

# UNIVERSITY OF IDAHO

## DESIGN GUIDELINES AND CONSTRUCTION STANDARDS

Prepared by

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### PURPOSE

These Design Guidelines, along with Technical Construction Standards, cover all University of Idaho construction and renovation projects throughout the State of Idaho on all property owned by the Board of Regents the University of Idaho. They are intended to assist architects, engineers, design professionals, contractors and University of Idaho Staff in understanding the preferences of the University in the development, maintenance and repair of University of Idaho facilities statewide. The University of Idaho, Facilities Maintenance, and Architectural and Engineering Services expects the Design Professionals (DP) we engage to develop all necessary construction documents, including detailed specifications for each subject project. Therefore the information contained herein is not

intended to be a specification book or project manual in lieu of that effort. These guidelines are to be used to assist those persons at the University of Idaho who manage projects to assure they are implemented in the design and construction of the built environment on campus. These guidelines are to serve the DP in the preparation of all necessary documents and submittals required to deliver a complete project based on the UI Project Managers guidance and direction. These Guidelines will serve to identify those products, procedures, protection systems and operating sequences which we prefer to use. It will explain the appropriate connections to our utility systems, and it will indicate our desire for particular finishes, product uses and details. The Design Professionals are advised to refer to those sections of the manual that relate to their projects and adhere to its guidelines.

These Guidelines and Standards are intended to create a common starting point for the design, construction, renovation and general care of all facilities on the University of Idaho campuses statewide. The standards are the results of years of experience in designing, building and operating facilities on these campuses with a historical knowledge of what has served the University well and what has not. They form the basis and preferences for all UI facilities. It should be clearly understood by all persons using these standards that they are not specifications documents, nor are they procedures for construction. Design and document preparation continue to be the design professional's responsibility. Means, methods, techniques and procedures remain the Contractor's responsibility.

These standards represent the preferred construction products, materials, details and systems to use in the development of programs, plans, specifications and construction documents for all projects on property owned by the Board of Regents, University of Idaho. Components listed in these standards are selected through pre-qualification guidelines including but not limited to, performance characteristics, code/regulatory compliance, safety concerns, maintenance control and inventory standardization. These standards represent the intent of the University of Idaho to address the following primary criteria while providing optimal life cycle cost benefit to the University and The Board of Regents.

- Safety
- Reliability
- Maintainability
- Efficiency
- Sustainability

#### **Building Codes:**

The requirements of these guidelines and standards are not intended to supersede any adopted or applicable building code, ordinance, statute, regulation or law. If there is a conflict with any requirement in the design guidelines or the construction standards, the applicable code or law takes precedence.

All requests for variance shall be evaluated by the State of Idaho Division of Building Safety, the State of Idaho Fire Marshal and the assigned UI Project Manager and Facilities Management.

## CONTENTS

### I. DESIGN AND CONSTRUCTION PROJECT DOCUMENT STANDARDS: The UI Design and

Construction Project Document Standards requirements have been arrayed in the generally accepted 16-Division Specification Master spec format. That information constitutes the first volume of this document.

- II. APPENDIX: Documents and drawings, which cannot be reduced to brief descriptive comments, are compiled in an appendix, which makes up the second volume of the document.
- III. FORMS: The third volume of the document consists of the contract administration documents and additional forms that are specific to the University of Idaho.
  - Volume II, Appendix and Volume III Forms are not posted on the Facilities AES website. These are available through the project manager for each particular project.

**VOLUME 1**

**DESIGN AND CONSTRUCTION  
PROJECT DOCUMENT STANDARDS**

## BOILERPLATE

### BIDDING REQUIREMENTS

#### Contractor's Licensing Requirements

- Plumbing and electrical contractors shall have trade licenses issued by Idaho Division of Building Safety (DBS)
- All contractors and subcontractors shall have Idaho Public Works Contractor license appropriate to their classification of work, and total value of the project.
- If there are no federal funds in the project, the contractor shall have an appropriate Idaho Public Works Contractor's license at the time of the bid.
- If the project is funded in whole or in part by federal funds, the contractor shall have an appropriate Idaho Public Works Contractor's license prior to signing a contract.

#### Bid Form

- Idaho Naming Law: Bid form will indicate electrical, plumbing and mechanical (HVAC) contractors at time of bid. All blanks shall be filled in with all appropriate license numbers or indicate N/A. Failure to indicate either the appropriate subcontractor or "N.A." in the space provided on the Bid Proposal form may result in the bid being disqualified.

#### Public Works Contract Report, WH-5

- All subcontractors shall be shown on this form, with appropriate license numbers, prior to any subcontract being signed or work performed. Up-dated reports may be issued as new subs are added.

### CONTRACT FORMS AND THE CONDITIONS OF THE CONTRACT

#### Supplementary Conditions

- The University of Idaho standard Supplementary Conditions shall be used (UI document—Volume III).
- This includes the Supplemental Agency Guidelines for Construction Projects.

#### Contractor's Affidavit Concerning Taxes

- Contractor must pay Idaho sales tax on material purchased by or consigned to him and installed on campus. Sales tax may not show as a line item on any contract or itemized billing.

#### Application for Payment (UI document--see Volume 3)

- Billing for retainage must be a separate application.
- The use of electronic fund transfer is strongly encouraged.

### **PROJECT CHRONOLOGY AND OWNER REVIEW REQUIREMENTS FOR MAJOR CAPITAL CONSTRUCTION PROJECTS**

All initiation requests for capital projects are forwarded to the Assistant Vice President for Facilities. The AVP for Facilities examines the viability of the request in relation to the role and mission of the University, and secures the approval of the senior administration to proceed. A general project program is developed to clarify the scope of the request. From that basic program, cost figures are developed and a project budget is prepared. The request is appropriately prioritized, and the funding effort begins.

If the funding received includes any money from the State of Idaho Permanent Building Fund, usually through legislative appropriation, the project will be constructed under the auspices of the State Division of Public Works (DPW). At this point, DPW assigns the project to one of their project architects, and the A/E selection process begins. Although the UI will have considerable input, the

University will be considered the agency, and DPW is the owner. All contracts will be signed with the owner, and the owner's representative will be the DPW Project Manager.

If the funding received is entirely "non-traditional" funding such as federal grants or private monies, and no State dollars are involved, then the project will be managed at the UI level and the University will be the owner. The State of Idaho DPW will have no involvement. Under this situation, the University will then select a Project Architect from UI Architectural and Engineering Services to be the Project Manager (PM).

**Project Consultant selections and deliverables are as follows unless specific directions are received from the UI Project Manager/Project Architect.**

- Request for Qualifications (RFQ) process
- Verify scope of work and expectations; sign AIA agreement with Project Consultant (A/E)
- Programming
  - Owner will furnish the general program, previously developed by Facilities/AES (Owner)
  - A/E will verify program and establish basic budget. This may involve some user-group meetings and the preparation of cost estimates for some program elements.
- Schematic Design
  - Much of this effort may take place on the UI campus
  - Continuous review by owner; usually in a charette setting
- Design Development
  - 50% review by owner, concurrent with continuing design activities
  - A formal 100% Design Development presentation will be made to the University by the A/E. This will include a detailed budget verification as well. Allow a minimum of two weeks review time by owner. (If the project is being managed by DPW, a formal presentation to the State Permanent Building Fund Advisory Council is usually required at this point).
  - Owner approval to proceed with Construction Documents
- Construction Documents
  - User-group meetings with Facilities personnel to develop specification particulars.
  - 50% review by owner, concurrent with continuing design activities
  - A formal 95% Construction Document presentation will be made to the University by the A/E. This will include a detailed budget verification. Allow a minimum of two weeks review time by owner.
  - A/E to make final changes/corrections to documents
  - 100% CD's are completed, and the owner will verify final changes/corrections concurrent with the Advertisement for Bid.
  - Identify alternates
- Bid
  - Print documents; usually by A/E as a reimbursable expense
  - Advertise for Bids; usually by the University
  - Distribute documents; usually by the A/E as a reimbursable expense
  - Pre-bid walk-through; conducted by the A/E
  - Issue addenda; A/E
  - Bid Opening; conducted by A/E
  - Review bids jointly by A/E and University
  - Award notification by owner
  - Sign construction contracts between owner and contractor
  - Pre-construction Conference conducted by A/E

- Contract Administration
  - All consultants will visit site weekly when applicable work is in progress.
  - A/E will conduct monthly meetings and publish minutes
  - A/E will handle all Submittals, Supplemental Instructions, Requests For Information, Substitution Requests and will review all Change Order proposals and Pay Requests prior to forwarding to owner for approval and payment.
  - A/E is responsible for all project coordination and documentation
  
- Close-out
  - A/E will verify commissioning
  - Owner's instruction, coordinated by owner
  - Submission of Operation and Maintenance Manuals, approved by A/E
  - Submission of Close-out documents, including as-built drawings
  - Substantial Completion Inspection
  - Correction of punch list deficiencies
  - Back-check inspection
  - Certificate of Occupancy inspections and certifications coordinated by owner
  - Preparation of Record Documents by A/E (if specified during fee negotiations)
  - Final payments, release of retainage and final sign-off by owner
  
- Warranty
  - Warranty deficiencies may be noted to the contractor directly by the owner, or through the A/E. ▪ Owner will survey the occupants and perform a cursory inspection during the eleventh month.
  - The need for a year-end Warranty Inspection will be determined by the owner based on the information gathered above. The A/E may be asked to perform a formal Warranty Inspection and issue a Deficiency report.
  - Prior to the twenty-third month, the roofing manufacturer will inspect the roof to close out the installer's two-year guarantee.
  - The roofing material warranty continues for the specified period.

