accordingly. However, after the building is in the dry it becomes very rainy pushing the parking lot to the critical path, then the parking lot would be considered. However, if the parking lot could have been completed during reasonable float time but not exercised until it was on the critical path, it would need to be discussed. Now in our example, earthwork receives -1 days, concrete receives -2 days, structure receives 4 days, skin and roof receives -2 days, resulting in a balance of -1 days and the contract time would not be affected. However, after the building was in the dry, the scheduled time for the parking lot is delayed to a wet Spring and justified 3 additional days. The contractor would be entitled to three days minus one day resulting in a two day extension to their contract, but no monetary compensation.

14. All contractors are to submit deviations to the drawings and uncovered utilities to the General Contractor's As-Built set that is to be kept in the GC's trailer and checked by the Superintendent and AE Representative monthly for completeness. Failure to complete this requirement will be grounds to withhold the monthly payments until it is complete. These drawings are to be transferred to the Consultant at the completion of the project and incorporated in their drawings prior to UAMS receiving a hard and electronic copy.

15. Perform labor in a professional manner by mechanics skilled in their respective trades. Results shall meet or exceed criteria established by their respective trade certifications, applicable reference standards and workmanship required of trade associations.

16. Contractor shall fax to UAMS a copy of their payment request front cover sheet when submitting to the A/E.

17. Contractor payment request and pricing shall be broken down into 2004 CSI format, which this spec is written by. Failure to follow this format may result in delay of payments.

18. The Owner reserves the right to perform random testing for asbestos containing materials any time during construction, but prior to Final Completion.

19. Neither final payment nor any retained percentage shall become due until the Contractor submits to the Architect completed redline drawings for inclusion in record drawings.

20. If Final Completion is not achieved by the date established for Final Completion; The Contract will be considered complete when all work has been completed and the completion of all contract requirements have been certified complete by the Architect or Engineer of Record and UAMS. Projects to $100,000 shall be given 30 days to meet this requirement. Projects in excess of $100,000 but not more than $1,000,000 shall be given 60 days to complete this requirement. Projects in excess of $1,000,000 shall be given 90
days to complete this process. These time periods may be adjusted on a per project basis by UAMS due to the complexity of a project. Completion of contract requirements includes, but not limited to, completion of punch-list, as-built drawings, O & M manuals, etc. No deduction or payment of liquidated damages will, in any degree, release the Contractor from further obligations and liabilities to complete the entire Contract. Permitting the Contractor to finish the work, or any part of it, after expiration of the Contract time, shall in no way constitute a waiver on the part of the Owner of any liquidated damages due under the Contract. All work to a project after occupancy shall not interfere with operations in that area, and will not be a cause for delay. Work should be minimum when substantial completion is granted with the space useable for its intended use.

21. Contractors will attend a yearly UAMS Safety Training Class led by the Department of Occupational Health and Safety in conjunction with the Department of Design & Construction. The 60-minute class will instruct the Contractor in areas of safety concerns and practices to adhere to during construction on the UAMS Campus.


23. Ensure that the fire alarm, detection, and suppression systems are not impaired. A temporary but equivalent system must be available when any fire system is taken out of service or is inoperable. Inspect and test temporary systems in accordance with a schedule established by UAMS including a 24/7 fire watch until system is reactivated. Document inspections and testing and keep ready in a binder marked with UAMS project number and UAMS project name.

24. Maintain portable ABC fire extinguishers at the job site. Train all workers on use and care of fire extinguishers.

25. Provide crime prevention in construction areas; UAMS is not responsible for theft of tools or other items from jobsite.


27. Ensure that exits provide free and unobstructed egress. All workers should receive training if alternative or temporary exits are designated during duration of project.

28. Ensure free and unobstructed access to emergency departments or services, and to emergency personnel.

29. Follow the guidelines established during the Infection Control Risk Assessment. Failure to adhere to these guidelines may result in a ban from campus for six months for this policy is to protect the patients, public, staff, and contractors.

30. All products must contain a minimum one year warranty from substantial completion of the project covering full value of labor and materials to repair or replace work that fails to uphold project requirements. Other warranties will be addressed in their individual sections. In no event will the warranty expire prior to one year from substantial completion.

31. The Consultant and Contractor are cautioned to take no action on directions issued by other University staff or departments until approval is obtained from Design & Construction. Failure to obtain this approval either by the action itself or subsequent repair or realignment to the scope, will not be compensated by project funds or UAMS. The only exception is when safety is involved, which OH&S can shut down that portion of work.

32. Beginning January 2013 all contractor supervisors are required to have completed the ASHE HCC program. Contact ASHE for available testing dates and locations.

Operation and Maintenance Documentation
A. Bind in commercial quality 8-1/2 x 11 three D side ring binders with durable covers.

B. Cover: Identify each binder with typed or printed title of Closeout Document (Example: WARRANTIES), Title of Project; name, address and telephone number of Contractor and equipment supplier(s); and name of responsible company principal.

C. Table of Contents: Neatly typed with each item identified with the number and title of the specification section in which specified, and the name of Product or work item.

D. Separate each entry with index tab sheets keyed to the Table of Contents listing. Provide full information, using separate typed sheets as necessary. List Subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

E. The commissioning process requires detailed O&M documentation as identified in this section and technical specifications.

F. Contractor shall submit two draft copies of the complete operating and maintenance manual to the DESIGN & CONSTRUCTION for review by the architect/engineer and CxA or the contracted commissioning agent as assigned within 60 calendar days after review of equipment shop drawings. One copy will be returned to the contractor within 30 days after receipt by the A/E.

G. Contractor shall submit corrected final approved manuals prior to substantial completion. Prior to final submittal, the CxA or the contracted commissioning agent as assigned shall review the O&M manuals (in addition to the initial draft O&M manual), and documentation, with redline as-builts, for systems that were commissioned to verify compliance with the specifications. The CxA or the contracted commissioning agent as assigned will communicate, through the DESIGN & CONSTRUCTION, deficiencies in the manuals to the contractor or A/E, as requested. Upon a successful review of the corrections, the CxA or the contracted commissioning agent as assigned will recommend approval and acceptance of these sections of the O&M manuals to the DESIGN & CONSTRUCTION. The CxA or the contracted commissioning agent as assigned will also review each equipment warranty and verify that all requirements to keep the warranty valid are clearly stated. This work does not supersede the A/E’s review of the O&M manuals according to the A/E’s contract.

H. The contractor shall compile O&M manuals for every piece of equipment and building operating or electrical system being commissioned with the following format:

1. Quantity: 1 Hard Copy and 1 Electronic copy (Unless more are required by the technical specifications).

2. Format: 8 1/2 x 11 3 ring loose-leaf binders, 3-inch maximum, and electronic format that is compatible with owner’s system. Each binder shall be clearly labeled on the spine. Use as many binders as required. Do not overload binders. Dividers with permanently marked tabs of card stock shall separate each section and sub section. Tab labels shall not be handwritten. A separate manual or chapter shall be provided for each applicable system as follows:

   (a) Chillers
   (b) Cooling Towers
   (c) Boilers
   (d) Pumps
   (e) Air Handling Units (include sequence of operation, one line diagram and area served in a plastic pouch for mounting on equipment or in equipment room)
3. There shall be a title page and table of contents in the front of each binder for each binder’s contents. In each binder, there shall be a main tab for each specification section. Behind the section number tab there shall be the equipment ID tag sub-tab for each piece of major equipment (or group, if small or numerous). These sub-tabs shall be similar to the specification number tabs but of a different color. Behind each equipment name tab shall be the following sections, in the given order, divided by a double weight colored sheet labeled with the title of the section.

(a) Contractor. The first page behind the equipment tab shall contain the name, address and telephone number of the manufacturer and installing contractor and the 24-hour number for emergency service for all equipment in this section, identified by equipment.

(b) Submittal and Product Data. This section shall include all approved submittal data, cut sheets, data base sheets and appropriate shop drawings. If submittal was not required for approval, descriptive product data shall be included.

(c) Operation and Maintenance Instructions. These shall be the written manufacturer’s data with the model and features of this installation clearly marked and edited to omit reference to products or data not applicable to this installation. This section shall include data on the following:

(1) Model number, serial number and nameplate data for each piece of equipment and any subcomponent.

(2) Installation, startup and break-in instructions.
(3) All starting, normal shutdown, emergency shutdown, manual operation and normal and emergency operating procedures and data, including any special limitations.

   i. Step-by-step procedure for system startup, including a pre-start checklist. Refer to controls and indicators by nomenclature consistent with that used on panels and in control diagrams.

   ii. Sequence of operation, with detailed instruction in proper sequence, for each mode of operation (i.e., day-night; staging of equipment).

   iii. Emergency operation: If some functions of the equipment can be operated while other functions are disabled, give instructions for operations under these conditions. Include here only those alternate methods of operations (from normal) which the operator can follow when there is a partial failure or malfunctioning of components, or other unusual condition.

   iv. Shutdown procedure: Include instructions for stopping and securing the equipment after operation. If a particular sequence is required, give step-by-step instructions in that order.

(4) O&M and installation instructions that were shipped with the unit.

(5) Preventative and corrective maintenance, with service procedures and schedules:

   i. Provide a schedule for preventive maintenance in a printed format and an electronic format compatible with owner’s system. State, preferably in tabular form, the recommended frequency of performance for each preventive maintenance task, cleaning, inspection and scheduled overhauls.

   ii. Cleaning: Provide instructions and schedules for all routine cleaning and inspection with recommended lubricants.

   iii. Inspection: If periodic inspection of equipment is required for operation, cleaning or other reasons, indicate the items to be inspected and give the inspection criteria for: motors; controls; filters and any other maintenance items.

   iv. Provide instructions for minor repairs or adjustments required for preventive maintenance routines. Identify test points and give values for each. Include sensor calibration requirements and methods by sensor type.

   v. Corrective maintenance instructions shall be predicated upon a logical effect-to-cause troubleshooting philosophy and a rapid replacement procedure to minimize equipment downtime.

   vi. Troubleshooting: Troubleshooting tables, charts, or diagrams shall be used to present specified procedures. A guide to this type shall be a three-column chart. The columns shall be titled: malfunction, probable cause and recommended action.

   vii. Repair and Replacement: Indicate repair and replacement procedures most likely to be required in the maintenance of the equipment.
(6) Safety Precautions: This subsection shall comprise a listing of safety precautions and instructions to be followed before, during and after making repairs, adjustments or routine maintenance.

(7) Manufacturers’ brochures (including controls): Manufacturers’ descriptive literature covering devices and equipment used in the system, together with illustrations, exploded views and renewal parts lists. Manufacturers’ standard brochures and parts list shall be corrected so that information applying to the actual installed equipment is clearly defined.

(8) Supply any special tools required to service or maintain the equipment.

(9) Performance data, ratings and curves.

(10) Warranty and guarantee, which clearly lists conditions to be maintained to keep warranty in effect and conditions that would affect the validity of the warranty.

(11) Any service contracts issued.

(d) Supplemental Data. Prepare written text and/or special drawings to provide necessary information, where manufacturer’s standard printed data is not available and information is necessary for a proper understanding and operation and maintenance of equipment or systems, or where it is necessary to provide additional information to supplement data included in the manual or project documents.

(e) Control Diagrams/Drawings. Include the as-built control diagrams/drawings for the piece of equipment and its components, including full points list, full print out of all schedules and set points after testing and acceptance of the system, and copies of all checkout tests and calibrations performed by the contractor (not commissioning tests).

(f) Specifications. This section is comprised of the component or system specification section copied and inserted complete with all addenda.

(g) System Description. This section shall include the individual equipment portion of the overall system Design Basis Narrative.

E. Commissioning Record in O&M Manuals

1. The CxA or the contracted commissioning agent as assigned is responsible to compile, organize and index the following commissioning data by equipment into labeled, indexed and tabbed, three-ring binders and deliver it to the GC, to be included with the O&M manuals.

(a) Commissioning Plan

(b) System reports including design narratives and criteria including sequences. Each system shall contain the startup plan and report, approvals, corrections, construction checklists, completed performance tests, trending and analysis, training plan and recommended recommissioning schedule.

(c) Final Commissioning Report including an executive summary, list of participants and roles, brief building description, overview of commissioning and testing scope and a general description of testing and verification
methods. For each piece of commissioned equipment, the report should contain the disposition of the commissioning authority regarding the adequacy of the equipment, documentation and training meeting the contract documents in the following areas:
1) equipment meeting the equipment specifications,
2) equipment installation,
3) performance and efficiency,
4) equipment documentation and design intent, and
5) operator training. All outstanding non-compliance items shall be specifically listed. Recommendations for improvement to equipment or operations, future actions, commissioning process changes, etc. shall also be listed. Each non-compliance issue shall be referenced to the specific performance test, inspection, trend log, etc. where the deficiency is documented. The performance and efficiency section for each piece of equipment shall include a brief description of the verification method used (manual testing, BAS trend logs, data loggers, etc.) and include observations and conclusions from the testing.

Cleaning

1. Progress Cleaning
   a. The premises and job site shall be maintained in a reasonable neat and orderly condition and kept free from accumulations of waste, materials and rubbish. Remove crates, cartons, and other flammable waste materials or trash and dispose of properly in the appropriate dumpster.
   b. Wipe all surfaces of dust and other matter in a manner that will not stir particles in the air. In sterile areas, the spray must be preapproved prior to use.
   c. Broom or vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.

2. Final Cleaning
   a. Use cleaning materials and agents recommended by manufacturer or fabricator of surface to be cleaned and approved by UAMS prior to use. Do not use cleaning agents that are potentially hazardous to health or property, or might damage finish surface.
   b. Employ experienced workers for final cleaning.
   c. Clean exposed hard surfaces to a dirt free condition, free from stains, films and similar foreign surfaces. Restore reflective surfaces to their original condition.
   d. Clean unoccupied spaces in a manner that will not generate dust.
   e. Vacuum clean carpet and similar soft surfaces, removing debris and excess nap; shampoo as required to eliminate stains.
   f. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other substances that are noticeable vision-obscuring materials. Polish mirrors and glass, taking care not to scratch the surfaces.
   g. Remove labels that are not permanent labels, if in doubt as the UAMS Project User Contact.
   h. Wipe surfaces of mechanical and electrical equipment, and other similar equipment. Remove excess lubrication, paint, mortar droppings, and other foreign substances.
i. Clean plumbing fixtures to a sanitary condition, free of stains, including stains
   resulting from water exposures.

j. Clean light fixtures, lamps, globes and reflectors to function with full efficiency.

k. Clean exposed surfaces of diffusers, registers, and grills.

l. Clean to a dust free surface areas under desks and desktops, baseboards, cabinets
   (inside & out), computer monitors, CPU’s, and printers, inside elevators, entrance
   mats, and furniture.

3. Routine Maintenance
   a. When hard surface floors have changed the color of the floor or as requested by
      UAMS, strip the wax and reseal with a wax approved by UAMS.
   b. When soft surfaces have been stained, clean the carpet in a manner that will remove
      the stain and not alter the color of the carpet.
   c. Do not wax epoxy coatings.

4. When areas are occupied
   a. Greet customers with kindness
   b. Tell customers to have a great day
   c. All public areas, restrooms, and Lobbies to be cleaned by 8:30.
   d. Empty trash cans and other debris marked trash
   e. Perform a final cleaning
Guidelines for UAMS employee and visitor exposure can be found in the following:

<table>
<thead>
<tr>
<th>Agency/Organization</th>
<th>Name of Occupational Exposure Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Occupational Safety and Health Administration (OSHA)</td>
<td>Permissible exposure limits (PEL)</td>
</tr>
<tr>
<td>OSHA substance specific standards</td>
<td>N/A</td>
</tr>
<tr>
<td>National Institute for Occupational Safety and Health (NIOSH)</td>
<td>Recommended exposure limits (REL)</td>
</tr>
<tr>
<td>American Conference of Governmental Industrial Hygienists (ACGIH)</td>
<td>Threshold limit values (TLV).</td>
</tr>
</tbody>
</table>

These levels will also apply in non-patient care area and areas not adjacent to patient care areas.

In patient care areas and/or areas adjacent to patient care areas the chemical exposure levels shall not exceed one tenth (1/10) of the ACGIH TLV in effect when the bid is awarded. Where no TLV has been established, the chemical exposure levels shall not exceed one tenth (1/10) of the NIOSH REL in effect when the bid is awarded. Where neither of the above limits has been established, the UAMS Occupational Health & Safety Department will determine threshold level(s).

Noise from construction activities shall not interfere with the ability of UAMS employees to perform their duties and/or to hear fire alarms.

Notify UAMS Project User Contact of upcoming work that could expose patients, UAMS employees, and/or visitors to dust, vapors, fumes, and/or noise.

Definitions:
1. Vapor-The gaseous form of substances which are normally in the solid or liquid state and which can be changed to these states either by increasing the pressure or decreasing the temperature.
2. Gases-Formless fluids which tend to occupy an entire space uniformly at ordinary temperature and pressure.
3. Aerosol-An assemblage of small particles, solid or liquid suspended in air. The diameter of the particles may vary from 100 microns down to 0.01 micron or less, e.g., dust, fog, and smoke.
4. Fumes-Small, solid particles formed by the condensation of vapors of solid materials.
5. Dust-Small solid particles created by the breaking up of larger particles by processes such as crushing, grinding, drilling, explosions, etc. Dust particles already in existence in a mixture of materials may escape into the air through such operations as shoveling, conveying, screening, sweeping, etc.

No work is to be done in an area without prior approval of UAMS. All work must be carefully coordinated to minimize interruptions to these services.

Sites shall be secured with a chain link fence high enough to prevent reasonable unauthorized entry. Signage advising non-authorized personal to stay out shall be placed on the fence and both ends of a gate. Gates shall be large enough to allow any necessary transportation through the gate and the gate kept locked when no one is on site. A set of keys to open the gate shall be kept at the Control Center, coordinate with the UAMS Project User Contact.

Contractor will be allowed to tap into existing utilities.

No discharge of gases or materials causing gases shall be done within 25 feet of a fresh air intake. In the case of roof work around air intakes, coordination must be made to shut off the unit if necessary while work is being done within 25 feet. Odors inside the building must be minimized.
Division 03     Concrete

Cast-In-Place Concrete
1. In all elevated mechanical room floors, provide a curb at the perimeter of the rooms and at all openings through the slab. Curb shall be offset at haul route doors with a map on the mechanical room side. At elevators, construct a ramp at elevator discharges for unloading at the curb height. The curb shall be 4” tall or as approved by DESIGN & CONSTRUCTION.
2. In all Hazardous storage rooms, a curb shall be constructed and sized for the material being stored in drums should there be a leak. A means to dispose of the drums shall also be included over the curbs.

Architectural Precast Concrete
1. The use of architectural precast concrete is acceptable to use within the exterior skin of the building. Architectural precast concrete shall reach 5000psi at 28 days, be free of packets, streaks, and honeycombs, and acid etched to provide texture and color to match Indiana Limestone.
2. Exterior steel items embedded in the precast unit shall be hot-dip galvanized or stainless steel.
3. Provisions are to be made when blending with brick masonry units to allow for different expansion/contraction between the two different materials, but maintain the building watertight.
Division 04  Masonry

Brick Veneer
1. Brick veneer shall match color and texture of other buildings on campus unless directed by UAMS. Field brick color is based on ADESIGN & CONSTRUCTIONONE Denton Blend 100 Burnt Pumpkin, 3-5/8” x 2-1/4” x 7-5/8”. A 4’ x 4’ mockup is to be provided for approval by Architect and UAMS prior to installing or ordering brick. The Project Core Committee shall approve any other colors during planning.
Division 05  Metals

General
1. All structural steel is to be primed unless it will conflict with spray on fireproofing.
2. All exterior metal not painted or subject to continuous moisture shall be hot-dipped galvanized. Consultant should use extreme care on selecting which is painted verses galvanized so that a failure on a structural component does not place the public in danger should the member deteriorate.
3. Structural steel shall be designed under mechanical equipment to prevent excessive vibration. All openings in the structural shall be properly supported.
4. When storing structural steel and deck, protect it from the corrosion, deformation, and other damage during delivery, storage, and handling.

Structural Steel
1. Steel exposed to the moist environments and not scheduled to receive spray on fire resistance is to be galvanized.

Light Gage Metal Framing
1. Provide a safe means to access all roofs including one story internally.

1.

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Division 06 Wood, Plastics, and Composites

Rough Carpentry
1. Rough carpentry is not to be used to support walls or ceilings. Rough Carpentry may be used to as blocking in walls, to support millwork, under sills, as telephone backboards, or cant strips in roofs if permitted by the governing codes.
2. Roofing cant strips can be pressure treated wood complying with AWPB-LP-2, kiln dried to maximum moisture content of 15%.
3. Blocking in walls, under sills, or telephone backboards shall be fire-retardant if permitted by code. Wood is to bear UL label on each piece of lumber used. Acceptable manufacturer: Dricon by Hickman Corporation.
4. Do not use wood for flat roof decks.

Millwork
1. All millwork shall comply with standards of the Architectural Woodwork Institute (AWI) “Quality Standards,” Premium grade materials and installation. All wood used shall be kiln dried lumber, premium grade for exposed wood, paint grade for covered wood or shelving in storage closets. Species of wood will be selected on a project-by-project basis, verify selection with DESIGN & CONSTRUCTION.
2. Exposed face veneer matching panels shall be book matched, grade A, no heartwood. Exception will be antique veneer which shall be slip matched.
3. Constant horizontal wet surfaces (any area which has an open water source) shall be a non-porous solid surface, an acrylic compound ½" thick with continuous backsplash, only exception is stainless steel when approved by DESIGN & CONSTRUCTION. Side splashes shall be sealed in epoxy to the countertop if not continuous. Sealant used to seal backsplashes is not permitted. Wood backing for solid surface is not permitted.
4. Plastic laminate can be used on countertops that do not have a wet surface, but must be ascetically coordinated with the solid surface if in the same room. Particleboard or chipboard will not be used; use only 7-ply veneer core plywood with Type II water resistant glue or MDF boards with Type II water resistant glue for laminates. Laminate cladding shall be high pressure decorative laminate complying with NEMA LD 3 grade GP-50. Run laminate in a direct to minimize joints but maintain pattern.
5. Porous counter tops (natural materials such as granite) are discouraged and must be approved in advance through DESIGN & CONSTRUCTION.
6. Edge banding shall be 3mm, hardwood of same species as exposed face veneers though vinyl edge banding is allowed.
7. Melimine laminate MDF board is approved as a backing to millwork.
8. Stainless steel shall be minimum 20 gage and all members sized to handle the expectant load to be imposed without warp or dents from normal use.
9. Hardware shall comply with ADA accessibility Guidelines, 28 CFR Part 36, Appendix A. Anchor millwork firmly to walls without visually seeing the fastener.
10. Do not install unless required temperature and relative humidity conditions have been stabilized and will be maintained in the installation areas.
11. Any questions are to be addressed to Design & Construction.

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Division 07    Thermal and Moisture Protection

Roofs
General
1. Sensitive areas defined as areas adjacent to air intakes, and will include the entire roof area being renovated shall have the air intakes conditioned to prevent odors from entering the building. A filtering system at the air intakes is the preferred method.
2. Asphalt kettles are banned from the campus.
3. Single-ply roofs are not acceptable unless approved in advance by DESIGN & CONSTRUCTION.
4. Warranties shall be a minimum of 15 years, but 20 years is preferred if project budgets permit. Roof warranties shall consist of a manufacturer 15-year full value warranty and Contractor 2 year full warranty. Provide a sign at the roof stating the manufacturers name, roofing contractor name, and warranty expiration dates.
5. Flat roofs are to be torch applied modified bitumen unless waived by DESIGN & CONSTRUCTION and the substrate shall be concrete or steel.
6. Sloped roofs greater than 3:12 shall be standing seam metal roof if budget permits. As a minimum, architectural asphalt shingle roofs will be allowed provided structural movement, roof venting, and water discharge has been properly design. These roofs can be a wood substrate if code allows.

Torch Applied Installation Requirements
1. Comply with the best practices manual from NRCA.
2. Only certified users can operate torch units – NRCA CERTA program only
3. Protect any combustible materials that may make contact with flames to prevent fires.
4. Have torch stands available and use them.
5. Never leave a burning torch unattended.
6. Have a minimum of two 20# ABC fire extinguishers available within 10 feet of torch operations and all personnel shall be trained in its use.
7. Have cell phones ready in case of emergency.
8. Air Intake locations shall be roofed after-hours when within 10’ of intake. Due to the sensitive nature of some departments air intake fans cannot be shut down. The duct is to be extended 8 feet above the deck by the roofing contractor.
9. Utilize minimum 2 hour fire watch by properly trained and dedicated personnel; shall include checking for smoldering to underside (whenever possible) as well as top side of roof.

Type
1. Roofs shall be torch-applied modified bitumen 2 or 3 ply with an aluminum or granular coating.
2. Acceptable manufacturers are Siplast, CertainTeed, Britec, Johns Mansfield, Garland, & Tamko
3. Manufacturer’s material specification should be followed and all material accessories approved by the manufacturer for a complete roof warranty, including flashing.
4. Roofs shall meet Class A and I-60 requirements.
5. Roof insulation shall comply with current energy conservation regulations.
6. Roofs shall be sloped to provide positive drainage to roof drains with scuppers or overflow drains arranged for backup should a drain not function properly.
7. Provide walk mats to access equipment needing regular maintenance.
8. Provide mats under lightning protections supports if used on the roof; coordinate with electrical. Lightning rods are not to penetrate the roof.

Fire Resistant Materials
1. Spray on fire-resistant materials shall be in accordance with IBC and inspected as required by IBC Chapter 17. Other requirements for inspector-of-record specified elsewhere shall apply. Thickness shall be as required by Consultant-of-Record to attain the required fire-resistant rating. The sprayed on fire-resistant materials shall be constructed such that that remain in place without random falling on ceilings.
2. UAMS Standard for fire stopping material in wall and floor penetrations is 3M, Hilti, or STI; firestoping shall be limited to one manufacturer per building and shall be UL rated for the penetration being protected.
3. For Smoke/Firewall Penetration Inspection: Insure all rated walls are sealed with no gaps greater than UL Requirements. Notify the UAMS Project User Contact at the appropriate time (before the ceiling tile is installed) that the area is ready for inspection. Stencil all walls at clear intervals within the room with the rating of the wall to insure proper identification prior to inspection; identification shall be easily identified in each room.
4. For Smoke/Firewall Penetration Daily Maintenance: At the end of each workday, seal all smoke / firewall penetrations using temporary measures if permanent measures are not available or provide a 24 hr fire watch.

Water Repellents
1. In all elevated mechanical room floors, seal elevated equipment room floors with epoxy or other suitable durable watertight material. The material will turn up walls 4” or as approved by DESIGN & CONSTRUCTION and be capable of holding water up to 1” from rim for 6 hours. Watertight material is to wrap the curb. Seal includes the perimeter, all openings, and equipment pads. System is to be tested before acceptance.
2. In below grade structures, seal floors, walls, and/or roofs to prevent water intrusion. The use of expansive clay similar to Voltex is preferred, but other type of applications would be considered. Minimum warranty is 5 years from substantial completion for complete replacement of failed materials.
3. All sealants are to be compatible with the surrounding materials and rated for the type of application. Use backer rods or bond breaker tape as required by system manufacturer. Do not use silicone on the exterior. Sealants should be specified that is guaranteed for a minimum five years for the application to be used and be finished aesthetically pleasing. Pavement sealant is to be self-leveling, preferred manufacturer is Neogard, but other would be considered.
## Division 08 Openings

### Door & Frame General

1. Door undercut shall not exceed ¾” or as required by code.
2. Door gaps excluding bottom shall not exceed 1/8” as required by codes.
3. Fire-rated doors shall comply with all prevailing codes having jurisdiction. Labels shall be permanently fixed to frames or doors as required by codes and visible at all times when door is open.
4. Doors, frames, and windows are to be protected while being stored on site against corrosion, abuse, or other damage. Maintain temperature and humidity levels acceptable to manufacturer in areas doors are hung.
5. Doors and frames shall be installed so that they swing or operate freely without binding. They are to be set plumb, level and true to line, without warp or rack of framing.

### Wood Doors

1. Acceptable manufacturers are Algoma, Marshfield, Buell, Eggers, Oshkosh.

### Hollow Metal Doors and Frames

1. Provide drip edge on exterior doors/frames with no cover.
2. Acceptable manufactures are Steelcraft and Ceco.

### Aluminum Doors

1. Aluminum doors shall only be used when approved by DESIGN & CONSTRUCTION. Aluminum frames and doors shall be by a single manufacturer with five or more years of proven experience. Aluminum is to be from controlled alloy billets of 6063-T5.
2. Aluminum frames and doors are only to be used in fire rated openings up to 20 minutes when allowed. Jambs are to be premachined to prepare for hardware, with concealed reinforcement plates, alignment clips, and fastened within frame without exposed fasteners.

### Automatic Doors

1. Specify Stanley automatic doors and hardware where applicable. To be designed for heavy use applications using low energy barrier free operator, self-contained electromechanical design. Automatic door contractor is to be responsible for coordination of fire alarm and security requirements to door and ensure door hardware is capable for interfacing with systems. Reference division 16 for Security and Fire Alarm requirements.
2. Control shall allow for manual or automatic operation.
3. Opening speed shall be 3 to 5 seconds, closing speed shall be 3 to 5 seconds, delay before closing adjustable between 2 to 25 seconds. Door not to exceed 15 pounds force or as specified by governing codes.
4. Operator shall have provisions for key switch to turn card reader on at nights.

### Hardware

1. Hardware is to be coordinated with the Security and Fire Alarm sections
2. Specify Best key system and key system into campus master system as directed by DESIGN & CONSTRUCTION. A Best representative is to coordinate the keying of the doors for a project with a designated UAMS representative without additional charge to the project or UAMS.
3. Permanent keys are to be delivered to the UAMS designated representative straight from Best.
4. Utility, Stairwell, and Exterior doors are addressed in Security section
5. Design for slim line door panic hardware, where applicable. (Von Duprin is preferred)
6. Kick/Armor plates for all corridor doors. Type to be determined during planning. 36” tall armor plates are to be used on all doors separating corridors and factory installed to meet fire codes.
3. Magnetic hold opens on all doors separating corridors unless directed by DESIGN & CONSTRUCTION.
4. Provide astragals and coordinators for double pair of doors requiring rating or security.
9. Provide wall-mounted doorstops where practical. Floor stops are to be used if wall stop is impractical and shall be placed so as not to be a tripping hazard.
10. All doors are to be positive latched where in patient areas and opens to corridors or egress routes. Other doors are not excluded from being positive latch, if in doubt, ask.
11. Hardware is to be mortise installed unless waived by DESIGN & CONSTRUCTION.
12. Astragal requirement shall be constructed on active leaf of door pairs with latching hardware.

**Aluminum Entrances and Storefronts**

1. Aluminum entrances and storefronts shall be installed complete by a single manufacturer or their representative except cylinder, which will be provided under hardware. Door is to be heavy duty.
2. Permanently label each unit of tempered glass and place approved decals on window.
3. Exterior Glass is to be highly energy efficient (sealed insulated/ low e coating) unless waived by DESIGN & CONSTRUCTION.
4. Aluminum mullions are to be consistent in finish with no shading differences present between pieces. Baked on painted finish shall be guaranteed for 20 years, anodized shall be guaranteed for 10 years. Mullions shall be thermal break constructed.
5. Provide continuous flashing under all exterior windows. Any lapping of flashing shall be perpendicular to run and sealed in solid sealant.
6. Water test each piece of glass (ASTM E 331) after installation with a pressure hose (10 lbs per sf) to prevent water infiltration into the building. Repair any area found to be leaking.
7. Tinting is to match other exterior windows.
8. Use non-staining shims where required for proper operation.
9. Plumbness shall not exceed 1/8” in 10’, ¼” in 40’. Levelness shall not exceed 1/8” in 20’, ¼” in 40’. Alignment not to exceed 1/16” where surfaces are flush.

**Glazing**

1. Systems shall be single source. Comply with ANSI Z97.1 and CPSC 26 CFR 1201 CII.
2. Permanently label each unit of tempered glass and place approved decals on window.
3. Exterior Vision Glass (q3) is to be highly energy efficient (sealed insulated/ low e coating) unless waived by DESIGN & CONSTRUCTION.
4. Exterior Spandral Glass (q2) is to be ceramic coated complying with ASTM C 1048.
5. Wire Glass (q8, m2) is to comply with ASTM C 1036, type II (pattern and wire glass flat).
6. Mirror Glass (q2) is to comply with ASTM C 1036 with a silver coating 2 mil thick complying with CS27.
7. Tinting is to be the same between vision and spandrel for a matched finish.
8. Provide continuous flashing under all exterior windows. Any lapping of flashing shall be perpendicular to run and sealed in solid sealant.

9. Water test each piece of glass (ASTM E 331) after installation with a pressure hose (10 lbs per sf) to prevent water infiltration into the building. Repair any area found to be leaking.

10. Use non-staining shims where required for proper operation.


**Glazed Curtain Wall System**

1. Aluminum entrances and storefronts shall be installed complete by a single manufacturer or their representative except cylinder, which will be provided under hardware. Door is to be heavy duty. System shall comply with AAMA provisions for “Metal Curtain Wall, Window, Storefront, and Entrance Guide Specifications Manual”.

2. Permanently label each unit of tempered glass and place approved decals on window.

3. Exterior Glass is to be highly energy efficient (sealed insulated/low e coating) unless waived by DESIGN & CONSTRUCTION.

4. Aluminum mullions are to be consistent in finish with no shading differences present between pieces. Finish shall be guaranteed for 20 years. Mullions shall be thermal break constructed.

5. Provide continuous flashing under all exterior windows. Any lapping of flashing shall be perpendicular to run and sealed in solid sealant.

6. Water test each piece of glass (ASTM E 331) after installation with a pressure hose (10 lbs per sf) to prevent water infiltration into the building. Repair any area found to be leaking.

7. Tinting is to match other exterior windows.

8. Use non-staining shims where required for proper operation.

9. Plumbness shall not exceed 1/8” in 10’, 1/4” in 40’. Levelness shall not exceed 1/8” in 20’, 1/4” in 40’. Alignment not to exceed 1/16” where surfaces are flush.

10. Approved manufacturers are Kawneer, Efco, US Aluminum, and Vistawall.
Division 09  Finishes

General
1. Specify all fabrics and finishes to meet applicable flame spread rating.
2. In patient care areas and/or areas adjacent to patient care areas the chemical exposure levels shall not exceed one tenth (1/10) of the ACGIH TLV in effect when the bid is awarded. Where no TLV has been established, the chemical exposure levels shall not exceed one tenth (1/10) of the NIOSH REL in effect when the bid is awarded. Where neither of the above limits has been established, the UAMS Occupational Health & Safety Department will determine threshold level(s).
3. All colors are to be approved by the project core committee.
4. Do not specify contractors to provide extra paint stock at the end of the job.
5. Recess double doors in corridor walls to protect from hallway traffic where practical.
6. Materials shall be installed as per manufacturer's guidelines.
7. Review all finishes at end of Design Development with DESIGN & CONSTRUCTION Interior Design Coordinator.
8. Architect will coordinate acoustical considerations for all disciplines.
9. Smoke Barriers shall be constructed to meet 1-hour requirements.
10. Floors subject to getting wet will be slip resistant but cleanable, and is to be discussed with DESIGN & CONSTRUCTION during planning.

Acoustical Ceilings
1. Design of acoustical ceiling system shall be based on Armstrong, 2 x 2 pattern, installed in compliance with ASTM C636. Attachments shall be designed for attachment to structure of not less than 5 times the hanger design load for the structural classification. Minimum size of wire is 12 gauge galvanized steel.
2. Installation of system shall be level and true to line, maximum tolerance 1/8" in 10', with neat and close fitting joints between spliced and intersecting members. Grid is to be square with ends and cross tees tightly butted, with faces in the same plane. Do not rest flanges of the cross tees on the flanges of the main runners. Install hold down clips and light fixture clips where required to meet code or pressure differentials.
3. Neatly and accurately cut and place acoustical panels to fit snugly into the main and cross tees with no space between the bottom of the panels and grid system. Finished installation should not show any gaps or panel edges. Acoustical panel shall be Class A (flame spread under 25).
4. Care should be exercised by architect in ceiling design where cleaning is required. Gypsum board ceiling may be necessary to meet code requirements if the specified Mylar ceiling will not work.
5. Due to limited storage space on campus and the frequency of replacing panels, acoustical panels shall be limited to Armstrong colored white with the following styles unless waived by DESIGN & CONSTRUCTION.
   a. Armstrong 2195 Cortega Beveled Tegular 9/16", 24" x 24" x 5/8"
   b. Armstrong 704A Cortega Angled Tegular 16/16", 24" x 24" x 15/16" 
   c. Armstrong 770 Cortega Square Lay-in, 24" x 24" x 5/8"
   d. Armstrong 868 VL Fireguard Nonperforated, 24" x 24" x ¾"
   e. Armstrong 769A Cortega Square Lay-In, 24" x 48" x 5/8"
Painting
5. Paints should have the proper primer for the application.
6. Painting shall be a minimum of two finish coats of water based acrylic latex or epoxy and have a consistent finish with no imperfections showing. An imperfection is defined as when undercoats, stains, or other conditions show through the final coat of paint, until the paint is of uniform finish, color and appearance. Edge corners, crevices, welds, and exposed fasteners should receive a film thickness equivalent of that of flat surfaces. Surfaces are to be prepared such that no depressions, cracks, or loose materials transmit through the paint.
7. Painting in high moisture content rooms shall be acrylic epoxy based.
8. Painting in high impact areas should refer to the epoxy floors and walls section.
9. Interior walls to receive water based acrylic latex shall be satin or eggshell finish. Textures should be coordinated through DESIGN & CONSTRUCTION.
10. Interior frames to receive water based acrylic latex shall be semi-gloss finish.
11. Painted ceilings to receive water based acrylic latex shall be flat finish. Textures should be coordinated through DESIGN & CONSTRUCTION but shall be cleanable.
12. Wood finishes shall have the appropriate wood filler and be stained with a polyurethane varnish or receive satin alkyd enamel, coordinate through DESIGN & CONSTRUCTION.
13. All structural exposed exterior metal is to be hot-dipped galvanized and painted.
14. All exposed metal is to be painted unless waived by DESIGN & CONSTRUCTION.
15. All ceiling areas above an open return grill are to be painted black.
16. Rated walls above ceiling are to be labeled as required by governing codes. Type of rated wall should be clearly visible when any ceiling tile is raised in the room.
17. Do not paint prefinished baked on finishes from manufacturers unless the item is old and in need of a protective coating to maintain its life.
18. Acceptable manufacturers are Sherwin Williams, Pratt and Lambert, Benjamin Moore, Pittsburgh, and Sterling.

Multi-color Seamless Wall Covering
1. Multi-color Seamless Wall covering should only be used when directed by DESIGN & CONSTRUCTION. Not to be used in any moisture related or patient areas.
2. Do not use any special types of VWC, coordinate with DESIGN & CONSTRUCTION. Wall covering should comply with ASTM requirements including stain, fungal, and bacterial resistance.
3. Apply material behind wall covering to allow quick release during stripping.
4. Joints are to be kept tight so that a uniform finish is seen. Do not install on any gypsum board that has been wet or imperfections corrected.

Ceramic / Porcelain Tile Floor Finishes
2. Ceramic tile not allowed in patient or equipment transport areas.
3. Ceramic tile allowed only in certain circumstances (example: Lobby areas) when directed by DESIGN & CONSTRUCTION. For ease of cleaning, tiles must be 12” minimum and grout lines ¼” or less with true straight lines. Grout shall be sealed prior to acceptance, sealer must be acceptable to grout manufacturer.
4. When using ceramic tile, include a base of similar material unless waived by DESIGN & CONSTRUCTION.
Vinyl Composition Tile Finishes
1. Acceptable manufacturers are Armstrong, Mannington, Azrock, GAF-Tarkett
2. Patterns shall be approved through UAMS DESIGN & CONSTRUCTION Interior department
3. Tiles shall be 12” x 12” x 1/8” Class I or Class II.
4. Maintain minimum temperature of 70F 48hrs before and during installation. Relative humidity shall be maintained at a level acceptable to floor manufacturer.
5. Floor is to be thoroughly cleaned prior to tile installation, any imperfections visible through tile as a result of unclean floor will have tile replaced at contractor expense.
6. VCT floors are not to be waxed by the contractor; UAMS will strip and wax the floors after acceptance.
7. Provide 3% surplus material as attic stock.

Rubber stair threads, risers, landing mats, base, and edge strips
1. Stair threads & risers shall be one piece where used with a tapered thickness gage of 5.33mm to 3.89mm, 2” nose depth and hinged underside to meet ADA requirements.
2. Landing Mats shall be 24” x 24” standard, 0.125” thick unless waived by DESIGN & CONSTRUCTION.
3. A 4” rubber base shall be used where no other base is specified.
4. Resilient Edge Strips shall be vinyl, 5/16” thick x 1-1/4” wide.
5. Carpet/Tile Joiner Strips shall be vinyl, ¼” carpet to 1/8” resilient tile.
6. Adhesives should not be visible and gaps shall be tight.
7. Maintain minimum temperature of 70F 48hrs before and during installation. Relative humidity shall be maintained at a level acceptable to floor manufacturer.
8. Accessories are to be carefully molded around the application it is intended to be used. Care should be exercised to ensure the accessory remains in place for an extended period of time, especially around corners.
9. Do not wax by contractor; UAMS will strip and wax the floors after acceptance.
10. Approved manufacturers are Johnsonite, Marley-Flexco, and Roppe.

Sheet Vinyl Flooring
1. Install only when directed by DESIGN & CONSTRUCTION.
2. Sheet vinyl seams are to be heat welded with a color to match the flooring. Metal cap strips are to be used at wall terminations. All joints are to be completely sealed so that a liquid may not penetrate the joint.

Carpet Flooring
1. Carpet is difficult to maintain at this institution and should only be used when directed by DESIGN & CONSTRUCTION.
2. Carpet should be specified with vinyl backing, 6’ roll goods standard and use a quick release adhesive.
3. Coordinate pile height, density, and turf with DESIGN & CONSTRUCTION interior designer. Possible roll resistance problems should be considered and discussed with DESIGN & CONSTRUCTION during design.
4. Carpet shall not show any imperfections including rolls, misalignment of pattern by more than ¼” in 10’, runs, or tears; maintain direction and pattern. Imperfections (holes, cracks,
depressions, or rough areas) in slab will be corrected with a leveling compound acceptable to adhesive manufacturer.
5. Acceptable manufacturers are Collins & Aikman, Mannington, and Lee’s.
6. Carpet padding should not be used.
7. Maintain temperature a minimum of 55F 48 hours before, during, and after installation.
8. Provide manufacturers standard cleaning instructions for the carpet installed.

**Carpet Tile Flooring**
1. To be used only when approved by DESIGN & CONSTRUCTION.
2. Carpet tiles where used are to have quick release adhesive for vinyl backed carpet adhesive.
3. Carpet joints are to be tight and straight, no adhesive is to be visible.
4. Color, size, pattern, texture, dye system, backing, and soil protection should be carefully considered when selecting.
5. Coordinate pile height, density, and turf with DESIGN & CONSTRUCTION interior designer. Possible roll resistance problems should be considered and discussed with DESIGN & CONSTRUCTION during design.
6. Wear warranty shall be 15 years limited; backing warranty is lifetime limited.
7. Carpet padding should not be used.
9. Carpet shall not show any imperfections including rolls, misalignment of pattern by more than ¼” in 10’, runs, or tears; maintain direction and pattern. Imperfections (holes, cracks, depressions, or rough areas) in slab will be corrected with a leveling compound acceptable to adhesive manufacturer.
8. Maintain temperature a minimum of 55F 48 hours before, during, and after installation.
9. Provide manufacturers standard cleaning instructions for the carpet installed.

**Epoxy (Composite) Flooring and Walls**
1. Epoxy flooring is the preferred floor for Restrooms, animal holding areas, and Kitchens provided the budget allows its use. Epoxy floors shall be troweled on with base.
2. Chemical Epoxy flooring is the preferred floor in cages wash areas.
3. Reinforced Epoxy Walls are preferred in high abuse areas.
4. Desco is the preferred epoxy coating, but other companies will be considered if the following criteria can be met

**Floor Preparation**
(1) Contractor shall prepare the floors from concrete to an acceptable flatness not to exceed 1/8” in 10’ when measured with a straightedge, unless approved by UAMS prior to beginning the work. Slope surfaces uniformly to drains where required.
(2) Contractor shall provide a floor patch compatible to the epoxy resin floor and shall use pea gravel as recommended by the manufacturer in thicker patches.
(3) Provide necessary materials to support floor integrity where expansion/contraction is shown.
(4) Patchwork shall be included as part of the contractors warranty.

**Epoxy Resin Floor and Base**
(1) Seamless Resinous flooring consisting of 100% solids epoxy resin blended with selected ceramic coated quartz aggregates.
All materials must be recommended and manufactured by a single manufacturer to insure compatibility and mechanical bond.

Products must be installed per manufacturer’s guidelines with a joint guarantee from installer and manufacturer protecting UAMS from failure, including delamination and pitting, for 5 years. UAMS reserves the right to have defected floors showing these conditions removed by the Contractor and replaced at no expense to UAMS.

Colors shall be as selected from standard options and can have different colors patterns within a project at no cost, but one color pattern per room without additional costs.

Slope surfaces uniformly to drains where required.

Bases shall be of the same material as the floor and can vary up to 12 inches as the project demands.

Bases shall have a turned metal edge strip installed at the top sealed against the wall to prevent liquid from entering the underside of the base and floor.

Inside corners are to be rounded with a 1" smooth radius integrally connected to the floor. Outside corners are to be rounded smooth and straight.

Cementitious Polyurethane Floor and Base (Chemical Resistance and Operating Temps over 140F)

Seamless Resinous flooring consisting of three-component, 100 percent solids, hand trowelable, polyurethane/cementitious, mineral aggregate flooring system to a nominal ¼" thickness.

All materials must be recommended and manufactured by a single manufacturer to insure compatibility and mechanical bond.

Products must be installed per manufacturer’s guidelines with a joint guarantee from installer and manufacturer protecting UAMS from failure, including delamination and pitting, for 5 years. UAMS reserves the right to have defected floors showing these conditions removed by the Contractor and replaced at no expense to UAMS.

Provide acid resistant coatings as projects require, expected chemicals are listed in Attachment “B” and are subject to change on a project-by-project basis.

Floors shall be prepped from concrete by the Contractor, and the surface product shall be level within 1/8 inch in 10 feet unless approved by UAMS. Slope surfaces uniformly to drains where required.

Provide elastomeric waterproofing membrane as required for proper installation.

Bases shall be of the same material as the floor and can vary up to 12 inches as the project demands.

Bases shall have a turned metal edge strip installed at the top sealed against the wall to prevent liquid from entering the underside of the base and floor.

Inside corners are to be rounded with a 1” smooth radius integrally connected to the floor. Outside corners are to be rounded smooth and straight.

Epoxy Resin Wall Coating (Reinforced)

Chemical resistant wall surfacing with integral fiberglass embedded on smooth walls. Coating shall be applied in a five step process including priming, applying fiberglass, sanding imperfections, two body coats and one sealer coat. Fiberglass shall be an alkali resistant fiberglass approved by the coating manufacturer.
(2) Must be capable of being installed on sheetrock, concrete or concrete unit masonry. When coatings are complete, the fiberglass shall have a slight texture but be free of pinholes.

(3) All materials must be recommended and manufactured by a single manufacturer to insure compatibility and mechanical bond. Film thickness shall be 20 to 40 mils.

(4) Products must be installed per manufacturer’s guidelines with a joint guarantee from installer and manufacturer protecting UAMS from failure, including delamination and pitting, for 5 years. UAMS reserves the right to have defected floors showing these conditions removed by the Contractor and replaced at no expense to UAMS.

(5) Surface texture shall be selected on a project-by-project basis. Each selection of finish is to be supplied for each project.
Division 10  Specialties

**Plastic Toilet Partitions**
1. Toilet partitions shall be solid plastic, high density polymer resin (HDPE) 3/4" thick seamless construction with eased edges, overhead braced and wall and floor anchored. Partitions at urinals shall be wall mounted between urinals to provide privacy.
2. Install in restrooms with more than two or more water closets or urinals.
3. Accessories shall be heavy duty, non-corrosive with theft resistant fasteners.
4. Acceptable manufacturers are Santana Products, Capitol Partitions, Comtec Industries

**Louvers**
1. Shall be extruded aluminum fixed louvers, complete, including fabrication modifications for the wall application. Louvers shall be in compliance with AMCA 500 and the design mechanical engineers performance requirements.
2. Louver shall include a bug screen on the interior of the building that can easily be removed for cleaning.
3. Louver shall have an anodized 20 year finish in a color approved by building core team.
4. Approved manufacturers are Ruskin, Construction Specialties, Airolite, Airline, Cesco, Greenheck, and reliable.

**Lockers**
1. Locker types and styles shall be discussed during the planning stages of a project with DESIGN & CONSTRUCTION. The standard locker will be based on metal units, but wood units may be allowed in higher profile areas if budget allows and DESIGN & CONSTRUCTION approves.

**Fire Extinguisher Cabinets, Extinguishers, Brackets**
1. Type and quantity to be approved by governing authority and shall be ADA compliant.
2. Fire extinguisher cabinets shall be a Larson’s Occult Series Vertical Duo Door semi-recessed sized for a 10-pound ABC extinguisher, rolled edges.
3. Fire hose cabinets shall be Larson’s HC Series with complete Hose rack unit, Horizontal Duo Door with “Fire Hose” in Red on the door, recessed.
4. Fire Extinguishers shall be 10lb ABC
5. Approved manufacturers are Larson & JL Industries.

**Wall and Corner Guards**
1. Install wall and corner guards in high traffic areas and discuss options during planning. Standard is plastic with non-corrosive metal reinforcement in corridor areas, but stainless steel will be considered. Wood will be considered in office areas.
2. Wall rails shall be based on Acrovyn HR-4C (plastic), Pawling BR-500 (plastic), Acrovyn AW-10CUB (wood), Acrovyn ECR-325 (stainless steel) unless waived by DESIGN & CONSTRUCTION. Type shall be verified with DESIGN & CONSTRUCTION.
3. Corner guards shall be based on Acrovyn SM-20M, Pawling CG-20/TC-20, install full height unless waived by DESIGN & CONSTRUCTION.
Toilet and Bath Accessories
1. Toilet and Bath Accessories are to be installed from 302/304, No 4 finish, 22-gage minimum stainless steel unless waived by DESIGN & CONSTRUCTION. Fasteners will be corrosive resistant. Exception will be fixtures installed by housekeeping.
2. Do not equip restrooms in Non-Clinical areas with feminine hygiene product dispensers, soap dispensers, trash receptacles, paper towel dispensers, or toilet paper dispensers, these items will be procured and installed by UAMS Campus Housekeeping.
3. Equip restrooms with adequate shelving for an 8½ x 11 notebook.
4. Design for baby changing stations in public restrooms, Men’s and Women’s. Manufacturer to be discussed during planning.
5. Equip toilet compartments with durable napkin disposals.
6. Provide blocking in the wall for the paper towel dispenser, coordinate location with DESIGN & CONSTRUCTION.
7. Soap dispensers will be Owner Furnished, but the architect should show the location on the drawing next to the sink and make provisions so that it is not over any joints in existing plastic laminate. Show recommended locations for other Owner furnished items as described in item 2 and note Owner furnished, Owner installed.
8. Acceptable manufacturers are Bobrick, Bradley, ASI.