## PROJECT CLOSE-OUT PROCEDURES

The University will often request phasing that will allow early occupancy of specified areas. Under these circumstances, a Beneficial Occupancy inspection will take place for the protection of the contractor. However, the occupied building areas are still included in the larger contract, although they can be billed at 100%. No retainage will be released, and these areas may be included later in the final Substantial Completion inspection. For the remainder of the building elements, the following sequence is noted:

- All building systems subject to the commissioning process are verified in writing by the appropriate consultant(s).
- Owner's training sessions take place.
- The contractor provides completed and signed-off copies of the punch list(s) developed by the contractor for his sub-contractors. At this time, the contractor also provides a list of work remaining to complete. No change orders will be issued beyond this point.
- The contractor stipulates in writing that the project is substantially complete, and he requests that a final inspection be scheduled.
- The Substantial Completion inspection is scheduled and conducted. A punch list of deficiencies is produced, and a time limit for corrections is established. The Certificate of Substantial Completion is issued.

- The 1-year, 2-year and extended warranty periods begin on the date of the issuance of the Substantial Completion Certificate.
- The contractor submits the Operation and Maintenance (O&M) Manuals to the University via the A/E consultants.
- All elements of the work that are indeed complete may be billed at 100%. Total 100% billing for all elements of the contract will not be paid until the O&M's have been received.
- The contractor sends notification that the punch list has been completed.
- A back-check inspection is conducted. This may be a complete re-inspection, as necessary, by the A/E. By prior arrangement, and at the discretion of the owner, the owner may check-off the items as they are completed in lieu of a formal punch-list inspection. Any additional back-check inspections required will be at the contractor's expense.
- All close-out documents are submitted to the owner via the A/E. The necessary documents are included in Volume 3, and they are:
  - Certificate of Substantial Completion
  - Consent of Surety to Final Payment
  - Contractor's Affidavit of Payment of Debts & Claims
  - Contractor's Affidavit of Release of Liens
- A separate and final application for retainage is submitted by the contractor, and final payment is made.
- Eleven months from the date of Substantial Completion, a Warranty inspection will be conducted by the A/E. The University may, at its discretion, survey the building occupants and conduct an in-house inspection to determine if a full Warranty inspection is required. The contractor is required to correct any deficiencies noted by either means of inspection.
- The roofing manufacturer will continue to provide the required warranty on the roofing materials for the stipulated period.



# DIVISION 01 - GENERAL CONDITIONS

## ENHANCED DIVISION ONE REQUIREMENTS

### 01 10 00 SUMMARY

### 01 11 00 Summary of Work

#### 01 11 13 Work Covered by Contract Documents

*This section to include project specific information which will be provided by the DP.*

Contractors shall incorporate language in subcontractor bid packages that reference University of Idaho Division 1 requirements and applicable language from their Construction Agreement with the University of Idaho.

#### **Work by Owner**

*Project specific information which will be provided by the Project Manager if Applicable.*

The Owner (UI) reserves the right to award other contracts related to the project, or to perform certain work itself. Any such work may or may not be known to the Owner or disclosed to the contractor prior to execution of the Agreement. The Contractor shall afford the Owner and such other contractor reasonable opportunity for the introduction and storage of their materials and equipment and the execution of their work, and shall properly coordinate its work with theirs in such manner as the Owner of Design Professional may direct. The Contractor shall also assure at its own cost reasonable access of other contractors to their site and their work.

The changing needs and requirements of a dynamic campus require flexible contract administration capabilities. Consequently, the University of Idaho is a hands-on owner during all construction projects. Adjustments are inevitable and scope changes should be expected. Immediate coordination access to the contractor is vital. To form the necessary contract administration partnership with the contractor, the specifications for all projects include the following.

#### **Staffing: All Projects on University of Idaho Property**

Regardless of project size or value, all contractors holding a contract with the UI must provide a qualified general superintendent or a working foreman with a resume or other documents showing basic qualifications of the designated superintendent for approval and this person/position must be present anytime work is taking place either self-performed or performed by sub-contractors. No exceptions. No changes of the superintendent are allowed without prior consent of the UI/AE. This position must provide a contact phone number to the A/E and UI and must be available for after hour contact by UI Construction Management and or its designee or the A/E. If any contractor holds more than one contract at the same time then a separate superintendent is required for each jobsite/contract unless specific written permission is granted by the University of Idaho Construction Manager or University of Idaho Project Manager waiving this requirement, written waivers must be granted prior to final addendums issued before bid opening. Other positions required based on dollar value will be specified in the project documents but are as outlined below.

- (A) General Superintendent - It is assumed that this individual will represent the contractor primarily, and will be responsible for coordination of subcontractors, technical aspects of the construction, maintenance of the schedule, generation of Requests for Information and similar duties.
- (B) Project Engineer/Document Administrator - This position will be primarily responsible for coordination and liaison with the owner's project team. He or she may also be responsible for safety meetings, pre-installation meetings, maintenance of as-built drawings, shop drawing and submittal coordination and distribution, monitoring and logging of site visits, and other functions typical of a Project Engineer or Quality Control Officer. This position will also be responsible for coordination with subcontractors and vendors contracted by the owner.
- (C) Contracts Specialist / Administrative Assistant - This position handles phone and fax messages, job-site filing, correspondence, distribution of minutes, drafts of pay applications and generally ensures that the job office is staffed during the normal 40-hour work week. This position is optional but encouraged on projects with an estimated construction cost less than 10 million dollars. This position is required on all projects of 10 million dollars or more.

#### **IV. Additional requirements:**

The contractor must provide the name and phone number of a designated local employee or resident who is generally available evenings and weekends to respond to emergencies on the job-site. This is not an on-call position, but the phone number provided must be equipped with voice mail or texting to ensure a timely response.

A designated member of the contractors on-site staff, in conjunction with the owner's Project Manager, may be required to conduct periodic meetings with stake-holders or user-groups selected from the campus community who are most impacted by the construction activity. This will be for a two-way exchange of information, keeping the owner's constituents aware of scheduled activities, and responding to impacts and dangers created by the project. The contractor's representative must have the authority to respond to issues raised in this meeting.

The contractor must maintain a set of documents in the job-site on which all as-built items are noted. In addition, this set of documents will be continually updated with the most current change orders and CCD's shown.

The contractor must maintain a file on site with a copy of all approved submittals and shop drawings.

#### **Construction Schedule**

- On projects over \$500K, the contractor shall produce a Critical Path Method (CPM) schedule. The schedule shall be updated every month (30 days) by means of an actual progress bar underlying the initially-scheduled work bar for each activity. The overall completion date for the project may not be extended or decreased on the CPM schedule until a change order reflecting the new completion date has been signed. In addition, the contractor shall produce an abbreviated, two-week look-ahead, bar chart schedule for use by the subcontractors, the owner's project team and the campus stake-holders groups.

#### **Schedule of Values**

- Schedule of Values must include a line item for project closeout.
- Schedule of Values must include a line item for commissioning.

#### **Quality Control**

- Owner's Testing Services (compaction, concrete cylinders, welding) will be contracted separately between UI and the appropriate consultant. This cost is part of the project overhead and will be included in the project budget.
- Plumbing and electrical contractors shall obtain Division of Building Safety (DBS) permits and call for inspections by DBS before work is covered.
- The University of Idaho reserves the right to inspect all phases of work with UI personnel.
- No local (city or county) permits or inspections are required.

#### Hours of Operation

- City of Moscow noise ordinance allows work between 7:00 AM and 9:00 PM. University requirements may be more restrictive on a project by project basis.

#### Construction Facilities and Temporary Controls

- Contractor may make temporary construction connections to any campus utility at the direction of the appropriate UI authority.
- Electricity will not be billed to the contractor, however electricity shall not be used for temporary heat.
- Water will not be billed to the contractor.
- Steam will not be billed to the contractor, but condensate shall be returned to the Power Plant.
- The above utilities will be metered. The meters will be provided and installed by the contractor as part of the construction cost. The project will reimburse the Facilities utility budgets for the costs of the utilities used. This will be an expense against the project budget, but not the construction budget.
- The campus community shall be separated from the work area by fences or hard, constructed barricades. Approval of type and structure components will be made by A/E and or UI CM or its designee.