Marker Boards and Tack Boards
1. To be discussed during planning with DESIGN & CONSTRUCTION to determine type and quantity.

Recessed Entry Mat
1. Recessed entry mat support shall be aluminum framed with “U” channels, locking bars, I beam supports, leg supports.
2. Thread surface shall be a technitron solid color pile, 100% nylon with permanent static control and soil resistant technology, 9/32” finished pile height. Threads should be easy to clean.
3. Color as approved by Building Core Team.
4. Acceptable manufacturers: Balco

Access Floors
1. Floors shall be Bolted/Snap-on Stringer System capable of 2500 psf concentrated load and 6000lb ultimate load, electrodeposition paint finish, light weight cementitious fill in panels, completely non-combustible, grounded with electrical continuity, and class A flame and smoke rating.
2. Floors finish shall have a high-pressure laminate (HPL) tile finish and contain appropriate perforated tiles arrange for maximum airflow.
3. System is based on Tate Access Floors Concore 2500.
4. Include suction cup to remove floor from support in closeout requirements.

Dock Bumpers
1. L-shape non-corrosive unit 18” x 18” x 4” thick. Heavy molded rubber compound reinforced with nylon, rayon, or tyrex cord. Space as necessary to protect the dock from damage.
Rotary Darkroom Doors
1. Door is to be two-way, high-impact ABS, flash point 730-752F, flame class rating UL 94HB.
2. Acceptable manufacturers California Stainless Manufacturing, Kreonite

Interior Identifying Devices
1. Manufacturer, font, type and style must be approved by DESIGN & CONSTRUCTION during planning for all specialty interior signage.
2. Room signage will be Owner Furnished, Owner Installed unless waived by UAMS.
3. Room numbers shall be coordinated with UAMS prior to manufacture of signs.
4. All stairs, utility rooms, and restrooms shall be adequately identified with name, symbols, and brail beside the door and installed as required by codes.
5. All offices shall have a sign in the corridor identifying the room with a number and slip cover to insert a name and/ or title complete with brail identifying the room number beside the door and installed as required by ADA. Only room numbers and brail shall be permanently fixed.
6. All stairs and elevators on each floor shall have a directory sign addressing the major department and department head for each floor using slots for removable signs. Directory shall also address connection points to other buildings.
7. Provide directional signs as directed by DESIGN & CONSTRUCTION.
8. Logo’s for the different departments can be found at the following address: http://creativeservices.uams.edu/uams_logos/

Building Plaques
1. All new buildings will be designed with a building plaque placed in a public area mounted so that it cannot be easily removed from the wall unless waived by DESIGN & CONSTRUCTION.
2. Building plaques will be unique for each project, but shall be designed for 36” x 24” with 864-letter allowance and a logo unless waived by DESIGN & CONSTRUCTION. Letter fonts and sizes to be selected on per project basis.
3. Plaques to be cast bronze with a dark background with letters and the logo highlighted in bronze and sealed.

Illuminated Exterior Signs
1. Signage shall be Friz Quadrata or Helvetica Medium fonts, coordinate which font through DESIGN & CONSTRUCTION. Size shall be reasonably visible within 500 feet of the building.
2. All exterior signage shall contain a very pronounced UAMS logo in Friz Quadrata with the lettering in white and a red dot replacing the cross bar in the A. Other descriptions on the signage shall be smaller and describe the name of the building and any other information necessary on that sign.
3. All exterior signage is to be approved by UAMS prior to final submission of contract documents.
4. Attached is the format and logo to be used for all exterior signage.

Non-Illuminated Exterior Signs
1. Signage shall be Friz Quadrata or Helvetica Medium fonts, coordinate which font through DESIGN & CONSTRUCTION. Size shall be reasonably visible within 500 feet of the building.

2. All exterior signage shall contain a very pronounced UAMS logo in Friz Quadrata with the lettering in black and a red dot replacing the cross bar in the A. Other descriptions on the signage shall be smaller and describe the name of the building and any other information necessary on that sign.

3. All exterior signage is to be approved by UAMS prior to final submission of contract documents.

4. Attached is the format and logo to be used for all exterior signage.

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**Acoustical Wall Treatment**

1. Coordinate acoustical considerations for all disciplines.

2. The maximum cumulative noise criteria are listed under Mechanical Noise Ratings.

**Bird Deterrent**

1. Elevated horizontal exterior surfaces are to be discussed with DESIGN & CONSTRUCTION for consideration of a bird deterrent to prevent them from roosting.
Division 11  Equipment

Appliances
1. Appliances shall be discussed during the planning stages for break, conference, and any other room designated by DESIGN & CONSTRUCTION. Appliances are defined as freestanding refrigerator, countertop microwave, coffee maker, dishwasher, and icemaker.
2. Appliances shall be Owner supplied unless noted otherwise during planning. Provisions are to be made to provide appliance with the necessary utility connections for proper function.
3. Icemakers shall be dispenser type unless waived in writing by DESIGN & CONSTRUCTION.

Laboratory Equipment
1. Laboratory equipment shall be coordinated for all labs with DESIGN & CONSTRUCTION and the Scientific Users Committee. Lab equipment may include a washer/disinfector, autoclave (sterilizer), ice machine, x-ray film processor, and any other equipment determined during planning and can be Owner or contractor purchased.
2. Manufacturer and model numbers will be determined during planning. Utilities shall be coordinated to support this equipment.

Laboratory Fume Hoods
1. System shall be tested per ASHRAE #110-R Testing, NFPA #45, and SEFA LF-1-1991 in the presence of UAMS environmental engineering and UAMS commissioning team.
2. A list of agents to be placed in the hood can be obtained from DESIGN & CONSTRUCTION.
3. Hood manufacturer shall be coordinated with VAV control system manufacturer to provide appropriate openings and penetrations for all required control accessories.
4. Type of hood is to be discussed with DESIGN & CONSTRUCTION and scientific user committee during planning.

Laboratory Casework
1. Casework is to be coordinated through DESIGN & CONSTRUCTION. Casework can be wood with a solid surface top with a continuous backsplash and sides permanently sealed to prevent liquids from entering edges or 316 stainless steel with a continuous backsplash and permanently sealed by welds to prevent liquids from entering the edges. Additional requirements are defined under millwork in Division 6.
2. Laboratory casework is to be carefully coordinated with DESIGN & CONSTRUCTION and the Scientific User Committee to verify structural load and chemical resistant requirements during planning. Casework and accessories shall be manufactured or furnished by a single laboratory furniture company with five or more years experience in the type of furniture being constructed.
3. Align surfaces of doors, drawers and panels faces with cabinet fronts without overlap of case ends, top and bottom rails. Meet horizontal and vertical case shell members (panels, top rails, and bottom rails) in the same plane without overlap, cracks, or crevices.
4. Cabinets shall be screwed or completely weld shell assembly without applied panels at ends, backs, or bottoms, so that cases can be used interchangeably or as a single, stand-alone unit.

5. Doors with glass inserts shall be designed for glass to be removable for glass replacement without tearing up the door. Glass to be 6mm laminated safety glass.

6. Drawers are to be full extension and interchangeable without the need for special tools. Allow for two locks per lab, keyed differently with 2 keys each lock.

7. Sinks and faucets within casework are to be carefully coordinated so that laboratory equipments can be washed in sink.

8. Casework is to have provisions for adequate electrical outlets spaced 12” apart and medical gases whose type and location will be noted during initial planning.

9. Hazard storage cabinets are to be provided in each lab as directed by DESIGN & CONSTRUCTION & OHS. Cabinet is not required to be vented unless directed by DESIGN & CONSTRUCTION & OHS.


**Electric Projection Screens & Projectors**

1. Use Da-Lite Tensioned Advantage screens or equal as approved through DESIGN & CONSTRUCTION. Screens should have the following options:

2. Screens should have an added layer of opacity to the back of the projection surface, eliminating light leakage, improving color reproduction.

3. Screens should have a Da-Mat

4. Screens are to be tensioned to maintain flatness across the entire projection surface. This greatly impacts corner-to-corner focus.

5. Projection surface and motor is to be separate from the housing.

6. Screens should have a 16:9 (1.78:1) (HDTV Format) aspect ratio and the bottom surface area of the projection area should be between 42 and 48 inches from the floor.

7. Projection screens shall be electric unless waived by DESIGN & CONSTRUCTION and have a low voltage switch to operate as located by DESIGN & CONSTRUCTION.

8. All (overhead) video/data projectors shall be planned to have a 120V20A circuit with a duplex receptacle at projector

9. All (overhead) video/data projectors shall be planned to have a 2-gang data port above ceiling at projector.

10. Provisions should be made to run Audio, video, and control wiring to a planned computer spot on the wall or floor. There should be a 2-gang wall box with a 2-gang mud ring or a floor box (Wiremold RFB-9 or RFB-11) with access to the projector. This should consist of two (2) ¾” conduits either stubbed up into accessible ceiling area or run to a junction box directly above the projector. Coordinate location with DESIGN & CONSTRUCTION.

11. There should be a 120V20A circuit with a duplex receptacle at the computer location.

12. There should be a 2-gang data port at the computer location.
Division 12  Furnishings

Window Treatment
1. Do not use vertical blinds unless approved by DESIGN & CONSTRUCTION
2. Do not use spring roller shades.
3. Window Treatment on the east and west elevations of buildings are to be coordinated with Interior Designer and User to verify that the Sun will not cast a glare on computer screens.
4. Shades shall meet the following specification. This specification is written as a descriptive, open specification in efforts to promote competition. Standard used is MechoShade Systems, Inc., Long Island City, NY., USA, Phone: 718-729-2020, Fax: 718-729-2941. Other manufacturers are allowed provided they can meet this specification. Coordinate selections with UAMS Interior Designer.

Multiple Seating
2. Floor mounted secured in place, with common upright support assemblies with upholstered seat and back cushions.
3. Acceptable manufacturers are Krueger International, Hussey, and Irwin.

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Division 13  Special Construction

Prefabricated Walk-In Cold Room
1. Comply with all governing codes. Perform work in accordance with NSF 7 for cold room construction and UL for operating equipment.
2. Locate the cooling unit on top of the ceiling panel on room near door permitting access for maintenance.
3. Provide a control panel with recording dial thermometers, alarms, and controls at door of each room with alarms wired to central control center in physical plant.
4. Design for a range in temperature of 1 to 4 degree Celsius unless noted otherwise in planning.
5. System is to have a ten-year panel warranty, five-year manufacturer's warranty for compressors, refrigerant, and controls, and two-year supply service and maintenance of refrigeration from date of substantial completion.

Radiation Protection
1. Comply with all governing codes when designing in a radioactive environment.
2. Special attention is to be given to the use of lead lined shielding in walls including glass openings to verify the structural integrity of the floor will not be exceeded.
3. Exhaust of radioactive materials will include alarms to monitor radioactive fallout in the ductwork and take appropriate action as required by governing codes.
4. Design review will include a shielding report signed by the physicist-of-record showing a layout of the room and the calculations in determining the shielding.

Commissioning
1. Commissioning shall comply with ASHE Health Facility Commissioning Guidelines.

Testing, Adjusting, and Balancing
1. Test and Balance to be an option for UAMS decision to either be performed under separate contract from the Sub Contractor and bid by General Contractor or be performed in-house by UAMS separate from the General Contractor. Determination whether or not to bid will occur during pre-design.
2. The TBA contractor shall be a member of NEBB or AABC with a minimum of five years experience in similar type of work. The TBA shall not be required to correct Contractor errors and/or omissions. It shall be the responsibility of the testing engineer to notify the Architect-Engineer, Contractor, and Commissioning Agent of problems found and work with them toward finding a satisfactory solution.

Piping Electrolysis Protection Testing
1. Test all piping subject to electrolysis with an approved system.

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Division 14  Conveying Equipment

Elevators

1. Design for space conditioning in elevator equipment rooms.

2. The elevator control system shall be of non-proprietary design or as follows. The system shall be serviceable and maintainable by a trained elevator mechanic of the Owner’s choice. A complete set of as-built, adjustor’s-level wiring diagrams and all service tools and software necessary to perform safety tests, diagnose problems, view or reset codes and/or change operational parameters of the elevator control system shall be provided to the Owner as part of the contract and shall be retained by the Owner and shall function for the life of the equipment. Hardware and software needed for diagnosis and operating parameter modification shall be products offered as standard by the manufacturer of the control system. No substitutions of proprietary circuit boards, EPROMS, hardware locks, software passwords or coding shall be allowed. As a condition of the installation, the original equipment manufacturer shall guarantee to sell and deliver, on a timely basis, proprietary component repair services, replacement and stock parts, and software updates to the Owner and/or to a third-party elevator maintenance company of the Owner’s choice at a fair market price and provide same with whatever technical notices or bulletins as would be provided to the OEM organization in order to keep the equipment current.

3. Technical and engineering support and assistance for control adjustment, maintenance or troubleshooting shall be provided by the original equipment manufacturer to any maintaining contractor designated by the Owner.

4. Elevator manuals, drawings, diagrams and prints shall be provided with the equipment at time of delivery. All documentation shall be available for replacement purchase, at reasonable cost, by any maintaining elevator contractor designated by the Owner.

5. Consultants shall coordinate all elevator requirements with the elevator inspector prior to final submission to UAMS and obtain approval of elevator from the elevator inspector. UAMS will not entertain additional costs due to the consultant’s failure to coordinate the work with the elevator inspector, but will review additional costs for work beyond the initial accepted requirements.

6. Public elevators shall have a plastic laminate wall finish as selected by the Architect and approved by UAMS Interior Designer. The floor is to be a stone-based tile similar to Fritztile with a pattern as selected by the UAMS Interior Designer and shall be lightweight so as not to impede the maximum load capacity.

7. Service elevators (hereby designated as freight, patient, or dietary) shall have stainless steel walls with a VCT floor with a color to match the elevator lobby and a pattern as selected by the UAMS Interior Designer.

8. Reference Waste Piping for drainage and hydraulic fluids in elevator pits.

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Division 21  Fire Suppression

Schedules
1. Identify Fire Suppression systems in accordance with UAMS Equipment Schedule and Room Number schedule provided by UAMS.
2. Valve Tags shall be indicated on the drawings with the number system approved prior to CD’s, Reference division 23 for sample of valve tags.

General
1. The fire protection shall be designed to provide a complete system with all necessary parts and equipment to comply with NFPA, IBC, FM, OSHA, Local authority having jurisdiction, and UAMS Insurance carrier. No work is to be done until all design and materials including submittals have been approved by the engineer-of-record, UAMS, local authority having jurisdiction, and UAMS’ insurance carrier. UAMS’ Insurance carrier and address is identified in division 1. Design flows and conditions shall be verified prior to beginning design. Ensure all fire protection construction submittal documents show piping locations, head locations, head types, occupancy hazard levels, and main pipe sizes.
2. Fire Sprinkler Heads shall be quick response.
3. Coordinate fire department connections with Authority Having Jurisdiction prior to Construction Documents.
4. Provide and install concrete thrust blocking on all underground piping where changes in direction or elevation occur. Provide thrust resistance on all sprinkler risers up through floor with sufficient seismic bracing at elbow or around piping. Exterior fire department connections will be beside buildings.
5. Coordinate head locations so as not to be over sensitive areas, such as expensive or electrical equipment. Comply with IBC by use of fire detection in lieu of fire suppression. Discuss type of fire protection in these areas during planning.
6. Kitchen hood fire suppression shall be isolated per hood, and shall not have multi-hoods on a system. System shall comply with UL300 and governing codes.
7. Design for dry pendant sprinkler heads in vestibules, other non conditioned spaces, or major electrical or data rooms.
8. Provide a cabinet with 12 spare quick response heads in the mechanical room.

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Division 22  Plumbing

General
1. All plumbing valves shall be tagged with a 1-1/2" round brass disc with black filled numbers and letters not less than 3/8" high in conformance with nomenclature covered in this division hung by means of brass s-hook and chain to the valve; reference mechanical tagging for an example. Numbers are to be obtained from UAMS.
2. Label MEP systems in accordance with UAMS Equipment Systems Schedule provided by UAMS.
3. Piping on roof shall be mounted on pedestal type stands that require no penetrations through the roof. Pedestal shall be treated wood encapsulated by an aluminum cover sized to handle the load of the pipe and height requirements. All piping shall be a minimum of 1'-0" above the roof. Pedestals shall sit on a pad compatible with the roof membrane. Provide rollers on stands where piping is subject to excessive movement.
4. All devices that have the potential of dumping water such as RPZ, relief values, etc. in any building must be piped and drained back to an approved drainage system. Man-made ditches or canals are not acceptable.
5. All valves shall be accessible.
6. Meter all new water and gas lines in buildings recording the flow and usage. These measurements will be returned to the Building Management system for monitoring. Because of the constant improvements in this technology, select equipment jointly with UAMS at time of building design.
7. UAMS reserves first right of refusal of all equipment and materials being removed. Coordinate with UAMS during planning.
8. Pipe and fixtures shall be stored, protected from the weather, and ends packaged to prevent dirt or other debris from entering.
9. Pipe running through concrete or block walls shall be sleeved unless waived by DESIGN & CONSTRUCTION.
10. All piping is to be identified by systems spaced appropriately to easily identify the system. If there is any question as to systems involved, discuss during planning.
11. All fixtures shall be non-absorbent throughout and free from waves, film marks, or discoloration. All surfaces coming in contact with walls, floors, or other flat surfaces shall be flat. All parts shall be acid resisting and non-corrosive.
12. Test all systems as required by governing codes, commissioning, and engineer-of-record to ensure pipes have no leaks. Tests shall be witnessed by UAMS.
13. Record all deviations to contract drawings on a record set identifying the revisions, revised locations, and depths where applicable weekly.

Water Closets
1. Fixtures shall be floor mounted, water saving vitreous china siphon jet elongated toilet with 2-1/4" passageway and 1-1/2" top spud, 1.6 gpf. Coordinate with ADA requirements for handicap fixtures.
2. Coordinate fireproof blocking requirements with Architect.
3. Fixtures shall be American Standard, Kohler, or Eljer

Urinals
1. No floor mounted fixtures. Fixtures shall be wall mounted, vitreous china siphon jet urinal with 3/4" top spud. Coordinate with ADA requirements for handicap fixtures.
2. Coordinate size requirements with DESIGN & CONSTRUCTION during planning. Sizes shall be 17” width minimum size with a minimum of 34” high to the top of the fixture above the floor in handicap applications or 40” in non-handicap applications.
3. Carrier shall be Wade universal hanger plate with pipe uprights and block base feet designed to meet the requirements of the urinal.
4. Coordinate fireproof blocking requirements with Architect.
5. Fixtures shall be American Standard, Kohler, or Eljer.

Lavatories
1. Can be incorporated into millwork or be stand-alone, coordinate with DESIGN & CONSTRUCTION.
2. Lavatories incorporated into millwork shall be self-rimming vitreous with 8” faucet centers unless waived by Engineering & Operations. Coordinate with ADA for handicap fixtures.
3. Coordinate fireproof blocking requirements with Architect.
4. Fixtures shall be American Standard, Kohler, or Eljer.

Sinks
1. Sinks shall be discussed during planning to coordinate with function by Customer including depth and the spigots to ensure flexibility to wash oversize equipment.
2. Design type of spigot and location in sink to avoid splash problems that result in counter top damage.
3. Fixtures shall be American Standard, Kohler, or Eljer.

Janitor sinks
1. Use separate spigots, hot and cold water supply to be independent. Service sinks shall be floor models.
2. Install vacuum breakers on all spigots. Install check valves on both water supply lines.
3. Coordinate type of sink with DESIGN & CONSTRUCTION.
4. All janitor sinks shall include provisions for a holder, 5 mops and/or brooms mounted on the wall.
Faucets
1. Faucets shall be electronic with 5-1/2” spout, splash-proof circuit control module, adjustable sensor screw, LED trouble shooting indicator light, time-out settings unless selected to be manual.
2. Spacing for faucets shall be 8” unless it is a retrofit and then coordinate with Engineering & Operations; some existing systems are 4”.
3. Design for hard-wired sensor type infrared unless noted otherwise by Engineering & Operations. Transformers shall be hidden, but accessible. Design to minimize the number of transformers by having multiple sensors on a transformer.
4. Faucets shall be Delta, Chicago, Kohler, or Eljer

Flush Valves
1. Flush valves shall have an 11-1/2” high inlet rough-in, chrome-plated brass with sensor-operated flush meter for “no hands” operation. Furnish each group of fixtures with a transformer designed for the application, 1” IPS screw driver check angle stop with protective cap, adjustable tailpiece, vacuum breaker. Flush connections and spud coupling for 1-1/2” top spud, cast brass wall and spud flanges with set screw escutcheon.
2. Design for hard-wired sensor type infrared flush valves unless noted otherwise by Engineering & Operations. Transformers shall be hidden, but accessible. Design to minimize the number of transformers by having multiple sensors on a transformer.
3. Flush valves shall be Royal, Sloan or Zurn AquaSense AV unless otherwise approved through DESIGN & CONSTRUCTION.

Electric Water Cooler
1. Electric Water Cooler shall be barrier free delivering 8.0 gph of 50F water at 80F inlet water and 90F room temperature. Bubbler shall have at least two push pads and a built-in pressure regulator.
2. Cooling tank shall be red brass with copper refrigerant coils. Refrigerant flow shall be controlled by capillary tube. Temperature shall be controlled by adjustable thermostat. All water lines shall be copper.
3. Unit shall have a limited five-year warranty on the sealed refrigeration system and component parts. Chilling package shall meet specifications of US Dept of Commerce Bureau of Standards; Public Health, Sanitary and Plumbing Codes; and be certified to ARI. Listed by Underwriters Laboratories, and certified by CSA. Cooler shall meet ANSI Std A117.1 and ADA requirements.
4. When supplying a normal height cooler, provide another one next to it meeting ADA guidelines.
5. Parts are to be readily accessible within 24 hours.
6. Acceptable manufacturers are Elkay, Oasis, and Halsey Taylor.

Emergency Shower
1. Shower shall be cast aluminum with flange for flush to ceiling mounting, stainless steel spreader, with pull rod for adequate reach complying with ADA. Furnish with air horn alarm. Mount alarm on wall adjacent to shower.
2. Consider a drain or containment area around the shower if permitted by code.
Elevator Sump Pump
1. The elevator sump pump shall be a submersible pump capable of complying with the governing codes and the requirements of the engineer-of-record.
2. Suction, discharge, intermediate chambers, impeller and terminal box cover shall be constructed of stainless steel. Wearplate, terminal box, and pump handle shall be constructed of composite materials. The motor shall be water lubricated with hermetically sealed windings. The wear plate shall be replaceable. Furnish with 1-1/4” threaded outlet, mechanical float switch and power cord.
3. Provide appropriate cover over pump to comply with governing codes and regulations.
4. Coordinate elevator sump pump with elevator inspector.
5. Coordinate with Waste Piping for storage of elevator waste and oil.

Hose Bibs
1. Exterior hose bibs shall be freeze proof, ¾” size, with chrome finish brass casting face, backflow preventer, wall clamp and key handle.

Bed pan washers
1. Design for wall mounted, hand-held, foot pedal operated bedpan washer assemblies in all patient care toilets except as directed otherwise by DESIGN & CONSTRUCTION personnel. Coordinate manufacturer with DESIGN & CONSTRUCTION. Coordinate and verify furrow dimension with Architect.

Plumbing Supports
1. Provide adequate pipe and equipment foundation and suspension systems in accordance with recognized engineering practices and code requirements, using where possible standard commercially accepted hangers and accessories.
2. Where thermal movement or vibration in pipes or equipment can occur, the pipe hanger assembly must be capable of supporting the line without sag or excessive movement except those systems requiring thermal considerations in all operating conditions.
3. Pipes shall be seismically braced as required by the International Building Code.
4. Supports for pipes or equipment shall be fastened to the building structure; supports being attached to other utilities are not acceptable.
5. If seismic bracing is not required, piping on roof shall be mounted on pedestal type stands that require no penetrations through the roof. Pedestal shall be treated wood with an aluminum cover sized to handle the load of the pipe and height requirements. All piping shall be a minimum of 1”-0” above the roof. Pedestals shall sit on a pad compatible with the roof membrane. Provide rollers on stands where piping is subject to excessive movement.
6. Exterior equipment shall be supported on galvanized structural steel supports designed by a Registered Arkansas Structural Engineer with seismic requirements of IBC meet unless waived by DESIGN & CONSTRUCTION. Indoor equipment in Mechanical Rooms shall be mounted on minimum 4” reinforced concrete pad with chamfered edges if ceiling height permits. Interior equipment mounted above ceilings shall be supported by structural steel seismically braced per IBC.

Plumbing Insulation
1. Insulation shall be manufactured in accordance with ASTM, UL, NFPA, and IBC standards and regulations and meet the requirement of a flame spread of 25 or less and a smoke developed rating of 50 or less.

2. Type of insulation shall be as determined by engineer-of-record to meet requirements of system with a minimum life of 10 years. Insulation shall be fastened to securely remain in place for the life of the insulation.