#### Safety Meetings

- The contractor shall conduct a job-site safety meeting each week. Attendance will be required by all employees of every subcontractor. The meeting should be of sufficient duration to cover the topic of the week, and to solicit input on safety concerns from the employees present. These meetings must be documented for the owner. An attendance sheet shall be provided as evidence of those meetings and the agenda.

#### Street Closure

- Any work which closes or impacts the flow of traffic on any street will conform to all City of Moscow and Department of Transportation (DOT) requirements. This includes, but is not limited to prior City approval, use of Class A Barriers, signage and other traffic control devices, and the use of flag-persons with hard hats and orange vests. Signage and traffic control must follow the Manual for Uniform Traffic Control, current edition.

#### Noxious Installations

- Adequate isolation and ventilation must be employed when installing carpet, tile, vinyl goods, laminate, or any product requiring adhesive. See Division 9 for details.

#### Materials and Equipment

- Overage (spares) in the amount of 10% shall be provided for acoustical ceiling tile, acoustical wall treatment, floor tile, carpet, ceramic tile, and other materials unique to the project.
- No left over paint products left on UI project unless specifically instructed in writing. All paint codes and draw down sheets are required in the O&M Manuals.

- All poly sheeting (Plastic) used in facilities being constructed or renovated will be fire-resistant as IBC and IFC.

#### Certificate of Occupancy

The State of Idaho DBS will issue a Certificate of Occupancy or a Certificate of Completion.

#### Operation and Maintenance Manuals

- Three bound copies are required; copies of documents with an approved stamp will suffice.
- All O&M's must contain a copy of all returned final approved submittal along with the associated maintenance and warranty information.

# DIVISION 2 - SITE WORK

## Locate

- Contractors must call for utility locate prior to any excavation. Many utilities on campus will be located by UI Facilities personnel, but they receive notification through the locate service for this area. The locate service is Digline (in Boise) at 1-800-342-1585 or (208) 342-1585. Digline may ask if the caller has the geographic location of the U of I. It is 39 North, Range 5 West, Section 7.

## General Sitework

- Fire apparatus access shall be maintained. When any portion of the facility is located more than 150' from an approved access route, a new access shall be constructed as a part of the project. The access shall be capable of handling the imposed loads of fire apparatus, and provided with a surface that will provide all-weather driving capabilities. The access shall have an unobstructed width of not less than 20', an unobstructed vertical clearance of not less than 13'-6", and a minimum inside radius on turns of 25'.

## Soil Investigation Data

- Soils report will be referenced in the contract documents and available to bidders. It will not be bound as a part of the CD's. This cost is part of the project overhead and will be included in the project budget.

## Boring Log

- Boring log will be referenced in the contract documents and available to bidders. It will not be bound as a part of the CD's. This cost is part of the project overhead and will be included in the project budget.

## Landscape General Notes

- Carefully examine the functionality around any living area. Open spaces for play and recreation around living areas are very important. Avoid dense plantings of shrubs and flowers except at the "front door" and on slope areas that cannot be maintained in any other manner. Plan for a sufficient number of bike racks at each residence. Avoid railings or similar objects near entries where bicycles might be chained. Plan for service vehicle access and parking in proximity to all living units.

## Tree and Plant Protection

- Trees and shrubs are valuable resources on campus, each having been individually planted. No landscaping may be altered and no trees may be removed without prior approval. No nails, wire or signs may be placed in or on trees. Trees to be saved will be protected by a construction fence surrounding the tree to the circumference of the crown. Fences shall be at least 6' high woven wire supported by metal posts. Ribbons or plastic construction fence will not suffice. No foot traffic, vehicles or material storage will be allowed on the root zone. Avoid activities which would cause compaction or contamination of the soil within the tree protection zone. Do not store liquids or powders in locations where spills may flow into the root zone. Do not rinse out concrete trucks, mixing tubs, chemical bottles or any other construction chemical or compound onto any area where the rinsate may end up in the soil.
- It is the responsibility of the contractor to maintain and water any trees or plant materials protected by a tree protection zone within the construction site limits. The soil around trees and plants must be saturated with water at approximately two-week intervals depending upon the weather conditions.
- All trees and other plantings which are a part of the contract shall be warrantied against decline or death for a period of one year from the date of planting or the date of Substantial Completion, whichever is later. Initial watering, composting, mulching and other care is the responsibility of the contractor. LES landscape technicians will assume

the care of the newly planted materials upon Substantial Completion. LES performance of these maintenance duties within the one-year warranty period in no way negates the contractor's warranty obligations.

- Pruning which may be required to complete the work or for access to the site must be accomplished in accordance with the American National Standard for Tree Care Operations ANSI A300-1995 and International Society of Arboriculture Standards. Trees considered to be Street Trees may only be pruned by an arborist certified by the City of Moscow. UI LES arborists may be engaged to do the work on a charge-back basis.
- Root pruning of trees and large woody shrubs shall be done using a method which will not vibrate or displace the roots within the soil mass. Pruning with a lopper or tree saw will satisfy this requirement. Do not pound or pull roots with a shovel, axe or backhoe bucket.
- Trenching under the drip line of a large tree (greater than 6" caliper diameter) will require tunneling under or going around the buttress and lateral-anchoring roots to ensure tree stability. These roots shall not be cut. Boring under this part of the root system is the preferred method. Smaller roots exposed during trenching operations shall be cut off cleanly on the tree side of the trench utilizing the methods described above.
- Plant materials that receive compaction or root damage may take up to a year or more to show damage or death from underground wounding. Trees and shrubs within the project zone of impact will be accessed for damage upon completion of the project and monitored for one year after the construction is finished. Any plants that decline or die during that time will be diagnosed as to the cause of decline or death. If no readily apparent causal agent is found for the plants decline or death, these plants will be considered to be "contractor damaged" and must be replaced under the project warranty.

#### Topsoil

- All required topsoil must be imported.
- Imported topsoil shall be a fertile, friable, natural loam soil, representative of productive soils in the vicinity. Topsoil is usually dark in color (often black). It shall be obtained from well-drained areas, free from admixtures of subsoil, clay lumps, brush, weeds and other foreign matter, and free of roots, stumps, stones larger than 1.5 inches in any dimension; and free of other extraneous or toxic matter harmful to plant growth and be a hindrance to grading, planting, and maintenance operations. Topsoil should be obtained from local sources. It should have an acidity range (pH) of 5.5 - 7.5, and an organic matter content between 2% and 8%. Loam topsoil must have 7% to 40% clay, 28% to 60% silt, and less than 52% sand particles. Not more than 1% of topsoil weight can be gravel or stones. Soil particle size categories: Clay - 0.002 millimeters and smaller, Silt - 0.002 to 0.02 mm, Sand - 0.02 to 0.2 mm.
- Topsoil depth requirements shall be 6" for lawn areas and 36" for tree or shrub areas.
- Fill Soil for placement in planting beds below the topsoil layer shall be natural friable loam free of lumps, roots, stumps, stones larger than 3" in any direction or other trash and debris such as concrete chunks or concrete spillage along the edge of any formwork. It shall not contain more than 10% by weight of gravel and/or stones less than 1.5 inches in any dimension. It must not contain toxic matter harmful to plant growth. It must have an acidity range (pH) within 5.6 to 7.5 and a particle size distribution as required for topsoil. In most instances, soil excavated from a construction site may be used for fill soil going back into the construction site.
- Facilities Assistant Director for Landscape and Exterior Services or his designee shall approve the source of topsoil and/or fill soil prior to installation.
- Topsoil shall meet or be improved to meet the following mechanical requirements by adding sand and/or peat or manure and incorporating into the topsoil: Sand - 52% maximum percentage, Silt - 60% maximum percentage, and Clay - 25% maximum percentage.

- Include in topsoil mix 20% EKO Compost or an equally comparable product. (EKO Compost is manufactured by EKO Systems of Lewiston, Idaho). Compost shall be mixed into the topsoil using a 1 to 4 ratio of compost to topsoil.
- After topsoil is applied to landscape renovations sites, whether for turf or other plant materials, the topsoil should be tilled in two different directions to a depth of 4 inches to allow gradework to be accomplished easily by hand or machine. Lightly compact with a cultipacker before planting grass.
- The landscape contractor is responsible for providing positive grade away from sidewalks, foundations, landscape plantings and other objects within the landscape so that water flows to a proper drainage exit point or storm sewer and does not pond or settle out within the landscape area itself. Rake the topsoiled area to a uniform and smooth grade throughout to eliminate dips, holes, and pockets that may retain water or hinder future maintenance activities. Remove all trash and stones to a depth of 2 inches.
- Turf restoration areas and new gradework must be inspected and accepted by LES representatives before seeding or sodding.

#### Seed Selection

- Turfgrass seed mixtures are selected according to desired maintenance levels for the particular area, either high/medium, low or dryland. Acceptable products include but are not limited to the following: (Note: Approved seed selections change frequently as new or improved strains are developed).

For high to medium maintenance areas (areas that receive regular irrigation/mowing):

**“Elite Lawn Mix”** consisting of:

- 20% Shamrock Kentucky bluegrass
- 20% NuGlade Kentucky bluegrass, 33% Affinity Perennial Ryegrass
- 20% Affinity Perennial Ryegrass
- 20% Secretariat Perennial Ryegrass
- 20% Magic Chewings Fescue

For low maintenance areas (areas that receive minimal irrigation/mowing):

**“Grassland LoGro”** consisting of:

- 40% Imagine Perennial Ryegrass
- 40% Creeping Red Fescue
- 20% Hard Fescue

For dryland areas (no artificial irrigation and rare mowing):

**“Erosion Mix”** consisting of:

- 30% Hard Fescue
- 20% Sheep Fescue
- 20% Creeping Red Fescue
- 15% Chewings Fescue
- 10% Canada Bluegrass
- 5% Regreen Sterile Wheatgrass

The above seed mixtures are all available from Grassland West in Clarkston, WA. Phone 1-800-582-2070. Regardless of the seed selected, it must meet industry standards of viability and purity, and be sown at rates appropriate for each type and mixture.

- Sod must be inspected and accepted by LES representatives before laying sod on campus grounds. The sod must be from an approved source and be weed, insect and disease free. No attempt is made to specify the exact species mix of sod due to the nature of that business, but it will generally be 100% Kentucky Bluegrass or a mixture of KB and Perennial Ryegrass.

- The landscape contractor is responsible for the care, fertilization and watering of newly installed grass seed or sod during the turf establishment period for 6 weeks or Substantial Completion, whichever is later. Complete granular fertilizer of neutral character must be used as a starter fertilizer for seeding grass or sod installations. Use fertilizer providing 1.5 pounds of available slow release nitrogen and 1.0 pounds phosphorus and 0.5 pounds potassium per 1000 square feet of area.

#### Trenching, Backfilling & Compacting

- Backfill of trenches in streets and paving shall be to City of Moscow standards (i.e. no native or excavated soil; only crushed gravel).



- All street excavations will be topped with asphalt (at least temporary cold mix) immediately upon completion of the work. No gravel crossings will be left overnight, as per City of Moscow ordinance.

#### Aggregate Base Course

- Sand, river rock and washed rock are not readily available in Moscow. Base specs on gradations of crushed basalt. Decomposed granite may be used for some structural fill applications.

#### Plant Mix Asphalt Paving

- **General**
  - **Description of Work:** Plant mix asphalt construction and material specifications are provided for construction of asphalt-paved sidewalks, parking lots and low traffic roadways. Specific limits of construction, site conditions and site-specific requirements are provided on drawings for individual construction.
- **Materials and Products**
  - **Aggregates:** Aggregates shall consist of crushed stone, crushed gravel or crushed slag with or without sand or other inert finely divided mineral aggregate. The portion of materials retained on the No. 4 sieve is coarse aggregate. The portion passing the No. 4 sieve is fine aggregate and the portion passing the No. 200 sieve is mineral filler.
  - **Coarse Aggregate:** Coarse aggregate shall consist of sound, durable particles, free from adherent films that would prevent thorough coating and bonding with the bituminous material and shall be free from organic matter or other deleterious substances. The percentage of wear shall not be greater than 40 percent when tested in accordance with ASTM C 131. The sodium sulfate soundness loss shall not exceed 13 percent, after five cycles, when tested in accordance with ASTM C 88. Coarse aggregate shall contain at least 70 percent by weight of individual pieces having two or more fractured faces and 85 percent by weight having at least one fractured face. Fractured faces shall be obtained by crushing. Aggregate shall not contain more than 8 percent by weight flat or elongated pieces when tested in accordance with ASTM D 4791.
  - **Fine Aggregate:** Fine aggregate shall consist of clean, sound, durable, angular shaped particles produced from crushed stone, slag or gravel that meets the requirements for wear and soundness specified for coarse aggregates. The aggregate particles shall be free from coatings of clay, silt or other objectionable materials and shall contain no clay balls. The fine aggregate, including any blended material for the fine aggregate, shall have a plasticity index of not more than 6 and a liquid limit of not more than 25 when tested in accordance with ASTM D 4318.
  - **Aggregate Base Course:** Base course shall consist of crushed, ¾-inch minus, well graded sand and gravel with less than eight percent passing the #200 sieve.
  - **Natural (non-manufactured) sand:** may be used to obtain the gradation of the aggregate blend or to improve the workability of the mix. The amount of sand to be added will be adjusted to produce mixtures conforming to the requirements of this specification. The fine aggregate shall not consist of more than 20 percent by weight of total aggregates. The aggregate shall have sand equivalent values of 40 or greater when tested in accordance with ASTM D 2419.
  - **Recycled Asphalt Paving (RAP):** Recycled asphalt paving may be used providing it is properly incorporated into the job mix formula including stockpile oil content data. No more than 15 percent by weight of total aggregates of recycled asphalt paving shall be used in the job mix formula.
  - **Mineral Filler:** If filler, in addition to that naturally present in the aggregate, is necessary, it shall meet the requirements of ASTM D 242.
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- **Bituminous Materials:** Bituminous materials shall conform to all requirements of the applicable ASTM test methods for the type and grade specified in the contract documents.  
**Antistripping Agent:** If required by the job mix formula, Antistrip shall be provided at no additional cost and shall conform to the requirements of paragraph sections 3.1 and 4.1.
- **Woven Geotextile:** Woven geotextiles shall have a minimum mullen burst strength of 400 psi (ASTM D-3786) and a grab tensile strength of 200 pounds per square inch (ASTM D-4632).
- **Preliminary Material Acceptance:** Prior to delivery of materials to the jobsite, the contractor shall submit certified test reports to the engineer for the following materials: Coarse Aggregate, Fine Aggregate and Bituminous Material. The certification(s) shall show the appropriate ASTM test method for each material, the test results and a statement that the material meets the specification requirement. The engineer may request samples for testing, prior to and during construction, to verify the quality of the materials and to insure conformance with the applicable specifications.

- **Construction**

- **Base Preparation** Prior to construction of asphalt pavement the subgrade and base shall be properly constructed and tested.

The subgrade surface shall be compacted to a minimum of 90 percent of the maximum dry density as determined by ASTM D-1557 (Modified Proctor). Soft or unstable areas shall be removed to firm soil and replaced with aggregate base course placed over woven geotextile fabric. Once prepared, the subgrade shall be protected from construction traffic or precipitation.

Prior to placing base course, a woven geotextile shall be placed as a separator between the subgrade and the base course. Woven geotextiles shall have material properties specified in section 2.1-K. Geotextiles shall have a minimum over-lap of 12 inches and be applied taut and free of wrinkles.

Base course shall be placed in eight-inch thick loose lifts at near optimum moisture content and compacted to at least 95 percent of ASTM D-1557 (Modified Proctor) to within one inch of the elevations shown on the drawings. The compacted base thickness shall not be less than 6.0 inches.

- **Plant Mixture**

- **Composition of Mixture:** The bituminous plant mixed pavement shall be composed of a mixture of well-graded aggregate, filler if required, and bituminous material. The several aggregate fractions shall be sized, handled in separate size groups, and combined in such proportions that the resulting mixture meets the grading requirements of the job mix formulas (JMF).
- **Job Mix Formula (JMF):** The bituminous mixture shall be designed using procedures and specifications according to ITD Class II or III or WASHDOT Class A or B bituminous mixes. No bituminous mixture for payment shall be produced until the engineer has approved a job mix formula.
- **Preparation of Bituminous Material:** The bituminous material shall be heated in a manner that will avoid local overheating and provide a continuous supply of the bituminous material at a uniform temperature. The temperature of the bituminous material delivered to the mixer shall conform to the oil producers temperature/viscosity graph requirements for mixing temperature submitted for the job mix formula (JMF).
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- **Preparation of Aggregates:** Aggregates for the mixture shall be heated and dried prior to introduction into the mixer. The maximum temperature and rate of heating shall be such that no damage occurs to the aggregates. The temperature of the aggregates and mineral filler shall not exceed the requirements for mixing temperature, when asphalt is added. Particular care shall be taken to insure that aggregates obtain uniform coating and distribution of the aggregate particles in order to produce a mixture of satisfactory workability.

**Stockpile Management:** The contractor shall establish procedures for insuring that material does not segregate when taken from stockpiles for loading into the plant.