3. Pipes and accessories shall be insulated with sufficient thermal conductivity to meet requirements of Arkansas Energy Code.

4. Exterior pipe shall include aluminum jackets around insulation.

5. Insulated piping with service temperature below 140F in mechanical rooms or exposed shall be protected by a smooth 20 mil PVC jacket. Elbows in water lines shall have a 20 mil PVC jacket.

6. All water piping shall be externally insulated unless waived by DESIGN & CONSTRUCTION.

7. Roof storm lines shall be externally insulated in sufficient lengths to prevent a condensate problem.

8. Seal all longitudinal and lateral insulation seams and joints on all piping systems transporting fluids or gases.

9. Insulation shall fit snug and securely to surface without air gap.

10. Tears, punctures, and other penetrations shall be repaired to provide a vapor-tight system.

Water Supply Piping Systems

1. All cold and hot water piping within a building shall be Type “L” hard drawn copper tubing, with solder joint wrought copper tube fittings unless waived by DESIGN & CONSTRUCTION. Joints shall be made with Stay Safe “Bridgit” Lead Free Solder, or equal. Lead solder shall NOT be used on any system.

2. Water overflow on Backflow Preventers are to be piped to an approved drain system sized to handle the flow.

3. All piping is to be arranged so as not to interfere with the removal of other equipment or devices, nor to block access to doors, windows, manholes, or other access openings.

4. Piping shall be properly supported and adequate provisions shall be made for expansion, contraction, slope, anchors, and seismic conditions.

5. High points of all water piping and where flow in pipe turns down shall be properly vented to prevent water hammer. Show manual and automatic air vent locations for piping systems on the floor plans.

6. Piping shall be worked into place without undue forces or springing being placed on the pipe.

7. Cutting or alterations of the building support of the structure will not be permitted without the expressed written permission of an Arkansas Registered Structural Engineer.

8. Copper piping routed below grade under concrete or fill which may attack the pipe surface, shall be sleeved with a 4-mil thickness polyethylene sleeve. Hot water lines shall have a red sleeve and cold water lines shall have a blue sleeve. Sleeve all penetrations through concrete or block with a compatible heavy-duty sleeve that will not react with copper pipe.

9. Water lines are to be properly designed to prevent corrosion in the pipes, which could affect water quality. Piping shall have isolators between dissimilar metals to prevent electrolysis. Lines shall be thoroughly tested to ensure corrosion of pipe is not taking place in line.
10. Zone isolation valves shall be installed at no less than one per floor and shall not interfere with other zones. Means shall be provided to drain the system.
11. All fixtures shall have one stop valve per line at each fixture.
12. Piping shall be free of any objectionable self-generated noise. Isolate piping from building where required to prevent transmission of noise.
13. Hot water shall be available at plumbing fixtures to receive hot water within 10 seconds. Hot water systems should carefully consider the use of a recirculation system to achieve the 10 second rule. Commercial Grade Point of Use Water Heaters will be considered when domestic hot water is not reasonably obtainable. Heat tape on piping indoors to heat domestic water for hot water is not acceptable.
14. Do not install over any electrical equipment, panels, or transformers.
15. The complete water system shall be thoroughly sterilized as required by the Arkansas Department of Health.
16. Domestic water valves are to be epoxy coated on the inside of the valve.

Deionized Water Piping
1. All supply and return piping shall be equal to Orion Scheduled 80 Whiteline pipe. Fittings shall be Schedule 80 PVDF mechanical joint with electrometric face seal, PVDF snap ring and nut.
2. All piping is to be arranged so as not to interfere with the removal of other equipment or devices, nor to block access to doors, windows, manholes, or other access openings. All water piping shall be pitched to a low point to drain.
3. Piping shall be worked into place without undue forces or springing being placed on the pipe. Cutting or alterations of the building structure will not be permitted without the expressed written permission of an Arkansas Registered Structural Engineer.
4. Show manual and automatic air vent locations for piping systems on the floor plans.
5. Zone isolation valves shall be installed at no less than one per floor and shall not interfere with other zones.
6. All fixtures shall have one gate valve per line at each fixture.
7. Piping shall be free of any objectionable self-generated noise. Isolate piping from building where required to prevent transmission of noise.
8. Do not install over any electrical equipment, panels, or transformers.

Waste Plumbing Specialties
1. Waste arms for lavatories and sinks shall be DWV copper with cast brass adaptors and wrought copper fittings unless system is acid waste. All interior sanitary sewer, vent, and storm drain piping above grade shall be standard weight cast iron soil pipe and no-hub fittings, unless waived by DESIGN & CONSTRUCTION. Sanitary sewer, vent, and storm piping below grade shall be standard weight cast iron soil pipe with hub and spigot fittings. Hub gaskets shall be equal to Tyler Pipes “Ty-seal”. Acid waste and vent piping shall be schedule 40 polypropylene equal to Orion Blue Line flame retardant with grooved ends for mechanical joints above grade and socket fusion welded joints below grade; the use of an acid trap should be considered.
2. All piping is to be arranged so as not to interfere with the removal of other equipment or devices, nor to block access to doors, windows, manholes, or other access openings. All water piping shall be pitched to a low point to drain.
3. Piping shall be properly supported and adequate provisions shall be made for expansion, contraction, slope, anchors, and seismic conditions. Sleeve all penetrations through concrete or block with a compatible heavy-duty sleeve that will not react with pipe.

4. Piping shall be worked into place without undue forces or springing being placed on the pipe. Cutting or alterations of the building support structure will not be permitted without the expressed written permission of an Arkansas Registered Structural Engineer.

5. Show vent locations for piping systems on the floor plans.

6. Piping shall be free of any objectionable self-generated noise. Isolate piping from building where required to prevent transmission of noise.

7. Equip mechanical rooms with adequate floor drains; use a minimum of 1 in 500 sf in areas requiring a floor drain.

8. Do not install water priming for floor drains, use trap guards.

9. Install water sensors at appropriate low points of floor connected back to the Control Center in all mechanical rooms over occupied spaces with a water source to notify UAMS of overflowing drains.

10. Floor and Roof drain acceptable manufacturers are Wade, Kohler, and Zurn.

11. Roof drains should include a deck clamp and seal.

12. Do not install drains or cleanouts in “clean areas”. Coordinate locations with DESIGN & CONSTRUCTION during planning.

13. Do not install over any electrical or data equipment, panels, or transformers.

14. Elevator drainage and hydraulic fluids must be captured in approved DOT 55 gallon drum properly labeled meeting EPA requirements. The drum is to have an alarm tied back to the Control Center through the BAS system to notify Control when the tank is about full and the line shall have a shut off valve to stop flow while the drum is being replaced. A minimum of two drums are required, one in service and one spare while the tank is properly being disposed. A curb is to contain the exact amount of spill should the drum fail.

15. When acid waste is used in a project, above ground piping should be stainless steel. Pipe should flow into an acid dilution tank before connecting to a waste system.

**Natural Gas Piping**

1. All gas piping below grade on the exterior shall be polyethylene PE 2406 piping and fittings. Gas above grade shall be schedule 40 or standard weight black steel with standard seamless carbon steel welded flanges. Gas piping 2” and smaller shall be schedule 40 or standard weight black steel with 150lb threaded malleable fittings.

2. All piping is to be arranged so as not to interfere with the removal of other equipment or devices, nor to block access to doors, windows, manholes, or other access openings. All gas piping shall be accessible.

3. Piping shall be properly supported and adequate provisions shall be made for expansion, contraction, slope, anchors, and seismic conditions.

4. Piping shall be worked into place without undue forces or springing being placed on the pipe.

5. Cutting or alterations of the building structure will not be permitted without the expressed written permission of an Arkansas Registered Structural Engineer.

6. Zone isolation valves shall be installed at no less than one per floor and shall not interfere with other zones.

7. All fixtures shall have one gas cock per line at each fixture.
8. Piping shall be free of any objectionable self-generated noise. Isolate piping from building where required to prevent transmission of noise.
9. Install accessible drip legs at all equipment.

**Medical and Lab Gases**
1. All piping unless waived by DESIGN & CONSTRUCTION shall comply with NFPA 99.
2. All piping is to be arranged so as not to interfere with the removal of other equipment or devices, nor to block access to doors, windows, manholes, or other access openings.
3. Piping shall be properly supported and adequate provisions shall be made for expansion, contraction, slope, anchors, and seismic conditions.
4. Piping shall be worked into place without undue forces or springing being placed on the pipe. Cutting or alterations of the building support structure will not be permitted without the expressed written permission of an Arkansas Registered Structural Engineer.
5. Alarm panel locations shall be discussed during planning.
6. Zone isolation valves shall be installed at no less than one per floor and shall not interfere with other zones.
7. Manifolds, tanks, compressors, connection to existing lines, and any other special requirements are to be discussed during the initial planning of the project.
8. Piping shall be free of any objectionable self-generated noise. Isolate piping from building where required to prevent transmission of noise.
9. Copper piping routed below grade under concrete or fill, which may attack the pipe surface, shall be sleeved with a 4-mil thickness polyethylene sleeve. Sleeve all penetrations through concrete or block with a compatible heavy-duty sleeve that will not react with copper pipe.
10. Piping shall have isolators between dissimilar metals to prevent electrolysis. Lines shall be thoroughly tested to ensure corrosion of pipe is not taking place in line.
Division 23  Heating, Ventilation, and Air Conditioning

General
1. Distribute HVAC design criteria appropriate for commissioning purposes to UAMS at the close of the project including all software to control and monitor the system. This information should include Basis of Design, detailed control diagrams with sequences of operation.
2. All vibration isolation and noise control devices shall be designed to meet the requirements of the latest edition of ASHRAE Systems Handbook and shall be installed on all equipment subject to vibration.
3. Meter all new buildings for steam flow and temperature, condensate return taken at the condensate return temperature, chilled water flow, chilled water supply temperature, and chilled water return temperature. These measurements will be returned to the Building management system for monitoring. Because of the constant improvements in this technology, select equipment jointly with UAMS at the time of building design. Include BTU meters with temperature and pressure options.
4. Coordinate mechanical room wall ratings with architect.
5. UAMS reserves first right of refusal of all equipment and materials being removed. Coordinate this right with UAMS during planning. All boilerplates from removed equipment shall be given to the UAMS Project User Contact.
6. Pipe and equipment shall be stored protected from the weather with ends packaged to prevent dirt or other debris from entering.
7. Show all dampers (manual, fire, smoke, control, etc.) on the floor plans.
   a. All motorized smoke/fire dampers are to be accessible and have individual status to report back to the BAS indicating location and position of damper. (whether open/close).
   b. All motorized smoke/fire damper actuator shall be direct coupling.
   c. All motorized smoke/fire actuator shall be two position, 15 second run time and 15 second spring return.
   d. All motorized smoke/fire actuators shall have metal housing with position indicators and auxiliary switches.
   e. All motorized smoke/fire dampers shall have a manual switch for each damper to allow a service technician to disconnect the hot lead to the motor for repair.
   f. When remodeling an existing building, verify existing fire dampers are serviceable and report inaccessible ones to Design & Construction or the Fire Safety Officer. When walls are declassified remove fire and/or smoke dampers within them.
8. Thermostat locations shall be shown on duct drawings. At closeout of the project, provide charts/schedules with the following information to UAMS.
   a. Lubrication chart listing all types of lubricants for each piece of equipment, and recommended frequency of lubrication.
   b. Fan belt and filter schedules listing all filters and belts required for each piece of equipment as well as the total requirements for each belt or filter model and size.
9. All HVAC valves shall be tagged with a 1-1/2" round brass disc with black filled numbers and letters not less than 3/8" high in conformance with nomenclature covered in this division hung by means of brass s-hook and chain to the valve. Numbers are to be obtained from UAMS.
10. All valves shall be accessible.
11. Piping underground shall be buried a minimum of 4 feet on main branches. Coordinate depths of different systems with all trades.

12. All piping run exposed to the weather with only insulation to protect it shall include heat trace to maintain the water temperature at a minimum of 40°F inside the insulation when the system is down.

13. All devices that have the potential of dumping water such as RPZ, relief values, etc. in any building must be piped and drained back to an approved drainage system. Man-made ditches or canals are not acceptable.

16. Record all deviations to contract drawings on a record set identifying the revisions, revised locations, and depths where applicable weekly.

17. The Central Plant chilled water, tower water, and steam loops operate with 20% surplus in the system unless waived by Engineering & Operations. If this surplus is reduced due to a new project load requirement, provisions are to be made to subsidize the loop with new equipment to replenish the loss. Any new building close to a loop is to be connected to the loop.

18. New buildings away from the loop which require new equipment in the building is to have a redundant system with each piece of equipment operating at a minimum of 75% full load unless waived by Engineering & Operations.

19. Special emissions permit is required by ADEQ under regulation 18 prior to construction of any combustion equipment or chemical emissions (ie boilers, generators, cooling towers, ETO sterilizers, etc) that may add to pollutants. The permit process is initiated by UAMS and can take months for approval before construction for this equipment can begin. The consultant is to provide UAMS with all specifics of any equipment early so that the permit process can begin so as not to disrupt the project.

**HVAC Load Calculations**

1.01 Design Conditions unless over ruled by an authority having jurisdiction

1.01.01 Outdoor

1.01.01.01 Peak cooling air flow requirements shall be calculated using the ASHRAE 0.4% dry bulb temperature and the mean coincident wet bulb temperature.

1.01.01.02 Peak cooling refrigeration (tons) and chilled water flow (GPM) requirements shall be calculated using the ASHRAE 0.4% wet bulb temperature, mean coincident dry bulb temperature, and the peak cooling air flow requirements.

1.01.01.03 Peak heating requirements shall be calculated using the ASHRAE 99.6% dry bulb temperature.

1.01.01.04 Peak humidification requirements shall be calculated using the ASHRAE 99.6% dry bulb temperature and the mean coincident wet bulb temperature.

1.01.02 Indoor
1.01.02.01 General: Indoor design conditions shall be compliant with the requirements listed below, ASHRAE Standard 55[1][1], and the AIA Guideline for the Design and Construction of Healthcare Facilities[2][2]. Design indoor conditions shall also be compliant with the recommendations of medical and data equipment manufacturers. Design conditions for special applications not listed below shall be discussed with the UAMS.

1.01.02.02 Patient Rooms
- Cooling – 72 deg. F
- Heating – 70 deg. F
- Maximum Relative Humidity – 60% RH
- Minimum Relative Humidity – 35% RH

1.01.02.03 Operating Rooms
- Cooling – 62 deg. F
- Heating – 75 deg. F
- Maximum Relative Humidity – 55% RH
- Minimum Relative Humidity – 40% RH

1.01.02.04 Patient Treatment Rooms
- Cooling – 72 deg. F
- Heating – 70 deg. F
- Maximum Relative Humidity – 60% RH
- Minimum Relative Humidity – 35% RH

1.01.02.05 Office and Administrative
- Cooling – 72 deg. F and 60% RH
- Heating – 70 deg. F

1.01.02.06 Classrooms
- Cooling – 72 deg. F and 55% RH
<table>
<thead>
<tr>
<th>Section</th>
<th>Heating Temperature</th>
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<tr>
<td>Laboratories</td>
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<tr>
<td>Corridors</td>
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<td>Heating – 70 deg. F and 35% RH</td>
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<td>Corridors</td>
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<td>Heating – 68 deg. F</td>
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<tr>
<td>Lobbies</td>
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<tr>
<td>Public Toilet</td>
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<td>Heating – 68 deg. F</td>
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<tr>
<td>Computer Rooms</td>
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<td>Maximum Relative Humidity – 60% RH</td>
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</tbody>
</table>
Minimum Relative Humidity – 40% RH

1.01.02.15 Elevator Equipment and Machine Rooms

- Cooling – 80 deg. F
- Heating – 68 deg. F
- Maximum Relative Humidity – 60% RH
- Minimum Relative Humidity – 40% RH

1.02 Ventilation Requirements

1.02.01 Ventilation Requirement Calculations:

1.02.01.01 General: Ventilation requirements for business occupancies shall be calculated in accordance with the requirements of ASHRAE Standard 62, latest edition[3][3]. Ventilation requirements for healthcare occupancies shall be in accordance with the requirements of the FGI Guidelines, latest edition, ASHRAE Standard 62, latest edition, ASHRAE Standard 170, latest edition, and AR Rules and regulations. ASHRAE Standard 62 ventilation air flow calculations shall be performed using the process listed below:

1.02.02 Building Pressurization: Ventilation requirements shall be sufficient for building pressurization. In shorter (3 stories or less), the design building pressure shall be 0.02 inches w.g. In taller buildings (more than 3 stories), the design building pressure in the summer shall be positive 0.02 inches w.g. and the design building pressure in the winter shall be positive 0.02 inches w.g or neutral.

1.03 Space Loads

1.03.01 Cooling and heating space sensible and latent loads shall be calculated for each individual zone.

1.03.02 Loads shall be calculated using an industry accepted load calculation program.

1.03.03 Space loads shall include building envelope loads, internal loads[11][11], and infiltration.

1.04 Air Flow Requirements

[3][3] Compliance with ASHRAE Standard 62 latest edition is deemed to be compliant with the Arkansas Mechanical Code.
[11][11] Occupants, lights, equipment, etc.
1.04.01 Air flow requirements shall be calculated for each individual zone shall be calculated based upon the peak space sensible cooling and heating loads and the AIA Guidelines, latest edition.

1.04.02 Cooling air flow requirements for each zone shall typically be calculated based upon the estimated space sensible cooling load and the difference between the design cooling supply air and indoor cooling space temperatures. In unusual applications, the space latent loads may govern the cooling air flow requirements. The peak cooling air flow requirements for each air handling system shall be equal to the peak coincident sum of the individual zone air flow requirements.

1.04.03 Heating air flow requirements shall be calculated based upon the estimated space sensible heating load and the difference between the design heating supply air and indoor heating space temperatures.

1.05 Air Handling Systems

1.05.01 The peak cooling refrigeration requirement (tons) shall be calculated for each air handling system. The peak cooling refrigeration requirement shall be calculated based upon the entering and leaving cooling coil conditions. The entering coil conditions shall be calculated assuming that exhaust air energy recovery equipment (if applicable) is in operation. The entering coil conditions shall also consider return air heat gains. The leaving coil conditions shall be determined based upon the desired space specific humidity (apparatus dewpoint) and the fan heat gain. The peak cooling refrigeration requirement with exhaust air energy recovery shall be calculated based upon the entering coil conditions assuming the exhaust air energy recovery equipment is operational and the leaving coil conditions.

1.05.02 The reduction in peak cooling refrigeration requirements (tons) associated with the operation of exhaust air energy recovery equipment (if applicable) shall be calculated for each air handling system. The reduction in peak cooling refrigeration requirements shall be determined by subtracting the peak cooling refrigeration requirement with exhaust air energy recovery from the peak cooling refrigeration requirement without exhaust air energy recovery. The peak cooling refrigeration requirement with exhaust air energy recovery shall be calculated based upon the entering coil conditions assuming the exhaust air energy recovery equipment is operational and the leaving coil conditions.

1.05.03 The peak chilled water flow requirement (GPM) shall be calculated for each air handling system based upon the estimated peak refrigeration requirement, a chilled water supply temperature of 45 deg. F, and a design chilled water flow of 10 deg. F. The peak chilled water flow requirements (GPM) shall be calculated assuming exhaust air energy recovery equipment (if applicable) is not operational.

[12][12] Diversity of internal loads and solar gains shall be considered.
[13][13] Calculated based upon the fan static pressure, fan efficiency, motor location, and motor efficiency.
1.05.04 The reduction in peak chilled water flow requirements (GPM) associated with the operation of exhaust air energy recovery equipment (if applicable) shall be calculated for each air handling system. The reduction in peak chilled water flow requirements shall be determined by subtracting the peak chilled water flow requirement with exhaust air energy recovery from the peak chilled water flow requirement without exhaust air energy recovery.

1.05.05 The peak steam flow requirement shall be calculated for each air handling system. The peak steam flow requirement shall include preheat coils and humidifiers. The steam flow requirement for preheat coils shall be calculated based upon the entering and leaving coil conditions. The entering coil conditions for preheat coils shall be calculated based upon the assumption that exhaust air energy recovery equipment (if applicable) is not in operation. The entering coil conditions for preheat coils shall also consider return air heat losses. The steam flow requirement for humidifiers shall be calculated based upon the entering and leaving humidifier conditions. The entering humidifier conditions shall be calculated based upon the assumption that exhaust air energy recovery equipment (if applicable) is not in operation. The leaving humidifier conditions shall consider the sensible heat gain of the humidifier (jacket steam flow).

1.05.06 The reduction in peak steam flow requirements associated with the operation of exhaust air energy recovery equipment (if applicable) shall be calculated for each air handling system. The reduction in peak steam flow requirements shall be determined by subtracting the peak steam flow requirement with exhaust air energy recovery from the peak steam flow requirement without exhaust air energy recovery.

1.05.07 The peak heating water flow requirement shall be calculated for each air handling unit based upon the required heat transfer rate, 150 deg F, heating water supply temperature, and 20 deg. F △T.

1.06 Fan Coil Units

1.06.01 The peak chilled water refrigeration (tons) requirement shall be determined for each fan coil unit. The peak requirement shall be equal to the capacity of the selected unit at the design conditions.

1.06.02 The peak chilled water flow requirements (GPM) shall be calculated for each fan coil unit based upon the estimated peak refrigeration requirement, a chilled water supply temperature of 45 deg. F, and a design chilled water △T of 10 deg. F.

1.06.03 The peak heating water flow requirements (GPM) shall be calculated for each fan coil unit based upon the estimated peak heat transfer requirement, a heating water supply temperature of 150 deg. F, and a design heating water △T of 30 deg. F.
1.07 Air Control Device (air terminals, air valves, etc.) Reheat Coils: The peak heating water flow requirement of the air control device reheat coils shall be calculated based upon the peak heating air flow requirement, sum of the space sensible heating loads, and the design air handling system supply air temperature. The peak heating water flow requirement of the air control device reheat coils shall be calculated based upon a heating water supply temperature of 150 deg. F, and a design heating water T of 30 deg. F.

1.08 Domestic Water Heating: The peak steam flow requirement for domestic water heating equipment shall be calculated based upon the estimated peak flow requirement for domestic hot water, entering cold water temperature, and the domestic hot water supply temperature. The peak steam flow requirements shall also consider heat losses from the domestic hot water supply and return piping.

1.09 Chilled Water: The peak building chilled water system refrigeration (tons) and flow (GPM) requirements shall be equal to the sum of the air handling system, fan coil unit, and process equipment requirements. The reduction in the building chilled water system peak refrigeration (tons) and flow (GPM) requirements associated with the operation of exhaust air energy recovery equipment shall also be determined. Any deviations are to be approved by Engineering & Operations.

1.10 Heating Water

1.10.01 The peak flow (GPM) requirement for heating water shall be equal to the sum of the fan coil unit, air handling unit reheat coils, air control device reheat coils, and process equipment requirements.

1.10.02 The peak steam requirement for the heating water converter(s) shall be calculated based upon the peak heating water flow requirement, design heating water supply temperature of 180 deg. F, and design heating water return temperature of 150 deg. F.

1.11 Steam: The peak building steam flow requirement shall be equal to the sum of the air handling unit (preheat coils and humidifiers), heating water converter, and domestic water heating requirements. The reduction in building steam flow requirements associated with the operation of exhaust air energy recovery equipment shall also be determined.

RC Sound Ratings
1. AHU schedules will indicate the maximum acceptable sound power levels (so that substitutions do not increase sound levels in spaces above design). Air Handling Units and fans shall be specified with maximum sound power requirements for all 8 octave bands in the equipment.
2. Maximum RC sound ratings acceptable
   - Patient Rooms  35
   - Wards 40
   - Surgery/ Procedures 35
   - Clinical Exams 45
   - Corridors and public areas 45
These values are to be measured using ARI 885.
Tagging
1. All equipment and accessories shall be tagged with a permanent system and brass valve tags permanently color coded on the back to know if valve is to be normally left open (green), closed (red), or adjustable to seasons (yellow). Numbers for rooms and equipment can be obtained at UAMS. Equipment classification shall be as follows:

<table>
<thead>
<tr>
<th>SHORT FORM</th>
<th>EQUIPMENT</th>
<th>COLOR</th>
</tr>
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<tbody>
<tr>
<td>ACF</td>
<td>AIR CURTAIN FAN</td>
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</tr>
<tr>
<td>ACP</td>
<td>AIR COMPRESSOR</td>
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</tr>
<tr>
<td>AHU</td>
<td>AIR HANDLER UNIT</td>
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<td>ATS</td>
<td>AUTOMATIC TRANSFER SWITCH</td>
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<td>BIO HAZARD HOOD</td>
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<td>CHILLER</td>
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<td>DRINKING FOUNTAIN</td>
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<td>REFRIGERATOR/FREEZER</td>
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<td>FPD</td>
<td>FIRE PROTECTION DEVICES</td>
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<td>FPS</td>
<td>FAN, SMOKE PURGE</td>
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<td>FXT</td>
<td>FIRE EXTINGUISHERS</td>
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<td>GENERATOR</td>
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<tr>
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<td>LIGHTING</td>
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<td>UNIT HEATER</td>
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<tr>
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<td>AIR VOLUME BOX (variable or constant)</td>
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Air Distribution Systems
1. Closely coordinate mechanical room systems to allow sound attenuation. Assure physical limitations do not disturb surroundings including noise, temperature, or humidity.
2. Equip elevator equipment and machine rooms with space conditioning. Room temperature shall be maintained as stated under design conditions.
3. Equip all telephone equipment and data server rooms with space conditioning with the equipment placed outside the space when possible. Room temperature shall be maintained as stated under design conditions.
4. Terminal boxes should be used for small rooms, fan coils should be used for large rooms when a central air conditioning system is not practical.
5. Equip electrical and mechanical equipment rooms with space conditioning with the equipment placed outside the space when possible. Room temperature shall be maintained as stated under design conditions.
6. Variable Frequency Drives shall be kept in a conditioned environment so as not to exceed a maximum temperature of 85°F.
7. Separate conference rooms conditioning from other rooms.
8. Do not design space conditioning for stairwells unless required for piping or coils.
9. Externally insulate all new supply ductwork. Replace all existing internally insulated ductwork within the scope of the renovation with new externally insulated ductwork. Exception shall be for sound and rubberized insulation similar to Armaflex can be used in returns for a maximum of 20’ in the branch lines as approved by Engineering & Operations. Ductwork insulation shall not be exposed to the air stream.