- **Preparation of Bituminous Mixture:** The aggregate and bituminous material shall be weighed or metered and introduced into the mixer in the amounts specified in the job mix formula (JMF). The combined materials shall be mixed until the aggregate obtains a uniform coating of bitumen and is thoroughly distributed throughout the mixture. Wet mixing time shall be the shortest possible time that will produce a satisfactory mixture, but not less than 30 seconds for batch plants. The wet mixing time shall be determined by the contractor based on the procedure for determining the percentage of coated partials described in ASTM D 2489. The moisture content of all bituminous mix upon discharge shall not exceed 0.5 percent.

- **Jobsite Conditions**

- **Weather Limitations:** The bituminous mixture shall not be placed upon a wet surface or when the surface temperature of the underlying base course is less than 40 degrees Fahrenheit. Ambient air temperature must be at least 50 degrees Fahrenheit and rising prior to initiating pavement placement. Paving may continue above 50 degrees Fahrenheit providing precipitation or other weather conditions do not inhibit the contractor's ability to achieve the product specifications. Once paving is initiated, continuous asphalt placement will be allowed until the ambient temperature falls below 45 degrees Fahrenheit. The temperature requirements may be waived by the engineer, if requested, however all other specified requirements including compaction shall be met.
- **Preparation of Underlying Surface:** Immediately before placing bituminous mixture, the underlying surface shall be cleaned of all debris and a prime coat or tack coat shall be applied to all curbs, saw cuts or overlay surfaces.

- **Test Strip**

Prior to the start of production paving for the project, the contractor shall demonstrate conformance to the project specifications by the construction of a test section. The test section shall be constructed over a similar underlying grade or pavement structure as is required for the project. The equipment used in construction of the test section shall be the same as will be used during construction of the project. The test section may be constructed at the project site or within 20 miles of the project site.

The test section shall be observed, sampled and tested by the owner's testing agency. The contractor shall notify the testing agency a minimum of 48 hours prior to beginning the test section.

The placement of the test section shall be observed by the testing agency and sampling and testing shall be performed to verify the properties of the job mix formula, mat and joint density, equipment and procedures intended for use on the project.

Test section sampling and testing shall include oil content, gradation, air voids, stability, mat and joint density, nuclear gauge calibrations, appearance and surface smoothness. No paving will be performed until test section verification is complete.

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The test section shall be considered acceptable if all field and laboratory test results conform to the requirements of the project specifications.

If the initial test section should prove to be unacceptable, it shall be removed, if located on the project site and the necessary adjustments to the job mix formula, plant operations, placing procedures and/or compaction procedures shall be made. A second test section shall then be placed in order to demonstrate that corrective action is effective. Full production shall not begin until a satisfactory test section has been constructed and accepted in writing by the engineer.

□ **Asphalt Handling Equipment**

**Bituminous Mixing Plant:** Plants used for the preparation of bituminous mixtures

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shall conform to the requirements of ASTM D 995. The engineer, or the engineers representative, shall have full access, at all times, to all areas of the plant for checking adequacy of equipment, inspecting operation of the plant, verifying weights, proportions, material properties and monitoring temperatures maintained in the preparation of the mixture.

- **Hauling Equipment:** Trucks used for hauling bituminous mixtures shall have tight, clean and smooth metal beds. To prevent the mixture from adhering to them, the truck bed shall be lightly coated with paraffin oil, lime solution or other approved material. THE USE OF SOLVENTS SUCH AS DIESEL FUEL IS PROHIBITED. Each truck shall have a suitable cover to protect the mixture from adverse weather and to maintain temperatures during haul.
  - **Bituminous Pavers:** Bituminous pavers shall be self propelled, with an activated screed, heated as necessary, and shall be capable of spreading and finishing courses of bituminous plant mix material which will meet the specified thickness, smoothness and grade. The paver shall have sufficient power to propel itself and the hauling equipment without adversely affecting the finished surface. The paver shall have a receiving hopper of sufficient capacity to permit a uniform spreading operation. The hopper shall be equipped with a distribution system to place the mixture uniformly in front of the screed without segregation. The screed shall effectively produce a finished surface of the required evenness, smoothness and texture without tearing, shoving or gouging the mixture. If automatic grade control device is used, the paver shall be equipped with a control system capable of automatically maintaining the specified screed elevation. The control system shall be automatically actuated from either a reference line and/or through a system of mechanical sensors or sensor directed mechanisms or devices, which will maintain the paver screed at a predetermined transverse slope and at the proper elevation to obtain the required surface. The transverse slope controller shall be capable of maintaining the screed at the desired slope within plus or minus 0.1 percent.
  - **Rollers:** Vibratory, steel wheel and pneumatic-tired type, self-propelled rollers shall be used. They shall be in good condition, capable of operating at slow speeds to avoid displacement of the mixture. The number, type and weight of the rollers shall be sufficient to compact the mixture to the required density while it is still in workable condition. The use of equipment, which causes excessive crushing of the aggregate, will not be permitted. Small, 500 to 1,000 pound vibratory plates will be allowed only in areas where large rollers cannot access.
- **Asphalt Placement**
    - **Coordination:** Notify the testing agency and the owner 48 hours prior to asphalt paving.
    - **Transporting, Placing and Finishing:** The bituminous mixture shall be transported from the plant to the site in vehicles conforming to the requirements of section 3.1.5. Deliveries shall be scheduled so that placing and compacting of mixture is uniform with minimum stopping and starting of the paver. Adequate artificial lighting shall be provided when paving at night. Hauling over freshly placed material shall not be permitted until the mixture has been compacted and allowed to cool to atmospheric temperature. Notify the testing agency and the owner 48 hours prior to asphalt paving.
    - **Asphalt Placement Sequence:** Upon arrival, the mixture shall be placed to the full width by a bituminous paver. It shall be struck off in a uniform layer of such depth that when the work is completed it shall have the required thickness and conform to grade and contour indicated. The speed of the paver shall be regulated to eliminate pulling and tearing of the mat. Unless otherwise permitted, placement of the mixture shall begin along the centerline of a crowned section or on the high side of areas with one-way slopes. The mixture shall be placed in consecutive adjacent strips as wide as practical. The longitudinal joint in one course shall offset the longitudinal joint of the layer below by at least two feet, however the joint in the

surface course shall be at the centerline of pavement. Transverse joints in one course shall be offset by at least five feet from transverse joints in the previous course. Transverse joints in adjacent lanes shall be offset by at least ten feet. In areas where irregularities or unavoidable obstacles make the use of mechanical spreading and finishing equipment impractical, the mixture may be spread and luted by hand with care to reduce segregation. Where mixture is spread by hand, compaction shall occur immediately.

- **Compaction of Mixture:** After placing, the mixture shall be thoroughly and uniformly compacted by rolling. The surface shall be compacted as soon as possible when the mixture has attained sufficient stability so that rolling does not cause undue displacement, cracking or shoving. The sequence of rolling operations and types of roller shall be determined by the contractor and shall be demonstrated to be sufficient to achieve the specified density during the test strip. The speed of the rollers shall, at all times be sufficiently slow to avoid displacement of the hot mixture and be effective in compaction. Any displacement occurring as a result of reversing direction the direction of the roller or from any other cause shall be corrected. Rollers shall not be parked on hot mixture until it has cooled sufficiently to avoid displacement. Sufficient rollers shall be furnished to handle the volume of mixture being placed. Rolling operations shall continue until the surface is of uniform texture, true to grade and cross section and the required density is achieved. In areas not accessible to the roller, the mixture shall immediately and thoroughly be compacted with hand compaction equipment. Any mixture that becomes loose and broken, mixed with dirt, containing check cracking, or is in any way defective shall be removed and replaced at the contractor's expense. Skin patching shall not be allowed.
- **Joints:** The formation of all joints shall be made in such a manner as to insure a continuous bond between courses and obtain the required density. All joints shall have the same texture as other sections of the course and meet the requirements for smoothness and grade. Longitudinal and transverse joints which are irregular, damaged, uncompacted or otherwise defective shall be cut back to expose a clean, sound surface for the full depth of the course. All contact surfaces shall be given a tack coat prior to placing any fresh mixture.
- **Smoothness:** The finished surfaces of the pavement shall not vary more than 1/4 inch in 10 feet at the pavement surface. Smoothness shall be evaluated with a 10foot straightedge. Measurements will be made perpendicular and parallel to the centerline at distances not to exceed 25 feet. When more than 15 percent of the measurements exceed the specified tolerances, the contractor shall grind or remove the deficient area until tolerance is met or replace with new material. Skin patching will not be allowed.
- **Thickness:** The finished and compacted asphalt mat thickness shall not be less than 2.5 inches thick in all pavement locations.

- **Submittals**

- **Source Approval:** The contractor shall provide the engineer with proper documentation that the material source(s) to be used for bituminous paving are Idaho Transportation Department approved sources, or independent laboratory test results indicating compliance with project material specifications. Independent test results must be for the proposed stockpile material and less than two years old.
- **Job Mix Formula:** No Bituminous mixture shall be produced until a job mix formula is approved by the engineer. The bituminous mixture shall be designed using procedures contained in the Idaho Transportation Department Materials Manual. The submitted job mix formula shall be no more than one year old and contain all required material properties such as gradation, oil type and material source(s). The job mix formula shall be submitted in writing at least 10 days prior to paving operations and include as a minimum the following:

Mix design procedures and specifications  
Material source designations  
Individual stockpile blend percentages and average gradation results.  
Job mix formula target gradation.  
Asphalt type or grade.  
Job mix formula percent of asphalt cement.  
Mixing and compaction temperatures.  
Oil producer's temperature/viscosity curves.  
Plot of the combined gradation on the Federal Highway Administration power 45 gradation curve.  
Graphical plots of unit weight, theoretical maximum density, air voids, voids in mineral aggregates and stability verses asphalt content.  
Percent natural sand/mineral filler.  
Percent fractured faces.  
Percent flat and elongated pieces.  
Antistrip agent (if required).

- **Samples:** The contractor shall submit samples upon request for job mix formula verification testing. The job mix formula for each mixture shall be in effect until modified in writing by the engineer. Should a change in sources of materials be made, the engineer must approve a new job mix formula before the new materials are used.
- **Bituminous Material:** The contractor shall furnish vendors certified test reports for each delivery of bituminous material shipped to the project. The vendor certified test report can be used for acceptance or be tested independently by the engineer.
- **Scale Certifications:** Submit to the engineer, plant scale certifications, and date of last calibration and next due calibration date.
- **Traffic Plans:** When required submit to the engineer approved traffic plans obtained from the appropriate local agencies and the owner.
- **Material Submittals:** Submit to the engineer all required product submittals for prime coat, tack coats, antistrip, etc.
- **Batch Tickets:** Submit to the engineer, batch tickets for all loads delivered to the project. The batch tickets shall contain as a minimum:
  - Project information.
  - Job mix formula designation.
  - Individual load and cumulative tonnage.
  - Ticket and truck numbers.
  - Batch time.
  - Tests performed

#### □ Testing

- **Independent testing:** The owner shall engage the services of a qualified materials testing laboratory. The materials testing laboratory shall perform acceptance sampling and testing to determine compliance with project specifications. The contractor shall cooperate with the testing laboratory to facilitate the taking of required material samples and field testing. Testing performed by the owner in no way relieves the contractor from fulfilling the project specifications.
- **Frequency of Testing:** As a minimum the following testing frequencies shall apply:
  - Oil Content: One test for each day of placement or every 2000 tons whichever is greater.
  - Gradation: One test for each oil content test.
  - Theoretical Maximum Density: One test per day or every 2000 tons, whichever is greater.

Mat Density: One test for every 500 square feet of surface area.

Joint Density: One test for every 500 lineal feet of joint.

Smoothness: Upon completion of paving operations and prior to opening to traffic.

Test Strip Verification Sample: Test strip verification test results must conform to the requirements of section 3.1.3 and project acceptance specifications (section 6.1).

- **Acceptance**

- **Material Properties:** Field-testing of the job mix formula shall conform to the requirement of the Idaho Transportation Department for the class of asphalt approved for the project.
- **Compaction:** Field density shall conform to the following requirements:
  - Mat density: A minimum of 92 percent of theoretical maximum density.
  - Joint density: A minimum of 89 percent of theoretical maximum density.
- **Surface Smoothness:** Finished pavement surfaces shall not vary more than 0.25 inch in 10.0 feet as measured in accordance with section 3.1.3 – F.
- **Thickness:** The measured, compacted mat thickness shall not vary more than 0.10-inch.
- **Submittals:** All materials required to be submitted shall be complete prior to final acceptance.
- **Penalties:** The owner reserves the right to impose an extended warranty period or to require the removal of asphalt placements that do not meet the project specifications. The contractor must comply with all imposed penalties within 10 days notice of unsatisfactory asphalt placements.
- **Accepting Official:** The contract officer for the University of Idaho shall inspect the paving, review independent test results and shall notify the contractor in writing within 14 days of acceptance of asphalt, require additional testing or corrective action required including removal and replacement of paving.

#### Sidewalks

- All new or replacement sidewalks will be constructed with curb cuts at street intersections, crosswalks, and other locations as appropriate in accordance with the Americans with Disabilities Act Accessibility Guidelines (ADAAG) 4.7. See Division 3 (Concrete) for additional details.

#### Parking Spaces

- Minimum parking space for head-on parking with a drive aisle will be 9'x18' with a 24' aisle. In addition, 2' of overhang (planter or sidewalk) must be allowed. (See Volume II for details).

#### Parking Lot Demarcations

- (See Volume II for parking standards).

#### Site Furnishings

- The U of I will provide exposed aggregate trash containers. The cost of these containers shall be included in the project budget.
- Specify brown, exposed aggregate bollards where applicable. Avoid generic, cylindrical, concrete bollards. Avoid painting bollards or other similar devices yellow.
- Avoid the use of concrete parking bumpers.

#### Disinfecting Water Mains

- Disinfection of water mains shall comply with American Water Works Association (AWWA) standard C651-92.



## Site Utilities

- The Consultant is required to obtain design approval and permits from Idaho Department of Environmental Quality (DEQ), US Environmental Protection Agency (EPA), and the City of Moscow for all site utilities (domestic water, sanitary sewer, storm sewer, reclaimed water). Applicable regulations include EPA construction site runoff mitigation permit (one acre site and larger), City of Moscow Ordinance 98-1, 99-17, and 99-23.

## Irrigation General Notes (*Irrigation Section Updated 4-15-2009*)

- Connect new irrigation systems to campus reclaimed water irrigation system whenever practical. However, any irrigation system supplied with reclaimed water must be identified as such. All devices and components of the system must be identified with purple markings. All sprinkler heads must have purple rings affixed, all valve boxes must have purple valve box tops, and any quick-coupler, faucet or hose bib must have a purple tag. Purple signs with white lettering must be placed at each of the most common entry points to the irrigated area and read, "Caution - Reclaimed Irrigation Water - Do Not Drink." These signs shall be mounted as high as possible on existing posts or 7' to the bottom of the sign on new posts where necessary.
- Contact the Facilities Assistant Director for Landscape and Exterior Services (LES) prior to performing any work which may impact or damage irrigation systems. LES will locate and mark all lines, valve boxes and sprinkler heads. Any damage must be reported to LES and the damage must be immediately repaired by competent personnel. Contractors may engage LES to make the repairs on a charge-back basis.
- A pre-installation conference must be scheduled at least 2 weeks prior to the commencement of the landscape and irrigation work. Materials, methods, utility interface and schedules will be reviewed. The University will provide the name and number of the Facilities Landscape Technician who will be the contractor's contact during the work.

## Irrigation Materials and Methods

- **Mainline Pressure Piping:** Downstream from the point of connection and upstream from the control valves. Piping is under pressure from the campus domestic or reclaimed water system. Mainlines up to 3" shall be schedule 40 PVC. Installations up to 4" may use either gasket or solvent weld. Installations over 4" shall be gasketed pipe only.
- **Circuit Piping or Laterals:** Downstream from control valves to sprinklers and specialties. Piping is under pressure only during operation. Piping up to 2" shall be class 200 PVC anything larger shall be Sch 40 PVC.
- **Quick Connects and Supplemental Watering Stations:** Connected directly off of mainline pressure piping with manual ball valve for isolation. Quick connects shall be connected by (3) galvanized street ells and appropriate nipple length to achieve overall height of finished grade. All fittings shall be thread taped and thread sealant used prior to assembly. May be under continual operating pressure from the water distribution system. Piping material same as laterals.
- **Fittings:** All glued fittings will be schedule 40 PVC socket weld fittings. Threaded fittings will be schedule 80 only. No galvanized fittings will be accepted downstream of the backflow assembly or the point of connection; the only exception for galvanized fittings is to connect quick coupler to the mainline for blow out or supplemental watering purposes. Gasketed pipe will use fittings designed for use with such installations, however 4" pipe may use either socket weld or gasketed fittings.
- **Thrust Blocking:** All installations of irrigation piping 3" and above will have thrust blocking installed at all points of intersection, at all valve locations, at all changes of direction of 45 degrees or more, and all points where pipe diameter is reduced by 1" or more.
- **Electric Control Valves** will be solenoid operated, plastic or vinyl bodied, with attached manual flow control up to 3" in size. All electric control valves in excess of 3" will be brass body. All multiple valve assemblies must be installed using a manifold and set in specified valve boxes. All electric valves, and manual isolation/ball valves must be rated at 150 psi.
- **Controllers** will be a Rainbird type ESP-MC or approved equal with the ability to interface with a Rainbird "Maxicom" centra; command system. Controllers to be mounted at

accessible locations outside of buildings. No inside mounts will be accepted. Mountings to be permanent and all controllers must be lockable.