10. Provide sound attenuation for privacy where ductwork is shared in offices and patient areas.

11. Number of VAV boxes per area is project specific. Options to be presented to UAMS for comfort, financial and maintenance considerations but shall not exceed 3 rooms of equal environment per thermostat. Reheats on all VAV regardless of interior or perimeter locations excluding electric and telecom closets.

12. Do not design ceiling cavity return air plenums.

13. High pressure duct joints are to be hard sealed to minimize leakage, use duct tape with screws on low pressure systems.

14. Show static pressure sensing locations for air systems on the floor plans.

15. Design outside intake louvers where practical for minimal moisture infiltration.

16. Use current SMACNA standards and symbols for ductwork design and drawings.

17. Bypass shall be installed with all VFDs. Interlock in ATC to open VAV terminal units in the event the VFD is placed in bypass.

18. Valves above 1” and damper actuators shall be pneumatically actuated with electronic controls.

19. Air Intakes shall not be placed where they can be accessible to the general public, minimum two floors up. Exhaust is to exit through the roof where feasible but should not discharge close to the general public. Deviations are to be discussed during planning.

20. Room differential pressure requirements shall be achieved by a minimum of 100 cfm at the openings(s), but not less than 0.01” static pressure at the door(s). Coordinate door undercuts with the architect. Adequate supply is to be provided in the corridors.

21. Each branch shall have accessible extruded aluminum balancing dampers as close to the main duct as possible to balance the system without depending on the diffuser or grill.

22. Fire and smoke dampers shall be installed as required by governing codes and damper reset shall be accessible.

23. All equipment in the air distribution system shall be easily accessible for repairs or replacement without the need for removal of other utilities and to be located to minimize disruptions to a space and not over any equipment, transformers, panels, or telephone gear.

24. Flex duct is not allowed through any walls, ceilings, or floors. Flex duct run when used should not be less than 3 feet or be greater than 6’ unless the code alters this requirement.

25. All ducts passing through fire or smoke walls shall have the appropriate damper to maintain the integrity of that wall unless allowed by code with the exception noted on the drawings.

26. Duct exhausting Labs or high moisture areas or equipment shall be design for the application. Coordinate chemical usage through DESIGN & CONSTRUCTION.

27. Areas within a new project are to be discussed during planning with the Core/User group to determine pressure relationships. Those rooms which require a positive or negative pressure relationship shall have a digital gauge placed above the door for monitoring with the sensors mounted as recommended by the manufacturer for accurate readings.

28. High Velocity Louver Faced Diffusers shall be used for HVAC supply systems; acceptable manufacturers are Hart & Cooley, Titus, Tuttle & Bailey, and Metalaire. Returns shall be perforated and by the same manufacturer. Special attention should be placed on the neck
size to minimize noise level in the room. Any deviations should be discussed and agreed to at the start of the project.

29. Low velocity perforated diffusers shall be used in critical areas or as defined by code to minimize pathogens leaving the medical staff and entering open wounds.

30. Design electrical for offices to allow for computer equipment including laser printer and space heaters often found under desks.

31. Dampers are not to restrict airflow except where necessary to control the air. Example, fire dampers should not protrude into ductwork.

**Mechanical Supports**

1. Provide adequate pipe, duct, and equipment foundation and suspension systems in accordance with recognized engineering practices and code requirements, using where possible standard commercially accepted hangers and accessories.

2. Where thermal movement or vibration in pipes, duct, or equipment can occur, the pipe hanger assembly must be capable of supporting the line without sag or excessive movement except those systems requiring thermal considerations in all operating conditions.

3. Pipes shall be seismically braced as required by the International Building Code.

4. Supports for mechanical pipes, duct, or equipment shall be fastened to the building structure. Supports being attached to other utilities are not acceptable.

5. If seismic bracing is not required, piping on roof shall be mounted on pedestal type stands that require no penetrations through the roof. Pedestal shall be treated wood encapsulated by an aluminum cover sized to handle the load of the pipe and height requirements. All piping shall be a minimum of 1’-0” above the roof. Pedestals shall sit on a pad compatible with the roof membrane. Provide rollers on stands where piping is subject to excessive movement.

6. Exterior equipment shall be supported on galvanized structural steel supports designed by a Registered Arkansas Structural Engineer with seismic requirements of IBC meet unless waived by Engineering & Operations. Indoor equipment in Mechanical Rooms shall be mounted on minimum 4” reinforced concrete pad with chamfered edges if ceiling height permits. Interior equipment mounted above ceilings shall be supported by structural steel seismically braced per IBC.

**Mechanical Systems Insulation**

1. Insulation shall be manufactured in accordance with ASTM, UL, NFPA, and IBC standards and regulations and meet the requirement of a flame spread of 25 or less and a smoke developed rating of 50 or less.

2. Type of insulation shall be as determined by engineer-of-record to meet requirements of system with a minimum life of 10 years. Insulation shall be fastened to securely remain in place for the life of the insulation.

11. Pipes, ducts, and accessories shall be insulated with sufficient thermal conductivity to meet requirements of Arkansas Energy Code.

12. Exterior pipe shall include aluminum jackets around insulation.

13. Insulated piping with service temperature below 140F in mechanical rooms or exposed shall be protected by a smooth 20 mil PVC jacket. Elbows in water lines shall have a 20 mil PVC jacket.

14. Ductwork, grills, drip pans, louver blanks shall be externally insulated.
15. All hydronic piping shall be externally insulated unless waived by Engineering & Operations.
16. Seal all longitudinal and lateral insulation seams and joints on all piping systems transporting fluids or gases.
17. Insulation shall fit snug and securely to surface without air gap.
18. Tears, punctures, and other penetrations shall be repaired to provide a vapor-tight system.

Steam Distribution & Condensate Systems
1. Comply with all governing codes and regulations.
2. Low pressure (below 20 psig) steam supply, steam return, steam vent, pumped condensate, and relief piping 2-1/2" and smaller shall be schedule 80 black steel with 300lb forged steel socket welded fittings up to isolation valve for AHU, then threaded forged fittings from isolation valve to AHU (20’ max). Low pressure (below 20 psig) steam supply, steam return, steam vent, pumped condensate, and relief piping 3" and larger shall be Schedule 80 black steel with 300lb forged steel or schedule 80 butt welded forged fittings up to isolation valve for AHU, then threaded forged fittings from isolation valve to AHU (20’ max). Extra strong pipe for steam and condensate return piping 10" and larger.
3. High pressure (20 psig to 75 psig) steam supply, steam return, steam vent, pumped condensate, and relief piping 2-1/2" and smaller shall be schedule 80 black steel with 300lb forged steel socket welded fittings up to isolation valve for AHU, then 300 lb threaded fittings from isolation valve to AHU (20’ max). Medium pressure (20 psig to 75 psig) steam supply, steam return, steam vent, pumped condensate, and relief piping 3" and larger shall be schedule 80 black steel with schedule 80 butt welded fittings up to isolation valve for AHU, then threaded fittings from isolation valve to AHU (20’ max). Extra strong pipe for steam and condensate return piping 10" and larger. Isolation valve is to be installed within 20’ of AHU.
4. High pressure (above 120 psig) steam supply, steam return, and pumped condensate systems shall not be used on this campus without approval of Campus Operations.
5. Forged steel weldolets, or branchlets and threadolets may be used for branch connections up to one pipe size smaller than the main. Forged steel half-couplings, ANSI B16.11 may be used for drain, vent, and gage connections.
6. All piping is to be arranged so as not to interfere with the removal of other equipment or devices, nor to block access to doors, windows, manholes, or other access openings.
7. Piping shall be properly supported and adequate provisions shall be made for expansion, contraction, slope, anchors, and seismic conditions. Anchor pipe to ensure proper direction of expansion and contraction.
8. Drip legs shall be designed at appropriate intervals for the system. Install bypass piping around strainer and trap.
9. Piping shall be worked into place without undue forces or springing being placed on the pipe. Cutting or alterations of the building structure will not be permitted without the expressed written permission of an Arkansas Registered Structural Engineer.
10. Piping routed below grade under concrete or fill, which may attack the pipe surface, shall be sleeved with a 4-mil thickness polyethylene sleeve. Pipe passing through concrete will be sleeved with compatible pipe.
11. Piping shall have isolators between dissimilar metals to prevent electrolysis. Lines shall be thoroughly tested to ensure corrosion of pipe is not taking place in line.
12. Show manual and automatic air vent locations for piping systems on the floor plans.
13. Zone isolation valves shall be installed at no less than one per floor and shall not interfere with other zones.
14. All equipment shall have one shut off valve per line.
15. Piping shall be free of any objectionable self-generated noise. Isolate piping from building where required to prevent transmission of noise.
16. Do not install over any electrical equipment, panels, or transformers.
17. This section combined with 24.
18. Design for steam backup; address options during planning.
19. Schedule all steam traps with flow rate, type, safety factor, pressure drop, and accessories.
20. All steam flanged gaskets shall be discussed during planning; minimum standard is Victaulic blowout proof gaskets.
21. Do not use orifice type traps.
22. Acceptable steam trap manufacturers are Armstrong, Hoffman, Spirax-Sarco
23. Equipment shall be designed to use low pressure steam unless approved in writing by Engineering & Operations for higher pressures.
24. Steam or compressed air condensate pumps for new buildings are to be pressure powered type over the electric type due to longer life and lower energy costs.

Hydronic Distribution Systems
1. Comply with all governing codes and regulations.
2. Chilled Water Supply, Chilled Water Return, Heating Water Supply, and Heating Water Return piping 2-1/2" and smaller shall be Type “L” hard drawn copper tubing with solder joint wrought copper tube fittings. Copper joints shall be made with Stay Safe “Bridet” lead-free solder, Silfos, or equal.
3. Chilled Water Supply, Chilled Water Return, Heating Water Supply, Heating Water Return piping larger than 4” shall be Schedule 40 black steel with standard seamless carbon steel 150lb butt welded fittings, butt welded joints and 150lb carbon steel slip on or weld neck flanges. Standard weight pipe for chilled water and heating water 12” and larger. Victaulic pipe is allowed where smoke is an issue.
4. All piping is to be arranged so as not to interfere with the removal of other equipment or devices, nor to block access to doors, windows, manholes, or other access openings.
5. Piping shall be properly supported and adequate provisions shall be made for expansion, contraction, slope, anchors, and seismic conditions.
6. Piping shall be worked into place without undue forces or springing being placed on the pipe. Cutting or alterations of the building structure will not be permitted without the expressed written permission of an Arkansas Registered Structural Engineer.
7. Copper piping routed below grade under concrete or fill, which may attack the pipe surface, shall be sleeved with a 4-mil thickness polyethylene sleeve.
8. Piping shall have isolators between dissimilar metals to prevent electrolysis. Lines shall be thoroughly tested with appropriate device to ensure isolation, results shall be recorded.
9. Show manual and automatic air vent locations for piping systems on the floor plans.
10. Zone isolation valves shall be installed at no less than one per floor and shall not interfere with other zones. All equipment shall have isolation valves to service the equipment. Isolation valves in heating water piping at each group of air terminals.
11. Piping shall be free of any objectionable self-generated noise. Isolate piping from building where required to prevent transmission of noise.
12. Do not install over any electrical equipment, panels, or transformers.
13. All two-way valves less than 1” on reheat coils shall have stainless stem and seats on with VFD on the hot water pumps.

14. Design for a flushing bypass of VAV hot water coils for use at start-up.

15. Coordinate chemical treatment requirements with Engineering & Operations.

16. Design 2-way valves for all chilled water coils. No 3-way valves are to be used unless it’s at the end of a run.

17. Provide auxiliary drain pans under all cooling coils located above ceilings with drains piped to a conspicuous location per Arkansas Mechanical Code.

18. Section deleted

19. Use of fan coils are to be minimized.

20. Use pressure differential switches on Chillers in lieu of flow switches in all hydronic piping.

### Water Treatment
1. Coordinate all water treatment with UAMS during planning.

### Fuel Oil Piping & Tanks
1. Comply with all governing codes and regulations.
2. All piping unless waived by Engineering & Operations shall be schedule 40 black steel pipe with 300lb socket welded fittings and joints. Connection to tank and pumps shall be made with 150lb malleable iron threaded fittings or flanges.
3. All piping is to be arranged so as not to interfere with the removal of other equipment or devices, nor to block access to doors, windows, manholes, or other access openings.
4. All piping shall be above grade and piped from an assessable loading point to the equipment. Day tanks are to be sized for a minimum of 24 hours and to be discussed during planning. No returns are to be on the system.
5. Piping shall be properly supported and adequate provisions shall be made for expansion, contraction, slope, anchors, and seismic conditions.
6. Piping shall be worked into place without undue forces or springing being placed on the pipe. Cutting or alterations of the building support structure will not be permitted without the expressed written permission of an Arkansas Registered Structural Engineer.
7. Piping shall be free of any objectionable self-generated noise. Isolate piping from building where required to prevent transmission of noise.

### Air Handlers
1. Consultants are to evaluate types of units to determine if energy efficient unit can recover cost difference within 5 years.
2. Comply with Air Movement and Control Association (AMCA) standards as applicable to testing and rating of fans (AMCA 300), air moving devices (AMCA 301) and testing of louvers, dampers, and shutters.
4. Provide central station air handling units which comply with Air-Conditioning and Refrigeration Institute (ARI) Standard 410.
5. Provide UV lights inside units at pans and coils.
6. Comply with ASHRAE Standard 52-76, UL Standard 900, and Arkansas Health Department Codes as applicable to air filters. Air filters racks shall be generic to accept any manufacturer filters.
7. Provide electric motors and products which have been listed and labeled by Underwriter Laboratories (UL) and comply with NEMA standards. Motors shall be premium efficiency with 1.15 service factor.

8. All electronic equipment shall conform to the requirements of FCC Regulations, Part 15, Section 15, governing radio frequency and electromagnetic interference and shall be so labeled.

9. Units shall be furnished with double wall insulated casing, hinged access doors, plenum fans, enthalpy recovery wheel if applicable with VFD, pre-filters, chilled water coil with stainless steel insulated drain pan, steam heating coil, fan motors, and all accessories necessary to make the system meet the required functions for the space to be used. Lifting lugs shall be welded to the base.

10. Belts shall be designed for a minimum 1.5 service factor.

11. Bearings must have an L10 life of not less than 200,000 hours.

12. Use VFD’s and belt drive for air handler exhaust and return fans on any motor greater than 1 HP. Design for extra capacity.

13. Fans are to be mounted on isolation bases or springs. Impellers shall be statically and dynamically balanced and complete fan assembly is test balanced at the operating speed prior to shipment.

14. Name plates shall be engraved non-corrosive metal with performance information.

15. Panels shall consist of dual wall 18 gage galvanized solid exterior skins and 22 gage galvanized steel interior skins enclosing a minimum U-factor of 0.10 BTU/(hr-sf-deg) complying with NFPA 90A. No insulation will be exposed to the air stream. Access shall be provided for removal of any internal component through hinged, sealed doors and removable access panels. Access doors at fan locations shall be equipped with 12” by 12” view ports with wire glass. Provisions are to be made for coil replacement.

16. Coil casings shall be constructed of continuous galvanized steel. Coil side plates shall be of reinforced flange type. Cooling coils shall be mounted in an insulated, 304 stainless steel IAQ sloped condensing pan. Coils will have a minimum of 2.5” clear height below the coil at the upstream edge and increasing in clear height (with the slope of the condensate pan) as it goes downstream.

17. Install magnahelic gauges on unit across filters and coils.

18. Acceptable manufacturers of non-energy efficient units are McQuay, York, Carrier, and Trane.

Exhaust & Intrigal Fans

1. Fans shall bear the AMCA ratings for the air and sound performance.

2. Fans shall be direct where possible or V-belt driven. Variable pitched drives shall be sized for 150% of motor horsepower capabilities, constructed of cast iron, keyed to the fan and motor shafts. Drive belts shall be oil-resistant, non-static, non-sparking, automotive type with life expectancy of over 24,000 hours. The complete drive assembly shall be mounted on vibration isolation mounts.

3. Furnish units with weather tight roof and end panels to protect motor, shaft, bearings, and drives from the elements.

4. All motors one-quarter horsepower and larger shall be continuous duty, permanently lubricated, open drip proof type with thermal overload protection. Motors less than one-quarter horsepower shall be shade pole type. Motors 1-1/2 horsepower and larger shall have full load efficiencies not less than the values scheduled by the engineer-of-record.
5. Motor bearings shall be pre-lubricated, resiliently mounted, double sealed type, capable of over 200,000 hour’s average bearing life (L-50). Unit shall have relubricatable oversized pillow block ball bearings resiliently mounted in neoprene rings.

6. Design for 10% extra capacity for air flow and static pressure.

7. Blowers shall be provided with a coating in the air stream to prevent corrosion. Fasteners shall be coated to prevent corrosion.

8. All wiring shall comply with the NEC and all material shall be UL listed.

**Pumps**

1. Pumps shall comply with NEMA Standards, FCC regulations, Part 15, Section 15, governing radio frequency and electronic interface, and shall be UL listed and stamped.

2. Type of pump shall be as selected by engineer-of-record to meet the best performance of the system without cavation in the system. The pump shall be sized to ensure the pump is non-overloading. Motor design shall be open drip proof with a NEMA Class C face design and a minimum service factor of 1.15. The motor shall be sized to operate continuously without exceeding the horsepower rating, regardless of the flow and head throughout the entire range of operation.

3. Pumps are to be designed to allow for servicing on the impeller, strainers, and bearing assembly with minimum pipe disturbance. An OSHA approved coupling guard shall be mounted between the pump and motor where applicable.

4. Pumps above 1 hp are to be vertically mounted.

5. Design top of vertically mounted pump is not to exceed 36-inches AFF.

6. Do not directly insulate chilled water or heating water pumps. Design insulated boxes to surround but not contact the pump.

**Air Terminal Units**

1. Heating water coils shall be attached to terminal outlet; coils shall be a minimum of two rows.
Division 25  Integrated Automation

HVAC Control Systems

1. HVAC Controls to be under separate contract from Mechanical Sub Contractor and bid by General Contractor. UAMS will confirm vendor to use for controls during project planning. Control manufacturers to be limited to Powers and Johnson. Control points and monitor points for all systems shall be coordinated with UAMS. Controls are to be local with monitoring and adjusting capabilities hardwired back to the UAMS Control Center and HVAC shop. Interface with existing systems as directed by DESIGN & CONSTRUCTION.

2. Automatic temperature controls systems shall include all control wiring, pneumatic air lines, field equipment, DDC panels, variable frequency drives, air terminal controllers, fan coil unit controllers, laboratory controllers, and central equipment for that application. For example, a factory designed application specific controller must be used in lieu of generic controllers when used in such applications as laboratory fume hoods. System shall provide for the automatic control and monitoring of the following systems and equipment as applicable: energy recovery air handling units, air handling systems, laboratory exhaust fans, chilled water system, heating water system, steam and condensate system, hoistway vents, stair pressurization fans, fan coil units, laboratories, supply air terminals, exhaust air terminals, miscellaneous alarms, unit heaters, cold rooms, and any other equipment required to properly operate the space for its intended use. All equipment and software shall be the most recent technology released by the manufacturer.

3. DDC panels shall be rated for a mechanical room environment. Panels shall have sufficient input/output point capacity to accommodate the indicated sequences of operation. Panels shall have a minimum spare point capacity of two analog outputs, four analog inputs, two digital outputs, and two digital inputs. Panels shall be furnished with processors, memory, power supplies. Etc. such that the installation of a future point requires only the installation of the appropriate point module. Enclosure shall be NEMA type 1 with lockable cover and transparent viewing panels. Enclosure assembly shall include a duplex receptacle and step-down isolation transformer with primary and secondary fuses.

4. Controllers shall be microprocessor-based with a minimum word size of 16-bits. Controllers shall have sufficient memory (min 1 megabyte) to support its own operating system, the sequence of operation, and control functions. Controller shall provide a minimum of two compatible communication ports for the connection of operator I/O devices such as printers, modems, and operator terminals. Controller shall continuously perform self-diagnostics for its communication system and components. Controller shall provide local and remote annunciation of any detected failures. In the event of a loss of power, the Controller shall provide for an orderly shutdown to prevent the loss of database and operating system software. A battery backup shall be provided to support the volatile memory and real time clock for a minimum of 72 hours. Upon restoration of power the Controller shall automatically resume full operation without manual intervention. Should the Controller memory be lost for any reason, the user shall have the capacity of reloading the Controller via a data communication port or operator workstation.

7. Point modules shall be modular universal supporting any combination of analog inputs, analog outputs, digital inputs, and digital outputs. Isolation shall be provided at all point terminations to suppress induced voltage transients consistent with IEEE Standards 587-1980. Each digital and analog output shall be equipped with an individual HOA override switch. Gradual switches shall be provided for all analog outputs. The Controller shall monitor override switches such that the operator is informed in the event that automatic
control has been disabled. Status indication for digital outputs shall be accomplished using an LED display. Status indication for analog outputs shall be accomplished using graduated intensity LED’s or an analog indication of value.

8. The DDC panel or lab controller shall include all necessary software to form a complete operating system and shall not be dependent upon the workstation or any other device for execution. Upon restoration of normal power the Controller shall be capable of incorporating data from any and all other DDC panels and air terminal controllers on the network. Controller programs shall also be capable of issuing commands to any device connected to any DDC panel or controller on the network. System shall include control programs, energy management programs, custom programs capable of accommodating complex algorithms, alarm management, historical data storage and Management, and data totalization.

9. The design of the EMS communications network shall consist of a high performance peer-to-peer system (EMS Trunk), air terminal controller, laboratory controller, fan coil unit controller, and variable frequency drive local area network (EMS LAN), switchgear interface Cabling (EMS Switchgear), and fume hood controller interface cabling (EMS Fume Hood). Communications may be executed directly between devices. Network shall provide high-speed data transfer rates for alarm reporting, report generation, and upload/download activities. Data transfer rates shall be sufficient such that an alarm occurring at any DDC panel, Laboratory Controller, Air Terminal Controller, or Fan Coil Unit Controller is displayed at the operator terminal within five seconds. Network shall provide for the automatic synchronization of real-time clocks, message and alarm buffering, and error detection. The communication speed at the EMS trunk level shall be a minimum of 115k baud. Communication speed at the EMS LAN level shall be a minimum of 4,800 baud. Isolation shall be provided at all EMS LAN terminations to suppress induced voltage transients consistent with IEEE Standards 587-1980.

10. Use VFD’s and belt drive for air handler exhaust and return fans on any motor greater than 1 HP. Design for 20% extra capacity if on VFD’s. Drives shall be compatible with the equipment it is to control and suitable for a mechanical room environment. Each drive shall be furnished with a removable keypad and display. Keypad must utilize a minimum of twelve membrane keys with tactile feel. Display to be a minimum of sixteen characters per line by two lines. Display shall be backlit with adjustable contrast. Keypad shall allow the drive to be manually started and stopped. Keypad shall allow the adjustment of all set-points and parameters. Keypad and display shall allow the output frequency, diagnostic messages, output voltage, output current, motor data, set-points, and control parameters. Each drive shall be equipped for self-diagnostic operation including reference speed command, heat sink temperature, bus voltage, bus current, PWM frequency, I/O command status, software version, and control settings. Each drive shall be equipped with an interface card for direct connection to the DDC panel. Interface shall allow direct communication between the drive and the EMS. Interface shall as a minimum provide start/stop, status, and alarm status. Minimum efficiency at full load is 96%.

11. Control Contractor shall furnish the Owner on major projects in excess of $1 million total in construction costs a lap top computer with all necessary software to interface with controls.

12. Control contractor shall furnish the Owner two-week training for two (2) UAMS employees at the manufacturers training center for major projects in excess of $1 million total in construction costs. The cost for this training shall be borne by the control contractor for the project being constructed and shall include, but not limited to, all books, lodging,
transportation, per diem for Owners employees and any other incidentals necessary for training.
13. Electronic bypass on all VFD's.
14. Valves above 1" and damper actuators shall be controlled with pneumatics with transducer.
15. Install magnehelic air gauges on unit across filters and coils to monitor filter loading.
16. A technical employee of the automatic temperature control contractor shall accompany the TAB Contractor throughout the testing, adjusting, and balancing process. The ATC Contractor shall provide assistance to the Commissioning Agent throughout the commissioning process.
17. Reference Commissioning Training requirements for training requirements.
18. Controls contractor shall furnish a portable operator's terminal. The portable operator's terminal shall be a laptop computer with the latest system software with full access programming of ddc controls at individual panels or across the network.
19. UAMS personnel shall have all software, training manuals and material required to program all field panels. This includes the ability to upload and download all network application firmware and software with the same capabilities as the vendor technician.
20. Coordinate a point for the elevator drum alarm, see waste piping for additional info.