- **Sleeves:** All piping passing under sidewalks, patios, common areas or roads will be encased in a 4" minimum diameter, schedule 40 PVC sleeve. Sleeves will extend a minimum of 12" beyond the edges of the surface being traversed, and the ends will be sealed to prevent dirt and debris from sloughing into the body of the sleeve. Sleeves will be buried not less than 10" but no more than 24". Sleeves must be clearly and accurately marked on as-built drawings.
- **Control Wires** will be AWG 14 minimum. Wire may be laid along side of water piping with 12" loops at all changes of direction equivalent to 45 degrees or more. Each valve will have one designated power wire of a color other than white and will be connected with a common (white) wire to the controller. No more than one valve per timer station. Splices will be connected solidly and encased in a waterproof sealing packet. All splices will be laid in trench with a 12" loop in the wire. Locations of splices will be indicated on the as-builts. If the Contractor uses an independent trench for control wires only, trench must be a minimum of 12" deep and free of debris. Wires will be laid in accordance with above specifications for direction changes and splices. Trench will be backfilled to 6" and a metallic tracer tape placed in the complete extent of the trench, and the remainder of the trench filled and compacted to specifications. Location of the trench will be indicated on the as-builts. Contractor will install one extra common (white) wire and one extra power (color) wire from controller to every manifold and any isolated valve.
- **Sprinklers:** No solid set above ground sprinklers are allowed on campus except on a temporary basis for dust control and plant storage areas. Riser systems in shrub areas unexposed to foot traffic, drip systems, and use of brass bodied sprinklers may be approved by the Landscape project contact person on an individual basis.
- **Sprinkler Types: Turf Areas** shall be Rainbird 1800 Series PRS or PRS-SAM, Hunter PGJ, PGP, I 20, I 25 and I 40, I-60 series. **Shrub and Planting Areas** shall be Rainbird 1800 Series with a 6" maximum riser. Shrub heads, bubblers, or low flow drip tubing must be approved by the Landscape project contact representative.
- **Swing Joints:** All sprinkler heads and quick connect adapters shall be fitted with swing joints. These may be made up of PVC fittings consisting of three Marlex 90 degree ells and two 4" minimum PVC nipples, Galvanized is only permitted on quick couplers "Funny Pipe" will not be used.
- **Valve Boxes** shall be AMTEK, CARSON or equal.
- **Quick Connect Couplers** shall be Rainbird only. Caps and size will indicate type of water source: 3/4" - (yellow) - potable water; 1" - (purple) - effluent (reclaimed) water. The Contractor will supply the University with one operating key for each quick coupler installed.
- **Backflow Prevention Assemblies** for irrigations systems will be brass bodied doublecheck assemblies as manufactured by FEBCO, WILKINS, WATTS or equal. No doublecheck assembly will be installed with input and output ports of less than 1" pipe diameter. All assemblies will be mounted to allow easy access to test cocks and shut-off valves. Locations must allow for testing and repairs. Backflow assemblies will be installed at the direction of the University of Idaho Utilities department (Water Purveyor). Following installation, the assembly will be tested and passed by a licensed Idaho Cross-Connect tester and a tag attached to the assembly recording the date of inspection, its operational status and the name, contracting company, certificate number and issuing date of the tester. A copy of this information will be provided to the University Water Purveyor.
- **Trenches** will be backfilled and compacted to 90%. All trenches over 100 feet in length shall be trenched in a slight "S" configuration. All fill material, native or imported, will be free of debris and rocks larger than 1/2". Pipe bedding will be clean sand or pea gravel. Main line trenches shall be of a depth to allow 18" of coverage from the top of the pipe to grade height. All mainline trenches will require imported fill to a minimum depth of 3" above and below the pipe. Trenches for lateral lines shall be of a depth to allow 12" of coverage, and imported fill is not required.
- **Manifold Assemblies** will allow a minimum of 4" of unobstructed piping between fittings on the upstream side of the valves. All fittings will be glue and solvent weld except on the inlet

and outlet of the valve which will be threaded male fittings (schedule 80 PVC). Use Teflon tape with thread compound. Manifolds will be constructed to fit in an appropriately sized valve box with adequate rooms between valves for repair. In the case of multiple manifold installations, each manifold will have a separately installed isolation valve to allow repairs to that manifold without interfering with the normal operation of the remaining manifolds on the system. All valve boxes will be set so that the top and lid are at finish grade, and in such a manner that the PVC pipe will not be damaged by settling.

- **Manual Valves** shall be brass bodied ball valves. All manual valves installed independently of a manifold systems will be encased in a 6" minimum round valve box with removable lid set at finish grade.
- **Manual or Automatic Drains** shall not be installed on campus irrigation systems.
- **Zones:** Zones combining full and partial circles will not be permitted.
- **Quick Connect Couplers** will be installed with an independent direct line off of the main line down stream of the double check assembly. Coupler will utilize a galvanized swing joint and will be installed within its own valve box (6" round minimum). A manual isolation valve will be installed immediately downstream of the point of connection. This valve shall be enclosed in a valve box (10 " minimum) sized to allow adequate operation of the valve.
- **Tests of Mainline** will be conducted when all the connections and valves are in place and the line has been thoroughly flushed (blown clean). Test at 125 psi with no more than 2 lbs drop in 2 hours.
- **Tests of Lateral Lines** will be conducted visually. Trenches may be partially back-filled leaving all joints exposed and sprinklers in place. No visible leaks or improper glue joints will be accepted.
- **Clean Up:** Prior to scheduling final inspection, the contractor will ensure that the project site is free of debris, excess soil, materials and equipment. Area will be leveled and soil spread to achieve final grade. If irrigation is performed in conjunction with landscaping, inspection will be performed prior to plantings and again when plantings are completed.
- **Operational Test:** The system will be operated on a zone by zone basis ( 1 to 3 minutes per station) to demonstrate the operation of the controller and that it tracks from valve to valve. This test will be witnessed by the representative of Facilities Landscape and Exterior Services, and any defective items will be noted on a punch list at that time.

#### Solid Waste and Recycling

- All new and renovated facilities will be provided with a screened, grade-level, exterior concrete surface for solid waste containers and recycling bins. Facilities containing food service will also be provided with a roll-off pad and related electrical service to accommodate a trash compactor of a size to be determined by the project needs.
- Concrete pads for solid waste and recycling collection sites shall be 6" reinforced concrete.
- All ramps or driveways leading to a collection pad must be 10' wide and 6" reinforced concrete. The grade must be such that the service truck can approach the unit on a level surface.
- Container enclosures must be located to allow ease of access for collection vehicles. No parking or other obstructions will be permitted in the access area. Enclosure access should provide for required vehicle backups of no more than 100'.
- Latah Sanitation Inc. (LSI) truck is 8.5" wide, 45' long and 14' high, requiring a 45' turning radius. Provide an obstruction-free vertical clearance of 14' throughout the entire access area, including approach, turnaround and retreat. All collection sites and truck service positions shall provide an obstruction-free vertical clearance of 26'.
- LSI and UI Recycling/Solid Waste personnel must be consulted during the programming stage for any project which will require a compactor.
- Multiple family residential areas should provide a dumpster capable of holding one cubic yard for every four living units.
- Classroom and office buildings should typically provide an area large enough to accommodate one six-yard solid waste dumpster and two or three one-yard recycling bins.
- Hazardous or noxious waste must be contained in accordance with the U of I Hazardous Material Policies. Such material may not be placed in solid waste containers.

□ Container Capacity	Height	Depth	Width
1 cu yd	48	30	60
2 cu yd	43	34.5	80
3 cu yd	53	43.5	80
4 cu yd	59	51.5	80
6 cu yd	74	66.5	80
8 cu yd	90	71	80

#### Demolition and Abatement

- Asbestos abatement will be included in the Construction Documents as a part of the project (contractor responsibility - although a separate abatement contract may be issued). Facilities Maintenance and Operations has a Hazardous Materials Abatement Shop. They may be available to do limited removal in advance of specific small projects.
- One of the first steps of every project (during the programming phase) is to request a hazardous material assessment, specifically for asbestos and lead paint, through the U of I Environmental Health and Safety Office.
- The contractor is required to provide and post Material Safety Data Sheets (MSDS) for chemicals to be used during construction.
- The contractor must contract with a waste hauler of his choice and be responsible for the hauling and disposal costs associated with any solid or hazardous waste disposal.
- The contractor must provide his own dumpsters and roll-off's. U of I dumpsters and dump sites are not to be used by contractors without the specific approval of an authorized representative of the Facilities Solid Waste and Recycling division.