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Division 26  Electrical

General
1. All electrical work shall comply with all governing codes and regulations including IBC, NEC, NEMA, ANSI, and Arkansas Department of Health. All products shall be UL listed and labeled.
2. Provide to Lead Consultant an updated scope of work at the end of each design phase that includes a performance-based description of the electrical systems that illustrate the concepts of operations. Use current CSI UniFormat organization. Upon request by DESIGN & CONSTRUCTION, include lighting systems energy recovery and payback.
3. All electrical panels, safety switches, and transformers to be Square D, GE, or equal.
4. Design MEP systems in accordance with UAMS Equipment Schedule provided by UAMS. Label all new equipment/systems, panels and control devices neatly and conspicuously. Label all new breakers in electrical panels.
5. Cables not in conduits shall be plenum rated.
6. Non-emergency outlet cover colors shall be coordinated with DESIGN & CONSTRUCTION Interior Design Coordinator.
7. Coordinate electrical room wall ratings with architect. The core project team for decision will review conflicts between code requirements.
8. Record all deviations to contract drawings on a record set identifying the revisions, revised locations, and depths where applicable weekly.
9. Devices within 6'-0" (or greater if required by code) of a water source shall be protected by means of GFI whether at the device or breaker.
10. General Contractor is to pay for all connection fees to energize utilities.
11. Design lightning suppressors for all electrical and communications parking equipment.
12. All work shall be performed on de-energized equipment when possible. De-energizing of equipment shall be performed by UAMS and must be coordinated with the UAMS Project User Contact one week in advance. UAMS approval must be obtained prior to working on any energized circuit.
13. Special emissions permit is required by ADEQ under regulation 18 prior to construction of any combustion equipment or chemical emissions (ie boilers, generators, cooling towers, ETO sterilizers, etc) that may add to pollutants. The permit process is initiated by UAMS and can take months for approval before construction for this equipment can begin. The consultant is to provide UAMS with all specifics of any equipment early so that the permit process can begin so as not to disrupt the project.

Electrical Supports
1. Provide adequate conduit and equipment foundation and suspension systems in accordance with recognized engineering practices and code requirements, using where possible standard commercially accepted hangers and accessories.
2. Where thermal movement or vibration in conduit or equipment can occur, the hanger assembly must be capable of supporting the line without sag or excessive movement in all operating conditions.
3. Conduits and equipment shall be seismically braced as required by the International Building Code.
4. Supports for conduits, or equipment shall be fastened to the building structure. Supports being attached to other utilities are not acceptable.
5. Conduit on roof shall be mounted on pedestal type stands that require no penetrations through the roof. Pedestal shall be treated wood encapsulated by an aluminum cover sized to handle the load of the conduit and height requirements. All conduits shall be a minimum of 1'-0" above the roof. Pedestals shall sit on a pad compatible with the roof membrane. Provide rollers on stands where conduit is subject to excessive movement.

6. Exterior equipment shall be supported on galvanized structural steel supports designed by a Registered Arkansas Structural Engineer with seismic requirements of IBC meet unless waived by DESIGN & CONSTRUCTION. Indoor equipment in Electrical Rooms shall be mounted on minimum 4" reinforced concrete pad with chamfered edges if ceiling height permits. Interior equipment mounted above ceilings shall be supported by structural steel seismically braced per IBC.

Identification
1. Provide engraving stock melamine plastic laminate, complying with FS L-P-387, in sizes required to provide all necessary information and minimum 1/16" thick, engraved with engraver’s standard letter style similar to Arial on black background and white core punched for mechanical fastening.

2. Comply with governing regulations and requirements or authorities having jurisdiction for identification of electrical work.

3. Provide Operational Identification and Warnings whenever reasonably required to ensure safe and efficient operation and maintenance of electrical systems, and electrically connected mechanical systems and general systems and equipment, including misuse of electrical facilities by unauthorized personnel. Where detailed instructions or explanations are needed, provide plasticized tags with clearly written messages adequate for its intended purpose.

4. In addition to danger signs required by governing regulations and authorities, install appropriate danger signs at locations subsequently identified as constituting similar dangers for persons in or about project including:
   a. High Voltage – whenever it is possible under any circumstances, for person to come in contact with electrical power of 600V and higher.
   b. Critical Switches / Control regardless of whether concealed or locked up, where untimely or inadvertent operation (by anyone) could result in significant danger to persons, or damage to or loss of property.

5. Install engraved plastic-laminated signs on each major unit of equipment in the project, including central or master unit of each electrical system including communication / signal systems, unless unit is specified with its own self-explanatory identification or signal system. Provide double line of text where necessary 3/8" high on 1-1/2" high sign, white lettering in black for all circuits. Signs for equipment on emergency power shall be white with red letters. As a minimum, sign shall be provided for all panel boards, electrical cabinets and enclosures, switchgear, power transfer equipment, transformers, starters, disconnects, junction boxes larger than 8" x 8", circuit breaker enclosures, power generating units. Signs shall contain the type of system, equipment number assigned through DESIGN & CONSTRUCTION, voltage, ampage, circuit fed from or to, manufacturing date and serial number (all equipment, gear, and major switches), and any other information to properly identify circuits.

6. All receptacle covers shall be labeled on the front identifying the panel and circuit. Emergency circuits shall be red with white lettering. Non emergency circuits shall be white or beige unless noted otherwise during planning with black lettering.
7. Any work to be conducted on electrical equipment shall be classified in accordance with the *Standard for Electrical Safety in the Workplace (level 1 through 5)*. Any electrical panel boards or switchboards installed shall be clearly and legibly marked with the electrical shock hazard (Available Arc Fault) in accordance with Article 110.16 of the NEC.

**Wiring, Raceways, Conduits**

1. Not Used.
2. In new construction, design cable trays above ceiling with proper fire sealing through rated walls. Stop cable tray prior to firewall and install conduit through wall properly sealed. Apply this design where economically practical in renovations.
3. Do not design flush or surface floor mounted electrical outlets.
4. All electrical wire to be soft drawn copper unless waived by DESIGN & CONSTRUCTION. Conductor’s #8 and larger shall be stranded. Minimum conductor size is #12 AWG unless waived by DESIGN & CONSTRUCTION. Wiring ran below grade or subject to moisture shall have moisture-resistant type insulation. Use stranded conductors for control circuits 24V and below. Minimum size shall be #16 AWG unless waived by DESIGN & CONSTRUCTION.
5. Where feasible, pull all wires at the same time. Use suitable pulling lubricant for building wire #4 AWG and larger. Provide pull strings in empty systems conduits.
6. On three phase, four wire systems do not use a common neutral for more than 3 circuits.
7. All wire installed on the load side of GFI circuit breakers shall be type “XHHW” or “XLP”. Use of pulling compound on these conductors is prohibitive.
8. Verify continuity of each branch circuit conductor.
9. Where taps and splices are necessary and approved, they shall be made in approved corrosion resistant metal splice boxes, wire ways, manholes, etc with suitable connectors as recommended by wire and cable manufacturer. No runs over 100 feet shall be made without the use of a pull box.
10. Primary service ran underground shall be encased in red-dye concrete. Minimum depth is 3'-0". At a depth of 1'-0" install a tape stating, “Caution, Underground electrical” or a tape approved by DESIGN & CONSTRUCTION. Coordinate work with Mechanical.
11. Conduits underground shall be rigid metal but can be schedule 80 PVC with RSC elbows if encased in concrete. Fittings shall be type 1 for rain tight connections, type 2 for concrete tight connections, type 3 for normal connections.
12. Conduits above grade shall be galvanized rigid metal conduit or metallic tube except at equipment connections or special conditions. Fittings shall be type 1 for rain tight connections, type 2 for concrete tight connections, type 3 for normal connections. PVC shall be by permission only unless required by code. Conduits subject to moist or corrosive conditions shall be liquid-tight. Unless waived by UAMS Project User Contact, all bends for conduits 1-1/4" or larger shall be factory made 90’s. Conduits shall be concealed unless waived by DESIGN & CONSTRUCTION; exception is electrical and mechanical rooms.
13. Surface metal raceway when approved by DESIGN & CONSTRUCTION shall be a UL listed one-piece surface with interlocking base and cover construction with a finish suitable for painting.
14. Provide flexible conduit for all motor connections and light fixtures (6 foot maximum length) with fittings complying with FS W-F-406, type 1, class 1, style A. Motor connections in areas subject to movement, moist, or corrosive conditions shall be liquid-tight flexible conduit with fittings complying with FS W-F-406, type 1, class 3, style G.
15. Coordinate type of cable handling to be used with Division 27.
16. Corridor receptacles shall be on independent circuits of receptacles in adjacent areas.
17. Plastic or insulated throat box connector shall be provided for all open conduit ends.
18. All wiring shall be color coded by phase and voltage level. Conductor's number 6 and larger can color code by tape securely fastened to insulation, smaller than number 6 shall be by insulation. Colors shall be as follows:

<table>
<thead>
<tr>
<th>Phase</th>
<th>120/208</th>
<th>277/480</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>black</td>
<td>brown</td>
</tr>
<tr>
<td>B</td>
<td>red</td>
<td>orange</td>
</tr>
<tr>
<td>C</td>
<td>blue</td>
<td>yellow</td>
</tr>
<tr>
<td>Neutral</td>
<td>white</td>
<td>gray</td>
</tr>
<tr>
<td>Ground</td>
<td>green</td>
<td>green</td>
</tr>
</tbody>
</table>
19. Use full size neutral and neutral conductors in all buildings.
20. Piping is not to be used for grounding unless required by code.
21. Installation of electrical conduit to be close to slab above or as close to wall as possible to avoid conflicts with mechanical ductwork, piping and cable trays.
22. Disconnects switches shall be installed at all equipment and shall be fusible or non-fusible heavy-duty type, quick-make, quick-break, sized for the rated equipment horsepower.
23. Backboxes are required in Fire Rated Partitions as stated in IBC if electrical boxes exceed 16 square inches opening within 100 square feet and not 24” apart. If required, provide a furr-out against the firewall to mount the headwall requirements.
24. Boxes for switches shall generally be placed within six inches of latch side of doorjambs unless waived by DESIGN & CONSTRUCTION.
25. Provide knockout closures to cap unused holes in electrical boxes.
26. Penetrations through a roof shall be coordinated with the roofer to run in conduit through a application warranted by the roof manufacturer. Group conduits to minimize penetrations.
27. Emergency power in Telephone rooms shall be coordinated to be close to the power source of the equipment. Conduits and wire shall be arranged so as not to be ran across doorways or become tripping hazards to employees working in the room.
28. All grounding means and methods shall be in accordance with Article 250 and Article 517 of the NEC. Only accepted grounding methods described in these articles will be acceptable.
29. The equipment grounding busses of the normal and essential branch circuit panel boards serving the same individual patient vicinity shall be bonded together with an insulated continuous copper conductor not smaller than 10 AWG in accordance with Article 517.14 of the NEC.
30. When neutral conductors are required for the final connection and operation of kitchen equipment, the smallest allowable size shall be 10 AWG.
31. Each branch circuit serving receptacles in office environments (data or electronic equipment) shall contain a dedicated neutral. Neutral sharing will not be allowed for these branch circuits.
32. Not Used.
33. Conduit size on campus is limited to ¾", 1", 1-1/2", 2", 2-1/2", 3", 4", 5" unless special requirements require a waiver by DESIGN & CONSTRUCTION in writing.
34. The largest wire size to use on campus is 500 KCM. Consideration should be used where economically practical to use two smaller wires to carry the load of one larger wire.
35. Disconnects using three phase power shall have UL labeled shields between the phases.

Devices
1. Provide factory-fabricated wiring devices, in types, colors, and electrical ratings for applications as selected by core team and complying with NEMA Stds Pub No WD 1. Colors for non-emergency devices to be selected during planning.

2. Receptacles in clinical areas shall be hospital grade, 2-pole, 3-wire grounding. Red receptacles with white letter identifying circuit shall be used for all emergency circuits. Receptacles in non-clinical areas shall be commercial grade, 2-pole, 3-wire grounding. Ground fault interrupters shall be added to any receptacle subject to wet areas or as defined by code.

3. Switches shall be commercial grade quiet toggle for the application to be used.

4. Switches in rooms to control the spread of organisms shall be the type to seal inside box.

5. Dimmers shall be provided for conference room lighting, coordinate with DESIGN & CONSTRUCTION. Dimmers shall be solid-state AC dimmer controls for incandescent fixtures, type to be discussed during planning.

6. Standard receptacle height: 16" AFF to top of box unless adjustment is necessary for coordination with millwork, furniture, or equipment. Standard wall switch height is 48" aff. Install alarm audio/visual devices 6'-8" aff. Install pull stations 4'-0" aff. Exceptions are where codes prevail.

7. Provide weatherproof outlets for interior or exterior locations exposed to weather or moisture.

8. All devices are to be installed plumb and square.
Transformers
1. Substation transformers to be cast resin type, primary and secondary.
2. Wall or ceiling mounted transformers is not acceptable. Mount transformers on neoprene pads sized to prevent vibration to structure.
3. Harmonic generation by User equipment should be considered when designing transformers.
4. Acceptable manufacturers Sq D, GE, or as approved through DESIGN & CONSTRUCTION.

Panels
1. Panels shall be UL listed and comply with NEC.
2. Power Distribution panelboards shall be dead-front safety type with panel-board switching and protective devices in quantities, ratings, types and arrangement as selected by engineer-of-record; with anti-turn solderless pressure type main lug connectors approved for copper conductors. Sub-feed breakers are not allowed unless waived by DESIGN & CONSTRUCTION. Construct unit for connecting feeder at top of panel. Equip with copper bus bars, and full size neutral bus; provide suitable lugs on neutral bus for out-going feeders requiring neutral connections. Provide molded-case main or main lugs only and branch circuit breaker types for each circuit, with toggle handles that indicate when tripped. Use of sub-fed breakers is not allowed. When multiple-pole breakers are required, provide with internal common trip so overload on one pole will trip all poles simultaneously. Provide a bare uninsulated grounding bar bolted to enclosures. Provide panelboards fabricated by the same manufacturer as enclosures, which mate properly with enclosures. Provide an isolated ground bus bar where required for proper operation of equipment or devices.
3. Lighting and appliance panelboards shall be dead-front safety type with panel-board switching and protective devices in quantities, ratings, types and arrangement as selected by engineer-of-record; with anti-turn solderless pressure type main lug connectors approved for copper conductors. Sub-feed breakers are not allowed unless waived by DESIGN & CONSTRUCTION. Construct unit for connecting feeder at top or bottom of panel. Equip with copper bus bars, and full size neutral bus; provide suitable lugs on neutral bus for out-going feeders requiring neutral connections. Provide molded-case main or main lugs only and branch circuit breaker types for each circuit, with toggle handles that indicate when tripped. Use of sub-fed breakers is not allowed. When multiple-pole breakers are required, provide with internal common trip so overload on one pole will trip all poles simultaneously. Provide a bare uninsulated grounding bar bolted to enclosures. Provide panelboards fabricated by the same manufacturer as enclosures, which mate properly with enclosures. Provide panelboards fabricated by the same manufacturer as enclosures, which mate properly with enclosures. Provide an isolated ground bus bar where required for proper operation of equipment or devices. The branch circuit breaker sub-assembly shall be in continuous contact and bolted to the panel enclosure back box; subassemblies mounted on “Z” brackets are not allowed. The circuit breaker sub-assembly shall utilize thermo-plastic mounting straps to properly align breakers.
4. Panelboard enclosures shall be constructed of minimum 16-gage galvanized steel complying with NEMA. Construct with multiple knockouts and wiring gutters. Provide fronts with adjustable indicating trim clamps, and doors with flush locks and keys, all panelboard enclosures keyed alike, with concealed door hinges and door swings allowing full access.
5. Emergency and Life Safety panelboards shall be clearly identified.
6. New panel fill by breaker count and capacity not to exceed 75% each of total.
7. Provide knockout closures to cap unused holes in electrical boxes.
8. Any work to be conducted on electrical equipment shall be classified in accordance with the Standard for Electrical Safety in the Workplace (level 1 through 5). Any electrical panel boards or switchboards installed shall be clearly and legibly marked with the electrical shock hazard (Available Arc Fault) in accordance with Article 110.16 of the NEC.

**Switchboards**

1. Switchboards shall be UL listed and comply with NEC, UL, and NEMA.
2. Switchboards shall be rated with a minimum 600 VAC for new buildings. Existing switchboards being replaced shall be field verified. Switchboards shall have been in standard production for a minimum one-year.
3. Enclosures shall be general-purpose type 1 with sections aligned front and rear. Heights should be verified with existing conditions to coordinate path to and the area it is to be installed. Switchboards shall be of deadfront construction with removable steel channels (1.5 inch floor sills) bolted to the frame to rigidly support the entire section for moving on rollers and floor mounting. Each switchboard section shall have an open bottom and individually removable top plate for installation and termination of conduit. The switchboard enclosure shall be painted on all exterior surfaces applied by the electro-deposition process over an iron phosphate pre-treatment complying with ANSI #49, color medium gray. All front covers shall be screwed removable with a single tool and all doors shall be hinged with removable hinge pins. Top and bottom conduit areas shall be clearly indicated on shop drawings.
4. All switchboards to have plated copper bus bars. The switchboard bussing shall be of sufficient cross-sectional area to meet UL Standard 891 temperature rise requirements. Ground bus shall be sized per NFPA 70 and UL 891 Tables 25.1 and 25.2 and shall extend the entire length of the switchboard. The phase (and neutral) through-bus shall be as designed by the engineer-of-record. For 4-wire systems, the neutral shall be of equivalent ampacity as the phase bus bar. Tapered bus is not acceptable. Full provisions for the addition of future sections shall be provided. Bussing shall include all necessary hardware to accommodate splicing for future additions. Shall be bolted with grade 5 bolts and conical spring washers.
5. Circuit breakers shall be electronic trip molded case full function 100% rated. All electronic circuit breakers shall have the following time/current response adjustments: Long Time Pickup, Long Fault Pickup, Short Time Pickup, Short Time Delay, Ground Fault Pickup, Ground Fault Delay and Instantaneous settings. Each adjustment shall have discrete settings (fully adjustable) and shall be independent of all other adjustments. Circuit breaker trip system shall be a microprocessor-based true rms sensing designed with sensing accuracy through the thirteenth harmonic. Sensor ampere ratings shall be as indicated by the engineer-of-record. Local visual trip indication for overload, short circuit and ground fault occurrences. Long Time Pickup indication to single when loading approaches or exceeds the adjustable ampere rating of the circuit breaker shall be provided. Circuit breakers shall be provided with Zone selective interlocking (ZSI) communications capabilities on the short-time and ground fault functions compatible with all other electronic trip breakers and external ground fault sensing systems.
6. Do not design for fused switches below 600 volts.
7. Power Logic monitors on all substations tied back to the existing power logic monitoring system through the campus TCP/IP backbone.
8. Show the entire single line switchboard bus work, as depicted on the factory record drawings, on an engraved laminated plastic (Gravoply) nameplate. The name shall be at least 0.0625 inch thick and located at eye level on the front cover of the switchboard incoming service section.

9. Switchboard metering shall be similar to Square D type CM 2450 Digital Monitor with 0.2% accuracy with the following features: A, V, kW, kVAR, kVA, PF, F, THD, K-Factor, kWh, kVARd, kVAd, kVARh, kVAh, KYZ output, RS-485 communication port, kWd, kVARd, kVAd, date/time stamping, predicted power demand, onboard alarms, min/max readings, data log, event log, extend memory (100k), wave form capture, disturbance monitoring and programmable logic. System shall be capable of communicating with existing Square “D” front end.

10. After installation of electrical grounding system is complete, test ground resistance with ground resistance tester. Where tests show resistance-to-ground is over 3 ohms, take appropriate action to reduce.

11. Any work to be conducted on electrical equipment shall be classified in accordance with the Standard for Electrical Safety in the Workplace (level 1 through 5). Any electrical panel boards or switchboards installed shall be clearly and legibly marked with the electrical shock hazard (Available Arc Fault) in accordance with Article 110.16 of the NEC.

Motor Starters
1. Comply with UL 508, “Electric Control of Equipment”
2. Provide motor starters and auxiliary components; of types, sizes, ratings, and electrical characteristics, which comply with manufacturers standard materials, design, and construction in accordance with published product information, and as required for complete installations. Where more than one type of equipment meets indicated requirements, selection is engineer-of-record option. Provide phase loss and low voltage protection relay in the control circuits of all motor starters. Size 0 starters shall be supplied as a minimum and shall be provided in an oversized enclosure for control wiring. Combination units shall be provided with integral non-fused disconnect or circuit breakers as recommended by engineer-of-record. Starters installed in existing motor control centers shall match existing equipment type, rating, etc.
3. Provide manual single-phase fractional HP motor starters of types, ratings, and electrical characteristics selected by the engineer-of-record; equip with thermal overload relay for protection of 120V AC motors of ½ hp or less. Provide starters with quick-mate, quick-break trip free toggle mechanisms; mount starter in NEMA type 1 general-purpose enclosure.
4. Provide full voltage alternating current magnetic starters, consisting of contactors and overload relays mounted in common enclosures; of type, size, ratings, and NEMA sizes selected by the engineer-of-record. Overload relays to be block type with manual reset. Control voltage to be supplied via 120V control transformer with fused primary and fused secondary. Controls are to include Green power off pilot light, Red power on pilot light, and Hands-On-Auto switch.
5. Any fuses shall be in fusible disconnects.

Lightning Protection System
1. Install lightning protection in accordance with governing codes including UL Master Label 96A, NFPA 780, and Lightning Protection Institute Installation Code (LPI) 175 for Lightning Rod Installations.

2. Air terminals shall project not less than 10’ above the object to be protected. Copper air terminals shall not be less than ¼’ diameter solid copper. Air terminals exceeding 24” in height shall be supported with a suitable brace supporting point; at not less than ½ the height of the air terminal.

3. Roof (main) conductors shall be a standard copper conductor and shall weigh not less than 375lbs per 1,000 ft with individually stranded wires of not less than 15 gage. Secondary bonding shall use not less than 80lbs per 1,000ft. Conductors are not to penetrate roof, coordinate with the roofer a support that will adhere to the roof without damaging the membrane.

4. Connections and splices shall be made with approved connector fittings. The connections and splices shall be sufficiently tight to withstand a pull strain of 200 lbs minimum.

5. Down and ground conductors shall be a standard copper conductor and shall weigh less than 375 lbs per 1,000 ft, with individual strands of wire of not less than #15 AWG.

6. After Ground Network has been completely installed, and before any equipment is placed in operation, the Electrical Contractor shall perform a Fall-of-Potential test in the presence of the engineer-of-record and UAMS. Resistance between ground and absolute earth shall not exceed 5 ohms.

**Interior Lighting**

1. Lighting is to comply with IBC, ANSI, NEC, UL, NEMA, CBM, Arkansas Department of Health, and Arkansas Energy Code.

2. Lights shall be selected to offer adequate lighting for the function of the area and safety of the occupants, yet utilizing all monetarily feasible energy saving features possible. UAMS strongly encourages the use of light fixtures that does not add to the stockpile of lamps currently in stock, unless the lamp is for an energy saving fixture.

3. Select fluorescent ballast to be high efficiency energy-saving electronic type with high power factor, class P sound rated A, THD less than 10%, crest factor less than 1.7, 90% power factor or more, shall withstand line transients as defined in ANSI/IEEE C62.41 (Category A), shall have a frequency of operation of 20 KHZ or greater, shall meet FCC Rules and regulations, part 18, Class A, and low-noise features.

4. Compact fluorescent lamp ballast shall be high efficiency electronic ballast capable of operating lamp types with high power factor, low noise, sound rated A, THD of 10% with internal thermal protection.

5. High-Intensity Discharge Ballast shall be of the regulating, high-power factor, (0.90 or above) saturated iron or grain originated silicon iron and encapsulated. Capacitors to be field replaceable. Ballasts shall be capable of maintaining correct lamp operation over a voltage input of plus or minus 10% of normal, in addition to accepting a voltage input reduction of 40% minimum before lamp dropout occurs. Ballast shall have a class F insulation, design for 105F ambient, suitable for operation in both mercury and multi-vapor lamps, designed to start lamps at ambient temperature of minus 20F and having 10KV nominal BIL minimum.

6. Recessed incandescent fixtures shall have UL listed thermal cutout protection.
7. Select fluorescent lamps to be EPA listed as non-hazardous, Phillips Alto, or equivalent, where applicable.
8. Select 2x4 fixtures to have factory preformed post-painted finish (no pre-painted metal) and a .125” minimum thickness lens.
9. Limit use of incandescent fixtures.
10. Conference/Presentation rooms are to be designed for the use of dimmable fixtures. Coordinate with DESIGN & CONSTRUCTION the sequence of dimming and locations of switch(es).
12. Do not design for battery operated fluorescent light ballast, hard wired only. Discuss special exceptions during planning.
13. Exit signs shall be Hubbell LED1-AC-RWW, LED2-AC-RWW.
14. Whips should not be longer than 6’ or as directed by code.

**Exterior Lighting**
1. Lighting is to comply with IBC, ANSI, NEC, UL, NEMA, CBM, Arkansas Department of Health, and Arkansas Energy Code.
2. Lights shall be selected to offer adequate lighting for the function of the area and safety of the occupants, yet utilizing all monetarily feasible energy saving features possible. UAMS strongly encourages the use of light fixtures that does not add to the stockpile of lamps currently in stock, unless the lamp is for an energy saving fixture. The lights are to be controlled by both photocell and time clock on a split leg.
3. High Pressure Sodium lights shall not be used.
4. The following luminaire shall be met when designing exterior lights:

<table>
<thead>
<tr>
<th>Location</th>
<th>Desired</th>
<th>Minimum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inside Parking Decks</td>
<td>5.0</td>
<td>2.0</td>
</tr>
<tr>
<td>Lots</td>
<td>1.0</td>
<td>0.4</td>
</tr>
<tr>
<td>Bus Shuttle locations</td>
<td>4.0</td>
<td>2.0</td>
</tr>
<tr>
<td>Main Entrances</td>
<td>5.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Other Entrances</td>
<td>1.0</td>
<td>0.2</td>
</tr>
<tr>
<td>Sidewalks</td>
<td>1.0</td>
<td>0.2</td>
</tr>
<tr>
<td>Local roadways</td>
<td>1.0</td>
<td>0.2</td>
</tr>
</tbody>
</table>

**Division 27 Communications**

**Voice and Data Systems**
1. Contractor provided rough-in for a standard UAMS phone/data outlet consists of a dual gang junction box with a single gang mud ring, dedicated 1” conduit with pull string & protective bushings at conduit ends with open end within 2’ of cable tray or hooks in accessible ceiling. This is to accommodate the typical UAMS phone/data outlet install with four Cat 6 cables ran to the rough-in box unless waived by UAMS DESIGN & CONSTRUCTION in writing. For non-standard phone/data outlets, conduit shall be sized to accommodate the number of wires the area could receive with 60% free space. Cable tray shall run from the communication room above Tele/Data Racks through accessible ceilings. Cable trays shall terminate at fire and smoke walls with adequate conduits
passing through the wall penetration. Contractor is to fire seal all contractor installed sleeves & conduit on the outside of sleeves or conduit. An extra conduit shall be provided through fire & smoke walls for future growth where this condition occurs. Cable trays are to be ladder type with adequate working clearance approved by UAMS Telecommunications. All cable tray turns & intersections shall utilize manufacture’s recommended fittings and installation methods providing 12” radius bends at bends and intersections. Rungs are to be 12” apart. Like Cooper B-line 166P12-18-144 & 16P-18-HT12. Contractor is to Ground & Bond Cable tray and UAMS installed Data Racks.

2. Where ever J-Hooks are proposed between wall rough-in conduits & Cable Tray, the following criteria should be met: Maximum of 4” between J-Hooks, Min width of J-Hooks to be 1”wide for flat portion of hook, Sizing & quantity of hooks to accommodate 150% of initial calculated cable requirements with a max of 100 Cat 6 cables per row of 4” j-Hooks, Hooks to be installed on studs with a min of 2 course treaded screws per J-Hook and at outside corners as well as the nearest studs to inside corners on both walls. Rows of J-Hooks are to be installed so that cable route paths between J-Hooks are not adjacent to obstacles that would be against code or recommendation so that the Cat 6 and other low voltage cables are not to be in close proximity to high voltage conduits, sprinkler systems or water pipes, med gas or oxygen lines. May use Cooper B-Line BCH64.

3. Phone/Data outlet boxes, conduit, pull string, cable tray etc. are Contractor Installed. Wire pulls, jack faceplates, patch panels, racks and terminations are by Owner.
• 19” x 84” data racks for each floor to accommodate Network equipment and patch panels for both LAN & Telephone needs. Cable Tray is to be installed above all racks at a min Height of 90” AFF.
• All Tele/Data jacks are to be Siemon products and therefore all contractor rough-in requirements should provide openings for installation of UAMS’ Standard Siemon product use. All substitutions for UAMS Telecommunications’ standard products must have signature approval by a UAMS Telecommunications representative. Examples of standard jacks that are currently used on campus are: CT-C6-C6-20, CT4-FP-20, CT-MFP-20 & MX-WP-C6-SS.

4. Equip patient care and exam rooms with a UAMS standard phone/data outlet.

5. High-rise construction to have phones in each stairwell at levels required by code. Phones are to be connected together and to ring down to Campus Police. Contractor is responsible for full installation package.

6. Phone lines for elevators shall be combined between cars as allowed by code to reduce the number of active phone lines to a minimum. Contractor is to install conduit for phone cable directly to elevator controls termination junction box.

7. Provide flexible communication and data whips for all furniture partitions with conduit of sufficient lengths for connections. Flexible whip is to be tied back into a metal covered junction box in the floor or wall. Conduit, bushings, connectors & whips are to be sized according to the number of cables required to area with no less than 60% free space.

8. Telephone/Data Rooms are to be provided and centrally located on each floor and stacked between floors. Each Telecom/Data room is to be sized according to specifications provided by UAMS Telecommunications based on the estimated Telephone & Data requirements that each Telephone/Data room is to service. Vertically aligned 4” sleeves with protective bushings between telephone/data rooms are to be installed by contractor as well.

9. A typical Telephone/Data Room is to have 3/4” wolmanized plywood backboard painted with fire retardant paint, ground bus bar to service ground, emergency power quad outlets
on every wall and 8’ AFF at each rack location, conditioned air for electronics, cable tray and adequate lighting for all technician work areas on emergency power. Consult UAMS Telecommunications for Layout details. Details will be dependent on service requirements. Minimum coverage of Plywood backboards are to be installed from 20” AFF (just above power outlet height) to 116” AFF on all walls, circumference the room, unless specified otherwise.

10. Contractor is to install and provide exterior emergency telephones for all new parking lots. This would include power for Blue light on the Phone pole & conduit for telephone cable. UAMS prefers to use a Gai-Tronics Model 297 with Model 234 Stanchion or comparable.

11. Contractor to install conduit with pull strings for Building Copper & Fiber feeds from service rooms at new site to designated core service source facilities as determined per case. Conduits are to be numbered and sized according to current & projected service requirements determined by UAMS Telecommunications.

12. Data may include both hard wired and wireless coverage. Provisions should be made to ensure wireless coverage does not interfere with wireless systems for medical equipment. Rough-In for Wireless LAN AP’s is to include a suitable Cable path from cable tray to proposed Wireless AP locations via ¾” conduit or cable hooks to within 2” of Wireless AP locations. Wireless AP locations are to be determined by UAMS IT after being provided Reflected ceiling drawing files.
Division 28  Electronic Safety and Security

Parking Control Equipment
1. Separate 1-inch conduits for electrical power and telecom/data between parking equipment items. Connect parking equipment to an adequate power source. Provide an accessible disconnect switch concealed from public view. Install a surge suppression system for power and communication lines.
2. Install heavy-duty pipe bollards to protect surface mounted equipment.
3. Traffic equipment placement set to factory recommendations on all curbs and traffic islands.
4. Key card equipment is programmable to void or validate individual cards or group of cards. Coin, token, or ticket issuing equipment shall be discussed for patient areas. Employee parking areas may be provided with card only access. Means of programming shall be included with all packages and adequate training of Owners personnel. Equipment is to be compatible with existing equipment.
5. Gate arms shall be constructed of wood standard painted black and white. Gates shall interface with programmable access equipment. Do not leave a gap between island and equipment.
6. Owner chooses all traffic and security telephone equipment.
7. Space conditioning and toilet access in parking lot attendant booths. Base specifics on individual project needs.
8. Install parking control equipment to factory recommendations on all curbs and traffic islands.
9. Design lightning suppressors for all electrical and communications parking equipment.
10. Follow the NEC for all wiring, include ground fault and disconnects on dedicated circuits for all equipment. Minimum circuit breaker shall be 20A.
11. Provide R/F receivers in gates and an on/off switch in the gooseneck.
12. All cabling shall be minimum stranded cat 5e.

Fire Alarm
1. The system shall be current complying with all pertinent codes, rules, regulations and laws of the Authority, and local jurisdiction. The System shall be completely UL listed and labeled and state-of-the-art. A sequence of operation shall be provided with every system.
2. The system shall include LCD annunciators, one-way multi-channel voice communication system, color graphic workstation and printer (unless compatible with existing system), control panel at the building with front-ends compatible with existing systems located at the physical plant control center, manual pull stations, area smoke detection, area heat detection, duct smoke detection, monitor sprinkler system waterflow(s) and valve supervisory switch(s), audible appliances, synchronized visual appliances, two-way communication system with phone jack located at elevator lobbies, stairwells, elevator cars, and fire pump room, connection to door hold opens, HVAC fan shut down, interface to building automation system (if applicable), and any other requirement of the governing codes.
3. All Life Safety System equipment shall be arranged and programmed to provide the early detection of fire or smoke, the notification of building occupants and physical plant control center, the override of the HVAC system operation, and the activation of other auxiliary systems to inhibit the spread of smoke and fire and to facilitate the safe evacuation of the building occupants.
4. The control panel(s) shall be state-of-the-art multi-processor based networked system designed especially for fire and smoke, one-way and two-way emergency audio communications, smoke control and be recognized and approved by UL. The control panel shall include all required hardware, software, and site-specific system programming to provide a complete and operational system. The control panel(s) shall be designed such that interactions between any applications can be configured, and modified using software provided by a single supplier. The control panel(s) operational priority shall assure that life safety takes precedence among the activities coordinated by the control panel. The control panel shall be capable of these minimum requirements: Support minimum of 2500 analog/addressable points, Support network connections minimum of 63 other control panels and annunciators, support multiple digital dialers and modems, support multiple communication ports and protocols, support minimum of 1740 chronological events. The network control panels shall include the following features:

- Ability to download all network applications and firmware from the configuration computer from a single location on the computer.
- Electronic addressing of analog/addressable devices.
- Operator interface control/display that shall annunciate, command and control system functions.
- Internal audio signal with different programmable patterns to distinguish between alarms, supervisory, trouble, and monitor conditions.
- Discreet system control switch provided for reset, alarm silence, panel silence, drill switch, previous message switch, next message switch, and details switch.
- Discreet system disable switch for speakers, strobes, elevator recall and shunt trip, doors, smoke dampers, atrium purge fans, AHU shutdown, stairwell pressurization fans, security, and a separate switch for all the above at one time.
- Systems reports that provide detailed description of the status of the system parameters for corrective action or for preventative maintenance programs. Reports shall be displayed by the operator interface or capable of being printed on a printer.
- Authorized operator with the ability to operate to modify system functions like system time, date, passwords, holiday dates, restart the system and clear control panel event history file.
- Authorized operator to perform test functions within the installed system.
- Standby power supply that automatically supplies electrical energy to the system upon primary power supply failure.

5. Provide a Firefighter Smoke Control Station at a designated location agreed to by the project core team when project is considered a high rise. The FSCS shall provide a graphic representation of the facility HVAC system and Stairwell Pressurization system (if applicable). Fan override and control switches and fan/damper status LED’s shall be provided. The following minimum system controls and indicators shall be provided on the FSCS: Power ON, Trouble, and Signal Silenced LED’s; System Reset, Silence, Trouble Silence, and Drill push buttons. It shall be possible to annunciate text messages via LCD display mounted in the FSCS enclosure.

6. Standby power supply shall be an electrical battery with capacity to operate the system under maximum supervisory load for 24 hours and capable of operating the system for fifteen minutes of evacuation alarm on all devices, operating at maximum load. The system shall include a charging circuit to automatically maintain the electrical charge of the battery. The system shall automatically adjust the charging of the battery to compensate for temperature.
7. The main display interface shall show the first and most recent priority system events without any operator intervention in colored graphics. All system events shall be directed to different message queues. Messages of different types shall never intermix to eliminate operator confusion. A “Details” switch shall provide additional information about any device highlighted by the operator.

8. All fire alarm systems are to be hard-wired back into UAMS Control Center and shall be tested (each piece) back to Control Center. UAMS shall be notified of the tests 120 hours in advance and be permitted to witness these tests.

9. Initiating device circuits monitoring manual fire alarm stations, smoke and heat detectors, waterflow switches, valve supervisory switches, fire pump functions, and air pressure supervisory switches shall be Class B (style “A” or “B”). Initiating device circuits monitoring magnetic security contacts, motion detectors, duress station, glass break and intrusion type devices shall be Class B (style “A” or “B”).

10. The contractor shall have installed similar system fire detection, evacuation voice and visual signaling control components on a previous project of comparable size and complexity. UAMS reserves the right to reject any control components for which evidence of a successful prior installation performed by the contractor cannot be provided.

11. Supplier shall maintain a service organization with adequate spare parts stock within 75 miles of UAMS. Any defects that render the system inoperative shall be repaired within 24 hours of UAMS notifying the contractor.

12. Preferred fire alarm system manufacturers shall be Siemens or Edwards to coordinate with existing systems. Non-proprietary systems shall be used.

13. Coordinate with UAMS on a case-by-case basis as to which fire alarm systems are to be brought up to current code during renovations. This work includes smoke detectors.

14. Fire alarm must be coordinated with the security system and tied into security where determined.

15. No audible alarms in intensive care areas as defined by NFPA.

16. Design audible fire alarm systems to remain at 15 dBA above ambient noise levels. Decrease the number of audible devices as necessary to maintain this sound level.

17. One pair fiber optics lines per controller for video.

18. All fire alarm wiring is to be in conduit with the junction boxes painted red.

19. Fire Alarm System shall be submitted to State Health Department in a timely manner so as not to delay the project for approval.

20. The system supplier shall schedule and present a minimum of 16 hours of documented formalized instruction to UAMS detailing the proper operation of the installed system and how to change the front ends and maintenance recommended by the system manufacturer. In addition, factory training is to be discussed during initial project planning. Factory training consists of the Fire Alarm contractor furnishing the owner two weeks training for two (2) UAMS employees at the manufacturer’s training center for major projects (in excess of 1 million dollars). The cost for this training shall include all books, lodging, transportation, per diem and any other incidentals necessary for training.

21. Provide a minimum of 2% extra replacement devices of each type used. Include a minimum of 3 keys to access the system.

22. Fire Alarm contractor shall furnish a portable operator’s terminal to the Owner. The portable operator’s terminal shall be a laptop computer with the latest system software with full access programming of individual fire alarm panels or across the system.
23. UAMS personnel shall have all software, training manuals and material required to program all field panels. This includes the ability to upload and download all network application firmware and software with the same capabilities as the vendor technician.

Security Systems

1. For the safety and security of UAMS personnel and property, all buildings shall be equipped with the Campus Security System. Areas involving cash transactions/storage, patient files, medical / drug storage, infants, and research shall be equipped with the Campus Security System and Video Monitoring. All cash exchange/storage areas shall also be equipped with panic/robbery alarms.

2. All buildings (Including Research) exterior doors that are common entrance/exits should be secured card access doors with closure.
   a. All exterior doors to be alarmed with supervised alarm.
   b. All access controlled doors to be monitored by video cameras connected to the campus surveillance system.
   c. Ground floor stair access shall be equipped with interior panic storeroom function with closure and no exterior entry. These doors are to be alarmed with supervised alarm.
   d. Roof access shall be equipped with storeroom function on the interior side with closure, exterior side unlocked unless building is equal to or less than two stories.
   e. Roof access below three stories shall be alarmed through the Campus Security System.
   f. Powered exterior doors shall have power supply in accessible ceiling and be coordinated to interact with the Campus Security System.

3. All buildings (Except Research) Interior Doors
   a. With the exception of the above named departments, all interior doors shall have Best hardware with passage or locksets depending on usage. For all interior areas video, card access control, alarms, and surveillance (audio/video) will be as requested by department heads during planning. All patient visiting/waiting areas should be equipped with video monitoring.
   b. Entrances into nursery areas will be equipped with card access doors and monitored by cameras connected to the campus wide surveillance system. Existing renovations can submit for a reduction to a Best “V” series lock if approved by UAMS ESAC Department.
   c. Elevator machine rooms, electrical closets, mechanical closets, and telephone closets shall be equipped with a Best lockset storeroom function with closure unless waived by DESIGN & CONSTRUCTION to card access control. Telecom/Data rooms/closets that house data or security equipment should be card access and monitored by a video camera connected to the campus video surveillance system.
   d. Interior Stairwell doors that are required to be locked to prevent unauthorized access shall be coordinated to disengage upon activation of the fire alarm system. These doors, if equipped with Delayed Egress Maglocks, shall have a sign per NFPA 101 reading “Push until alarm sounds, door can be opened in 15 seconds”.

4. All Research Interior Doors
a. All Lab doors shall have card access control with closure and be monitored by cameras connected to the campus wide surveillance system.
b. Animal Storage areas shall be card access control with closure and be monitored by cameras connected to the campus wide surveillance system.

5. Card access control shall be by UAMS ID badge which will consist of magstrip and/or prox/smartcard. Video Monitoring shall consist of tamper resistant color cameras and networked digital video recorders or a network based IP storage solution at the discretion of the ESAC department. Location of equipment shall be determined by the ESAC department during planning. Card readers are limited to 500 feet from controller, maglocks or electric latching devices are limited to 1000 feet, One fire alarm relay within three feet of the controller and One fire alarm relay shall be provided within 3 feet of each electric locking device in order to interface with the fire alarm system. All maglocks are to be 12/24VDC and meet the specifications set forth by the UAMS ESAC department. Campus Security System, Video system, maglocks, and all power supplies for electric latching devices and cameras are to be on emergency power and be equipped with battery backup. Any areas with video or audio surveillance shall post a warning sign at the entry of the unit. Any building being monitored should have a sign showing the building is equipped with card access, alarmed, or monitored by the UAMS Police Department. Signage to be provided by UAMS Sign Shop.

6. Technical Considerations
   a. Equip infant areas with Campus Wide Security System and Infant Security System.
   b. All high-risk areas (determined by UAMS) to be equipped with card access, video surveillance, alarm and panic monitoring.
   c. All security equipment to be supervised alarm type, with extended memory LAN OPTION Module and compatible system to PCSC IQ series or Software House Cure 9000 Istar. Specific equipment to be determined by the UAMS ESAC department.
   d. Door controller and power supplies to be located in a secure environment (Telecom/ Data Room) and hard wired to emergency power. Telecom/Data rooms/closets that house data or security equipment should be card access and monitored by a video camera connected to the campus video surveillance system.
   e. The door controller power supply and the Door Lock power supply to have a power distribution board containing individual circuit breakers for each point, and an on/off switch (similar to Altronix PD8CB).
   f. Power supplies for door controllers and door locks to be supervised with battery backup.
   g. All network cable and connections between security controllers, recording devices and the data switch to be provided and installed by the UAMS Telecom Department.
   h. All maglocks to comply with NFPA 101.
   i. All maglocks to be equipped with door sense contacts. All exterior card access doors will have electronic latching panic hardware equipped with REX (request to exit) switch and will be FAIL SAFE.
   j. Monitored doors without Electronic hardware to be equipped with door sense contacts (Class C N/O).
   k. All doors status contacts and motion sensors to be on a supervised circuit and to be equipped with an EOL resistor per line at the contact.
I. All card reader access doors to have an egress push button, motion sensor or touch bar that tie directly to the Campus Wide Security System.

m. All motion detectors to be Class C N/O.

n. All doors that are equipped with maglocks to have all other locking hardware removed.

o. All card readers must be compatible with PCSC or Software House hardware as determined by the ESAC department. All magstrip card readers shall be 4.5-5.5 vdc capable of reading 12-digit ABA standard high coercively magstrip and all proximity card readers shall be 12-16 vdc, 37 bit or better, 125kHz frequency.

p. All cable for Campus Security System will be Plenum rated.

q. A composite cable such as PCSC CBLCOMP or Belden Banana shall be used from Security Controller to each access controlled location.

r. Individual cable for door status, motion detection and push button egress to be 22 awg stranded shielded twisted pair (similar to Genesis WG3266).

s. Individual cable to card readers (if needed) to be 3 pair 22 awg stranded shielded twisted pair (similar to Genesis WG3262).

t. Individual cable to maglocks or electric latching device to be 18 awg stranded twisted pair (similar to Genesis WG1118).

Nurse Call

1. Install WEST Com nurse call system in all areas as required by Arkansas Department of Health Regulations. These are sole source items to match existing. Vendor must consult with Clinical Engineering to determine which Rauland-Borg model is applicable.

2. Provide conduit to access all areas for system.

Public Address and Music Systems

1. Include the installation of the Bogen overhead paging system in public & classroom areas to interface with current UAMS campus overhead paging system. Allocate the minimum of one new page zone per building. End user may request additional page zones.

2. UAMS Telecommunications typically installs the Campus Overhead Paging equipment using Bogen 1 watt SM1EZ Surface-Mount Ceiling Speaker or Clarity S-522 Lay-In Ceiling speaker for the Lay-In acoustical tile areas. Contractor is to provide a 3/4” conduit from a min of 2’ of accessible Cable Tray to within 2’ of speaker locations. Conduit installation is to include protective bushings on ends as well as pull strings. For areas that require overhead paging speakers in solid, non-accessible or Non Lay-In Tile areas, Contractor should provide 3/4” conduit within 6” – 18” of ceiling opening and then from speaker to speaker location and then on to Cable tray in accessible ceiling. Where overhead paging speakers are required in Non Lay-In Tile areas, the ceiling framing is to allow a min of 1” clearance around contractor provided 10” dia hole. Preparation should be planned to allow for the installation of 1 watt Bogen 8” cone speakers with 13” dia. Grilles using a Bogen MR8 mounting ring.

Televisions

1. Television locations and whether the television is floor or ceiling mounted shall be coordinated with DESIGN & CONSTRUCTION during the preliminary planning. Television
locations shall be provided with a 2-gang 120V 20A receptacle and provisions for coaxial connector in separate gang box.

Clocks
1. Design for a central clock control system in all educational facilities for each classroom.
   Design for an electric clock mounted high on a wall in all conference rooms.

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Division 29  Reserved
Not Used

Division 30  Reserved
Not Used

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Division 31  Earthwork

General
1. Specify requirement for any street work to be coordinated through DESIGN & CONSTRUCTION personnel.
2. Use water as necessary to prevent dust from being stirred in the air. Dust entering hospital fresh air intakes will be grounds for project stoppage until dust control measures are taken at no additional time to the project schedule.
3. Erosion control is to be utilized on all projects in which the ground is disturbed. Governing codes are to be followed and permits are to be obtained where required. Reference ADEQ site for more information and note that ADEQ and other governing regulations have been met on the drawings.

Site Investigation
1. Consultant is to hire a geotechnical engineer to verify subsurface material for new buildings.
2. Consultant shall obtain and pay for all necessary surveys to perform their work unless waived by DESIGN & CONSTRUCTION. Surveys shall conform to UAMS’ front end including property boundaries, topographical elevations, and all existing structures, contact DESIGN & CONSTRUCTION if unable to obtain this information on UAMS’ site.
3. UAMS will reimburse consultant for initial investigations as part of the consultant reimbursable provided consultant stays within the approved budget for this item. UAMS will not be responsible for costs from deviations during construction.

Earthwork
2. Select Fill under building slabs and around building slabs will be compacted to a minimum of 95% of maximum dry density. Parking Areas will be a minimum of 95% as determined by the Modified Proctor Test. Other areas disturbed shall be brought up to a minimum of 90% Standard Proctor density unless shown below. Higher compactions may be required if determined by engineer-of-record. Select Fill is to be tested per ASTM D2922 for each 2500sf of surface area per each lift, minimum of 3 tests per lift. This cost is to be part of the contract documents. Reports sent to the engineer-of-record are to also be forwarded to DESIGN & CONSTRUCTION's Project User Contact.
3. Existing building footings should not be compromised from excavations unless the engineer-of-record has made proper provisions to ensure the building will not be damaged as a result of the excavation or fill.
4. When unacceptable material is expected from the geotechnical report, a reasonable allowance is to be established within the contract including unit prices for complete removal and replacement of each unacceptable material expected to be encountered through the geotechnical report. The geotechnical engineer will verify all material to be charged to this allowance with quantities and shall report to all parties in a timely manner so that the project schedule is not delayed. The allowance is not to be exceeded without the expressed written permission of UAMS.
5. Before any excavation, Contractor must call “One Call” for utility location verification. If existing utilities in work areas are to remain in place, provide adequate means of support and protection during earthwork operations. Critical utilities such as medical gases and power are to be hand dug and located prior to excavation in the area. Every effort should be made not to disrupt a service to this campus unexpectedly.
6. Utility excavations should be trenched to uniform widths to properly access the utility. OSHA regulations will apply when working in trenches. Utilities shall have suitable fill placed around the utility to protect the utility from damaged prior to backfilling the trench. In addition, engineer and UAMS shall be allowed time to review utility installation and testing prior to backfilling. Care should be made to record locations of all underground utilities on record as-built drawings daily. Backfill for trenches shall be compacted and tested as noted in item 1 above.

Site Drainage
1. Comply with local or other governing authorities having jurisdiction. Slopes should not exceed 5% with provisions made at the termination so as not to erode the ground in surface discharges.
2. Piping under parking lots, drives, roads, or any other expected heavy loads shall be Reinforced Concrete Pipe meeting ASTM C76-80, class III with bituminous joint compound.
3. Piping under non-load areas shall be cast iron meeting ASTM A74-80. DESIGN & CONSTRUCTION will consider the use of plastic pipe.
4. Manholes shall be precast concrete with metal access steps in wall and cast iron covers identifying the system underneath.

Foundation Drainage
1. Provide foundation drainage for all underground structure or retaining walls. Drainage is to include perforated schedule 40 PVC grade pipe wrapped in filtering material embedded in drainage fill along the perimeter of the wall.

Termite Control
1. Use only termiticides which bear a Federal registration number of U.S. Environmental Protection Agency (EPA) and registered with the State regulatory agencies labeled for the prevention or control of termites, powder-post beetles, wood rotting fungi or other wood destroying organisms.
2. Apply approved chemicals according to labeled directions in trenches around the inside and outside of foundations, slabs, pipes, ductwork, piers, etc, after soil has been leveled unless waived by DESIGN & CONSTRUCTION. Application is to include a dye to permit visual inspection of treated soil.
4. Allow for drying after application prior to beginning concrete placement or other construction activities as directed on label.
5. Reapply application to any area that has been disturbed.

Drilled Concrete Piers
1. Provide unit prices for total installed costs within the Contract for variations from depths shown. Piers shall be measured by the linear foot for depths actually drilled from the authorized bottom of the pier to the upper termination at the bottom of the grade beam or formed portion of the pier. Additional lengths beyond the authorized termination at the bottom will not be paid for. There will be no extra payment for rock drilling done by a rock auger. Removal of unanticipated unforeseen obstructions that cannot be removed by rock augers will be paid for by the unit prices established in the contract for the type of excavation.
2. Tests shall be tested by an independent testing agency acceptable to UAMS and the Consultant of Record, but paid for by the contractor. Inspections shall be in accordance
with the International Building Code, Chapter 17, year as approved by the authority having jurisdiction. Installation of drilled piers and associated reinforcing and concrete shall be done with continuous inspection by a testing and inspection lab paid by the contractor and approved by the owner and engineer of record. The certified drilled pier report shall also include actual elevation of top and bottom of pier, elevation of rock (if any), final centerline location at top, variation of shaft from plumb, result of tests performed, actual levelness of bottom, seepage of water, still water level (if allowed to flood), elevation of bottom and top of casing if left in place, any unusable conditions, probe hole report (if applicable), dates of starting excavation, completion of excavation, inspection, testing, and placement of concrete (including any delays in concreting and location of construction joints in shafts).

3. Casings are at the discretion of the engineer of record. But should be used in areas crumbling or caving in of pier holes is likely, or pier to be inspected by lowering a man inside.

4. Use templates to set anchor bolts, leveling plates and other accessories scheduled to be installed in the pier.

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Division 32  Exterior Improvements

Sidewalks
1. Concrete shall be made from Portland cement, type 1, with a compressive strength of 3000psi minimum at 28 days, air content of 5 to 8%. Refer to division 3 Cast-in-place concrete for additional requirements.
2. Minimum standards for concrete sidewalk will be 6" compacted subgrade to a minimum 90% Standard Proctor density, 2" crushed aggregate base course, and 4" concrete.
3. Finish of surface shall be broom finished by drawing a fine-hair broom across the concrete surface, perpendicular to the line of traffic. Tolerance of finish is 1/4" in 10 feet when measured with a 10' straightedge with no abrupt changes to create a tripping hazard.
4. Provide handicap ramps in accordance with the Americans with Disabilities Act and other codes having jurisdiction.
5. Provide construction and contraction joints as necessary to control crackage.

Concrete Pavement
1. Concrete shall be made from Portland cement, type 1, with a compressive strength of 4000psi minimum at 28 days, air content of 5 to 8%. Refer to division 3 Cast-in-place concrete for additional requirements.
2. Minimum standards for concrete pavement will be 6" compacted subgrade to a minimum 95% Standard Proctor density, 6" crushed aggregate base course, and 6" concrete. Engineer-of-record should evaluate if additional requirements should be incorporated for heavier loads on the pavement.
3. Finish of surface shall be broom finished by drawing a fine-hair broom across the concrete surface, perpendicular to the line of traffic. Tolerance of finish is 1/4" in 10 feet when measured with a 10' straightedge with no abrupt changes to create a tripping hazard.
4. Provide construction and contraction joints as necessary to control crackage.

Asphalt Concrete Pavement
1. Asphalt shall be type 2 mix as described in sections 407 and 409 of the current AHTD Standard Specifications.
2. Surface course shall be type 2 mix composed of a mixture of mineral aggregate and asphalt cement in the proportions by weight for the type mixture designated installed in accordance with section 410 of the current AHTD Standard Specifications.
3. Base course shall be in accordance with section 303 of the current AHTD Standard Specifications.
4. Minimum standards for asphalt concrete pavement will be 8" compacted subgrade to a minimum 95% Standard Proctor, 8" crushed aggregate course compacted to 100% of maximum dry density, Tack coat dispersed at 0.4 gallons per square yard, 3" Surface Course minimum density 90% theoretical density.
5. Final pavement exhibiting surface defects such as poor texture, roller marks, honeycomb, cracking, rich spots, brown spots, bleeding or wavy shall be removed and replaced at no expense to UAMS. Tolerance is ¼" depression when measured with a 10' straightedge.
6. No do install when outside air temperature is below 40F or there is frost in the base or subgrade.
Parking Considerations
When designing parking spaces, the following considerations should be discussed with the Planner and Parking Operations for incorporation in the project.
1. Not Used.
2. At public lots, provisions for a collection booth complete with electrical, data, and independent heating / cooling at the exit. At all exits and entrances, provisions for a concrete pad complete with electrical and data shall be provided. Electrical and data should be coordinated with the parking control equipment to be used.
3. Way finding signs in addition to traffic signage to distinguish the direction of traffic, exits, level, emergency services if any, and elevators.

Traffic Markings
1. Paint shall be in accordance with Federal Specification TT-P-115E Paint, Traffic, Highway, White and Yellow & TT-P-1952B Paint, Traffic, and Airfield Marking, Water Emulsion Base. Parking spaces shall be painted in yellow paint where concrete is used, white where asphalt is used, 4" wide markings spaced minimum 9’ apart for non-handicap spaces, follow ADA guidelines and other codes having jurisdiction for handicap spaces. Parking spaces shall be minimum 18.5’ deep with 30’ between non-adjacent rows. Curbs shall be painted red when it is used as part of a fire lane. Street and parking stripping shall be in accordance with AHTD Standard Specifications and other codes having jurisdiction.

Traffic Signage
1. Provide signage in accordance with AHTD Standard Specification & UTDMC Standards. Signs shall include stop, employee parking, visitor parking, no parking, handicap parking, and any other sign designated by DESIGN & CONSTRUCTION.

Landscaping
1. Landscaping should meet the standards of the American Association of Nurserymen, Inc.
2. Preparation of planting area: Remove existing topsoil that is contaminated with undesirable plants, weeds, and grass.
3. Introduced topsoil shall be a fertile sandy loam with 5 to 20 % organic matter. Topsoil shall be free of slag, large stones, lumps, insects, grass and weeds. Topsoil shall be a mixture of three parts sterilized soil and one part Sphagnum Peat Moss. Depth should be sufficient for proper root growth.
4. Plant material is to be inspected by the UAMS Grounds Landscape Tech or Coordinator prior to installation. Plants found to be damaged, diseased; containing weeds, grasses or insects must be replaced before installation.
5. Anti-germination weed control agent such as Trifluralin Granulars should be applied to finished topsoil in flower and shrub beds. Follow manufacturers recommended application rate and water in after application. The residual effect of Trifluralin is three months. This will assure any weed or grass seed introduced into the planting area will not germinate during this time. UAMS Grounds Department will provide the continuation of treatment as needed.
6. Surface mulching material shall be shredded hardwood mulch free of foreign matter.
7. Rock added to any landscape area for rock gardens or accents shall be washed and free of foreign material.
8. No landscape material shall be introduced into any flower or shrub planting area which might contain weeds, seeds, undesirable plants, or chemical contamination.
9. Sloped areas shall be designed to minimize washout from weather. Ruts shall be patched at no expense to UAMS.

10. Sod shall be staggered when installed with joints filled with topsoil.

11. Lawns shall be free of rocks or other objects which might be thrown from a lawnmower excluding grass.

12. Before any of these plants are introduced on campus, written approval from Grounds is required:

   a. Bamboo – Phyllostachys species
   b. Bradford Pears – Pyrus calleryana ‘Bradford’
   c. English Ivy – Hedera helix
   d. Japanese Honeysuckle – Lonicera japonica
   e. Kudza – Pueraria Montana
   f. Mimosa – Albizia julibrissin
   g. Privet – Ligustrum sinense
   h. Running Money Grass – Liriope spicata
   i. Large leaf vinca – Vinca major
   j. Wisteria – Wisteria floribunda
   k. Bishop’s Weed – Aegopodium podagraria
   l. Ajuga – Ajuga reptans
   m. Garlic Chives – Allium tuberosum
   n. Devils Walking Stick – Aralia spinosa
   o. Ardisia – Ardisia japonica
   p. Artemesia – Artemisia absinthium & Artemisia vulgaris ‘Oriental Limelight’
   q. Trumpet Creeper – Campsis radicans
   r. Sweet Autumn Clematis – Clematis terniflora
   s. Mexican Hydrangea – Clerodendron
   t. Wild Ageratum – Conoclinium coelestinum
   u. Queen Ann’s Lace – Daucus carota
   v. Russian Olive – Elaeagnus angustifolia
   w. Horsetail – Scouring Rush – Equisetum hyemale
   x. Wintercreeper Euonymus – Euonymus fortune
   y. Carolina Jessamine – Gelsemium sempervirens
   z. Ground Ivy – Glechoma hederacea
   aa. Chameleon Plant – Houttuynia cordata
   bb. Morning Glory – Ipomoea violacea
   cc. Cypress Vine – Ipomoea quamoclit
   dd. Creeping Jenny – Lysimachia nummularia
   ee. Yellow Rose of Texas – Kerria japonica
   ff. Deadnettle – Lamium species
   gg. Purple Loosestrife – Lythrum salicaria
   hh. Nandina – Nandina domestica
   ii. Mint – Mentha species
   jj. Bee Balm – Monarda didyma
   kk. Showy Evening Primrose – Oenothera speciosa
   ll. Prickly Pear Cactus – Opuntia sp
   mm. Star of Bethlehem – Ornithogalum umbellatum
   nn. Woodsorrel – Oxalis species
   oo. Passionflower – Passiflora incarnate
Tree Protection Notes:
1. All trees to be retained shall be protected during construction with temporary fencing.
2. Tree protection fences shall be installed prior to the commencement of any site preparation work (clearing, grubbing or grading).
3. Fences shall completely surround the tree or clusters of trees; will be located at the outermost limits of the tree branches (drip line); and will be maintained throughout the construction project in order to prevent the following:
   a. Soil compaction in the root zone area resulting from vehicular traffic or storage of equipment or materials
   b. Root zone disturbances due to grade changes (greater than 6 inches cut or fill)
   c. Wounds to exposed roots, trunk or limbs by mechanical equipment
   d. Other activities detrimental to trees such as chemical storage, cement truck cleaning, and fires.
4. Exceptions to installing fences at tree drip lines may be permitted in the following cases:
   a. Where permeable paving is to be installed, erect the fence at the outer limits of the permeable paving area
   b. Where trees are close to proposed buildings, erect the fence no closer than 6’ to the building
5. Where any of the above exceptions result in fence being closer than 4 feet to a tree trunk, protect the trunk with strapped-on planking to a height of 8 feet (or to the limits of lower branching) in addition to the reduced fencing provided
6. Where any of the above exceptions result in areas of unprotected root zones (under drip lines), those areas should be covered with 4 inches of organic mulch to minimize soil compaction
7. All grading within protected root zone shall be done by hand or with small equipment to minimize root damage. Prior to grading, relocate protective fencing to 2 feet behind the grade change area.
8. Any roots exposed by construction activity shall be pruned flush with the soil. Backfill root areas with good quality top soil as soon as possible. If exposed root areas are not backfilled within 2 days, cover with organic material in a manner, which reduces soil temperature and minimizes water loss to evaporation.
9. Prior to excavation or grade cutting within tree drip lines, make a clean cut between disturbed and undisturbed root zones with a rock saw or similar equipment to minimize damage to remaining roots.
10. Trees most heavily impacted by construction activities should be watered deeply once a week during periods of hot, dry weather. Tree crowns should be sprayed with water periodically to reduce dust accumulation on leaves.
11. Any trenching required for installation of landscape irrigation shall be placed as far from the existing tree trunks as possible.
12. No landscape topsoil dressing greater than 4 inches shall be permitted within the drip line of the trees. No soil is permitted on the root flare of any tree.

13. Pruning to provide clearance for structures, vehicular traffic and equipment shall take place before construction begins. All finished pruning must be done according to the recognized approved standards of the industry (Reference the National Arborist Association Pruning Standards for Shade Trees).
Division 33 Utilities

General
1. Piping underground shall be buried a minimum of 3 feet on main branches, exception will be sanitary and storm systems which are gravity feed. Coordinate depths of different systems with all trades.
2. All underground piping shall have a means to trace down the pipe after concealment, including tracer wire for plastic pipe and tape identifying the system or “caution, underground line” placed 1 foot below grade above the pipe systems which could disrupt the services of the building, with the exception of sprinkler piping.

Site Water
1. Comply with Central Arkansas Water requirements that can be found at www.carkw.com
2. Utility connection fees and other costs associated with turning on new utilities are to be included in project constructions cost.

Sanitary Sewer
1. Sanitary sewer systems shall be gravity flow, non-pressurized. The use of a lift station can be used if jobsite conditions dictate the need and DESIGN & CONSTRUCTION approves. Maximum slope of pipe shall be 5%.
2. Piping shall be tested with a 10-foot head of water for 24 hours. UAMS shall be allowed to witness these tests with 5 days notice.
3. Piping shall be ASTM A 746 ductile iron push on joints with rubber gaskets unless waived in writing by DESIGN & CONSTRUCTION.
4. Utility connection fees and other costs associated with turning on new utilities are to be included in project constructions cost.

Storm Sewer
1. Storm sewer systems shall be gravity flow, non-pressurized with a full moon visible as you look into the pipe. Maximum slope of pipe shall be 5%.
2. Piping shall be tested with a 10-foot head of water for 24 hours. UAMS shall be allowed to witness these tests with 5 days notice.
3. Piping shall be ASTM A 746 ductile iron push on joints with rubber gaskets or reinforced concrete piping unless waived in writing by DESIGN & CONSTRUCTION. Pipe should be designed to carry the load above it including under roads.
4. Utility connection fees and other costs associated with turning on new utilities are to be included in project constructions cost.

Electrical
1. Primary service ran underground shall be encased in red-dye concrete. Minimum depth is 3'-0". At a depth of 1'-0" install a tape stating, “Caution, Underground electrical” or a tape approved by DESIGN & CONSTRUCTION. Coordinate work with Mechanical.
2. Conduits underground shall be rigid metal but can be schedule 80 PVC with RSC elbows if encased in concrete. Fittings shall be type 1 for rain tight connections, type 2 for concrete tight connections, type 3 for normal connections.
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<td>Process Integration</td>
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Division 41 Material Processing and Handling Equipment

Material Handling Systems
1. The Campus Material Handling System is a computerized tube system manufactured by Swisslog that is expanding to be able to track all carriers in motion and allows expansion to other areas. Any building planning on utilizing a material handling system must be fully compatible with this system including tubes, blowers, and the established fully integrated computer network. Position of critical components must be designed to be placed reasonably close to available emergency power.

2. During planning, determine if nurse’s station or other critical areas are to include a Swisslog Translogic pneumatic tube delivery station or a fully compatible system as described above.

3. Suppliers of competing systems and stations must, in writing at the time of bid, certify their full compliance with all features and meet the reliability of the existing Swisslog Translogic system. References of successful installations with existing Swisslog systems must also be supplied with their bid. Determination of compatibility will be at the sole discretion of UAMS Clinical Engineering who has responsibility for maintenance of the system and has final decision on award.

4. Material handling contractor shall furnish the Owner two-week training for two (2) UAMS employees at the manufacturers training center for major projects in excess of $5 million total in construction costs. The cost for this training shall be borne by the material handling contractor for the project being constructed and shall include, but not limited to, all books, lodging, transportation, per diem for Owners employees and any other incidentals necessary for training.

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<tr>
<th>Division 42</th>
<th>Process Heating, Cooling, and Drying Equipment</th>
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<th>Process Gas and Liquid Handling, Purification and Storage equipment</th>
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</table>

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Division 48 Electrical Power Generation

General
1. Special emissions permit is required by ADEQ under regulation 18 prior to construction of any combustion equipment or chemical emissions (ie boilers, generators, cooling towers, ETO sterilizers, etc) that may add to pollutants. The permit process is initiated by UAMS and can take months for approval before construction for this equipment can begin. The consultant is to provide UAMS with all specifics of any equipment early so that the permit process can begin so as not to disrupt the project.

Emergency Service & Distribution
1. Design a Wye-Delta start on any large motors not on VFD’s required to be on emergency power to decrease initial load on emergency generators.
2. Emergency power shall be designed for all patient care areas as required by code.
3. Emergency power shall be discussed for all freezers or refrigerated units.
4. Emergency power is to be designed for lab areas as directed by Core Team. Coordinate with DESIGN & CONSTRUCTION during planning.
5. Emergency power shall be designed for all computer servers.
6. Emergency power shall be designed for the Campus Security System and maglocks.
7. Emergency power shall be designed for all telephone equipment.
8. Emergency Generators should have a full load bank test performed under field conditions when the building is ready for acceptance. Test shall be witnessed by UAMS. Testing to include:
   a. 30 min @ 25% Name Plate
   b. 30 min @ 50% Name Plate
   c. 30 min @ 75% Name Plate
   d. 60 min @ 100% Name Plate
9. Emergency outlet covers and receptacles are to be the color red with white lettering of the panel and circuit identification.
10. Emergency generators shall be designed with a minimum of 20% extra capacity.
11. Emergency power junction boxes shall be color coded.
12. Automatic Bypass switches shall have bypass.
13. Any work to be conducted on electrical equipment shall be classified in accordance with the Standard for Electrical Safety in the Workplace (level 1 through 5). Any electrical panel boards or switchboards installed shall be clearly and legibly marked with the electrical shock hazard (Available Arc Fault) in accordance with Article 110.16 of the NEC.

Uninterruptible Power Supply
3. Uninterruptible Power Supplies, whether battery or generation, shall be considered for all critical equipment that cannot tolerate a down time longer than one minute in the event of a power failure regardless of emergency power. Careful consideration should be made to critical equipment that has to reboot from a computer, some take five minutes to come back on line after power is restored.
4. Where a UPS is determined to be required, consideration with UAMS is to be made as follows:
   a. Load on emergency generator.
   b. Load on UPS, UPS should have some spare capacity in addition to the 80% cap load.
c. Harmonics with emergency power.

d. Time period of UPS power prior to emergency generator operation and stabilization.

e. Requirements for a Power Distribution Unit complete with breakers.

f. Location of UPS and PDU.

g. Type of UPS system

h. Battery replacement no sooner than 4 years when used. Battery discharge shall be gradient with unit calculation accurate within 2 minutes.

i. When battery is used, redundancy with a parallel battery compartment.

j. UPS remote monitoring capacity.

k. Emergency shut off of UPS and location of labeled button. Shut off shall disconnect AC and DC power from the UPS. Button is to be protected by a non-locking clear cover so that two steps are required before unit shut down.

l. Emergency shut off of HVAC systems and location of labeled button. Button is to be protected by a non-locking clear cover so that two steps are required before unit shut down.

m. Coordination with fire alarm and fire suppression systems.

n. UPS is to have a bypass to disengage UPS and go back to emergency power separate from the UPS in the event of a change out or failure of the system.

5. Any work to be conducted on electrical equipment shall be classified in accordance with the *Standard for Electrical Safety in the Workplace (level 1 through 5)*. Any electrical panel boards or switchboards installed shall be clearly and legibly marked with the electrical shock hazard (Available Arc Fault) in accordance with Article 110.16 of the NEC.

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Appendix

A: Not Used

B: The Guide to Consultants and Contractors is a working document that will be modified as changes become necessary and will do our best to inform design consultants and construction contractors of changes in our standards.

C: Tables

Rules and Regulations for Hospitals and Related Institutions in Arkansas - Table 5 (See Attached)
From the Rules and Regulations for Hospitals and Related Institutions in Arkansas
Table 5
Final Occupancy Inspection Check List

Inspector:_________________________________________ Date:_________________________________________
Facility:_________________________________________ Job:_________________________________________
General Contractor:________________________________

The following items shall be located at the site and copies furnished to the Division of Health Facilities Services (DHFS) prior to the final inspection and approval for occupancy of the project area(s). These items are in no specific order. Some items may not apply in every case.

<table>
<thead>
<tr>
<th>Item</th>
<th>Yes</th>
<th>No</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Architect/Engineer’s Certification of Substantial Completion?</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Interior finishes - smoke development and fire spread rating information?</td>
<td></td>
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<tr>
<td>Portable fire extinguishers - inspected, tagged?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Certificate of Occupancy - City Building Inspector?</td>
<td></td>
<td></td>
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</tr>
<tr>
<td><strong>Certification</strong> - fire alarm system, smoke detection system, sprinkler system, and any other fire suppression system has been installed, tested and meets all applicable standards?</td>
<td></td>
<td></td>
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</tr>
<tr>
<td><strong>Certification</strong> - medical gas system? (where applicable)</td>
<td></td>
<td></td>
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</tr>
<tr>
<td><strong>Certification</strong> - electrical system has been installed, tested and meets all applicable standards of the NEC, NFPA?</td>
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</tr>
<tr>
<td><strong>Certification</strong> - emergency generator has been installed, tested and meets all applicable standards of the NFPA, NEC?</td>
<td></td>
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<tr>
<td><strong>Certification</strong> - mechanical system has been installed, tested, balanced, and approved by the engineer of record?</td>
<td></td>
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</tr>
<tr>
<td><strong>Certification</strong> - communication system(s) has been installed, tested and meets all applicable standards of the NEC, NFPA?</td>
<td></td>
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</tr>
<tr>
<td>Are there manufacturer’s operation and maintenance manuals with equipment warranties on site for all newly installed equipment or a letter from the general contractor stating that the above items will be turned over to the owner?</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Have all applicable pieces of equipment installed during the construction been incorporated into the existing preventive maintenance system? Or, have new maintenance policies and procedures been written to insure that said items are maintained per the manufacturers recommendations?</td>
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<td></td>
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</tr>
<tr>
<td>Are there as-built drawings on site or a letter from the general contractor stating that the as-built drawings will be turned over to the owner?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are there copies of the Architect’s and Engineer’s final punch lists with verification that all items have been repaired or remedied?</td>
<td></td>
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</tbody>
</table>

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PROJECT COMPLETION REQUIREMENTS

Project Number: ___________________________  Date: ___________________________

Project Description: ____________________________________________________________
Project Manager: ______________________________________________________________

Checklist for Substantial Completion

1. Punch List
   a. Contractors list
   b. Architect-Engineer list
   c. Time noted to complete punch list items ________________________ days
2. Test & Balance report
3. Keying complete
4. Architect/Engineer issuance Certificate of Substantial Completion
5. Medical Gas Certification
6. Wall penetrations sealed as required
   a. Copy of physical plant work order with signature of inspection
7. Wall ratings marked above ceilings
8. Fire alarm tested and operating properly (Physical Plant and OH&S present during test)
9. Signage complete
10. Area cleaned up by housekeeping, barriers removed etc.
11. All equipment tested and operating properly
12. Health Department approval
13. Area out-gassed as required
14. Security systems working properly
15. Training on systems/equipment provided to physical plant as per contract
    requirements and form in project folder initialed by physical plant representative.
16. Statement of Insurance Changeover
   a. From Contractor
   b. Notification to Controller's Office & Mary Ann Coleman (OH&S)
17. Close out documents turned over to Engineering Dept. (Signature on all items.)
   a. As Builts AUTO-CAD format
   b. Operation and maintenance manuals
   c. Warranties etc.
   d. In-house construction red line drawings turned over to Physical Plant.
   e. Landscaping drawings and all related information turned over to Physical Plant
   f. Signed receipt from Engineering Department, Physical Plant etc. 1 copy in project folder, scanned copy on Project CD
    and 1 copy turned over to Associate Director for Construction to go into Master file.
   g. Bonds.
   h. Maintenance Agreements
   i. Product Certifications
18. Cleaning and care instructions turned over to housekeeping. One copy in project folder, scanned copy on Project CD and copy turned over to Rob West

Project Close Out

19. N/A

---

Revision Date  February 2013
# UAMS Criteria
## (In-house Checklist)

<table>
<thead>
<tr>
<th>Table 7</th>
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<tbody>
<tr>
<td>19. Signed receipt for any spare parts, tools, attic stock, etc. turned over to physical plant. One copy in project folder and scanned copy on Project CD.</td>
</tr>
<tr>
<td>20. All management fees charged. Verify with Debbie Jackson (including change orders.)</td>
</tr>
<tr>
<td>21. Building plaque installed</td>
</tr>
<tr>
<td>22. Project critiques completed, which includes a meeting and walk through of project approximately 30 to 45 days after area occupied.</td>
</tr>
<tr>
<td>a. Architect/Engineer performance</td>
</tr>
<tr>
<td>b. Contractors performance</td>
</tr>
<tr>
<td>23. ILSM (if applicable) copies in project folder and original to Rob West.</td>
</tr>
<tr>
<td>24. Errors and omissions resolved with A&amp;E</td>
</tr>
<tr>
<td>25. Financial Condition/Payment Status Defined</td>
</tr>
<tr>
<td>26. Identification badges turn over to project manager</td>
</tr>
<tr>
<td>27. Project closeout report sent to Physical Plant</td>
</tr>
</tbody>
</table>

## Final Occupancy Check List

<table>
<thead>
<tr>
<th>Final Occupancy Check List</th>
<th>Comments</th>
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</tr>
</thead>
<tbody>
<tr>
<td>28. Architect/Engineer's Certification and fire spread rating information?</td>
<td></td>
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</tr>
<tr>
<td>29. Interior finishes - smoke development &amp; fire spread rating information?</td>
<td></td>
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<tr>
<td>30. Portable fire extinguishers - inspected, tagged?</td>
<td></td>
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<td>32. Certification - fire alarm, smoke detection system, sprinkler system and other fire suppression system has been installed, tested and meets all applicable standards?</td>
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<td>33. Certification - medical gas system?</td>
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