#### **LEAD PAINT ABATEMENT SPECIFICATION LANGUAGE**

Sampling by the University of Idaho Environmental Health and Safety Office (EHS) has determined that lead-based paint is present on surfaces that will be affected or removed by this project. The appropriate abatement of this paint is included in this contract, and it is the responsibility of the contractor to accomplish this work. This work will include, but is not limited to the following:

\* The contractor shall involve the services of a firm that is regularly engaged in the business of hazardous material abatement. This firm must employ, or have access to, an Industrial Hygienist. The U of I will not provide hygienist services. The contractor shall produce, through the assistance of the abatement firm, a Work Plan which describes how the abatement activities will take place. If the contractor has a similar, previously-established Work Plan available in-house, that may suffice. The Work Plan will be submitted to the UI-EHS for approval before any abatement work may begin. UI-EHS is the final authority for acceptance of the plan. The Work Plan must contain, at least, the following:

- name and address of individual (hygienist or principal of firm) who will be responsible for the abatement procedures
- name and address of testing lab
- description of testing procedures and levels of measurements
- description of procedures that will be used to protect the personnel involved in the abatement effort
- description of procedures that will be used to ensure adequate separation and protection of the campus community from the abatement work
- identification of hazardous waste storage facility or sanitary landfill which will be used for the disposal of the lead-containing material, appropriate to the level of hazard to the waste stream
- description of the tracking mechanism(s) that will be used throughout the process, including all necessary forms and testing sequence
- describe the final closeout, clearance and approval process

*Note: Although the lead-containing material is being removed by the contractor on behalf of the University, the generator of the material -- in this case, the University of Idaho -- owns and remains responsible for the product forever. EPA form number \_\_\_\_\_ is used to track this responsibility.*

*The operator of the waste facility will document the precise location of the stored or buried material on this form. It is the responsibility of the contractor to ensure that this form is properly filled out and returned to the UIEHS office.*

The anticipated sequence of events throughout the abatement process would be as follows:

- Contractor will produce a Work Plan for approval by UI EHS
- Contractor will mark areas on site requiring renovation or removal
- Abatement firm will sample and test material on site prior to removal
- Containment to separate the campus community will be constructed
- Renovation or demolition work will proceed as per the Work Plan
- Material in the debris pile or special containment device (usually on the floor) will again be sampled and tested prior to removal from the site to determine the level of hazard to the waste stream, and to determine the type of handling required for disposal
- Material is properly transported and disposed
- EPA form is completed and forwarded to UI - EHS
- Final clearance test of the site is conducted
- Containment is removed
- Abatement firm issues notification of final clearance and sign-off

*The following observations and comments are provided to clarify certain portions of the abatement process. These are provided as additional background information for prospective bidders, and their inclusion herein implies no approval whatsoever.*

- *Generally*, if lead-containing paint is chemically washed from a hard surface such as concrete or CMU, the resultant liquid must be captured entirely, contained in appropriate barrels, and shipped to a hazardous waste facility for storage or destruction.
- *Generally*, if a surface such as drywall containing lead-based paint is demolished, the percentage of lead in the resultant pile is minimal. This may often be disposed of in an approved landfill as unclassified construction debris.
- *Generally*, by following the procedures set forth in the Work Plan, demolition and/or removal of the lead-based paint and resultant construction debris can be accomplished by the contractor's own labor forces. Typically, the protection required will be canistertype masks and disposable protective clothing.
- *Generally*, the enclosure required to separate the work from the building occupants would be a 2X4 and Visqueen dust barrier. The establishment of negative-air within this enclosure would be delineated in the Work Plan, but would not necessarily be a requirement.

## DIVISION 3 -

# CONCRETE

### Sidewalks

- All new or replacement sidewalks will be constructed with curb cuts at street intersections, crosswalks, and other locations as appropriate in accordance with the Americans with Disabilities Act Accessibility Guidelines (ADAAG) 4.7.
- Curb cuts will employ a pre-manufactured mat of truncated domes.
- Mid-block curb cuts and other curb cuts intersecting a sidewalk at 90 degrees will require an additional concrete apron and flared wing sections in line with the curb cut direction of travel and a minimum of 5' in diameter to allow a wheelchair to make the 90 degree directional transition on a hard level surface.
- Wherever possible, sidewalks shall be a minimum of 6' wide to accommodate tractor-mounted snow plows. Main walkways which are expected to accommodate a great deal of foot traffic should be 8' to 10' wide.
- Sidewalks shall be 6" thick.
- Sidewalks shall contain 6 X 6 welded wire mesh or fiberglass reinforcement in the concrete mix.
- Sidewalks shall be 3000# concrete.
- Specify hydronic snow melter systems in all exterior universal access ramps and hardscape which constitutes an entry slab.

## **DIVISION 4 -**

- All sidewalks will have penetrating sealer.
- Wherever possible, add diagonal sections where walks meet at right angles to match pedestrian desire lines.

# **DIVISION 5 -**

# **MASONRY**



## **DIVISION 6 -**

### **METALS**

#### Welding

- All handrails, bike racks, interior stair rails and similar tubular metal structures shall be constructed by hydraulic bending or the use of butt-weld ells. All welds shall be ground flush. No mitering will be allowed.
- Pipe rails shall be attached to concrete surfaces by direct welding to a separate weld-plate, with re-bar J-hooks, embedded in the concrete.

#### Roof Accessories

- Provide fall arrest anchors, appropriately located on or around roofing systems, as a point of tie-off for UI maintenance work. Specify code-compliant ladders (no ship's ladders) and work platforms for safe maintenance access.

# **DIVISION 7 -**

## **WOOD**

### Casework

- All casework must meet AWI Custom standards.

## DIVISION 8

### - THERMAL AND MOISTURE PROTECTION

#### Firestopping & Smoke seals

- Firestopping products and systems shall be UL approved, and provided by a single manufacturer throughout the project, for all trades. In projects with more than 20 firestopped penetrations, the work shall be done by a firm regularly engaged in this industry. Submittals shall be required for firestopping products and systems. The general contractor shall coordinate all firestopping requirements and submittals, or designate one subcontractor to assume this responsibility for all other trades.

#### Membrane Roofing

- Pitch roof with gables at entries; no gutters.
- Ensure that ice and snow flow and build-up on roofs has been considered during the building design so that it will not pose a hazard near entrances, walkways, pedestrian routes, or parking lots.
- Provide walkways, pavers or pads to all roof-mounted equipment.
- Membrane roof systems shall be ballasted or mechanically fastened. Note that washed rock (ballast) is not readily available in Moscow.
- Built-up roofing systems shall only be used where necessary to match existing.

#### Metal Roofing

- Metal roofing systems are preferred over any other type. Use gasketed standing seam for systems up to 3 on 12 pitch. Mechanically-fastened standing seam is acceptable above 3 on 12.

#### Composition Roofing

- Where circumstances dictate, use 40 year architectural grade composition, laminated shingles similar to Owens Corning Oakridge 40 Deep Shadow. Standard practice includes ice and water shield at eaves, rakes, penetrations, valleys and two layers of 15# felt instead of a single layer of 30# felt. Shingles must be hand nailed.

#### Roofing

- Design snow load at 40 pounds per square foot minimum.

#### Warranties

#### ROOFING GUARANTEE -- CONTRACTOR

The Roofing Contractor guarantees, subject to terms and conditions herein, that during Guarantee Period he will at his own cost and expense, make or cause to be made repairs to or replacements of work as necessary to correct faulty and defective work, and as are necessary to maintain said work in watertight condition.

In addition to making the work watertight, the Roofing Contractor shall remove and/or repair blisters, ridges, flashings, splits and other irregularities which in the opinion of the Roofing Manufacturer's technical representative do not conform to acceptable roofing practices and conditions. These repairs shall be made prior to expiration of the two (2) year Guarantee Period and to the satisfaction of the Roofing Manufacturer's technical representative.

This Guarantee is made subject to the following terms and conditions:

- Specifically excluded from this Guarantee are damages to work and other parts of the building, and to building contents, caused by: 1) lightning; windstorm; b) fire; c) failure of substrate due to deflection, deterioration, and decomposition; d) faulty construction of

parapet walls, copings, chimneys, skylights, vents, equipment supports, and other edge conditions and penetrations of the work; and e) activity on roofing by others including construction contractors, maintenance personnel, other persons, and animals, whether authorized or unauthorized by Owner.

When work has been damaged by any of foregoing causes, Guarantee shall be null and void until such damage has been repaired by Roofing Contractor, and until cost and expense thereof has been paid by Owner or by another responsible party so designated.

- The Roofing Contractor is responsible for work covered by this Guarantee, but is not liable for consequential damages to building or building contents, resulting from leaks or faults or defects of work.
- During Guarantee Period, if Owner allows alteration of work by anyone other than the Roofing Contractor, including cutting, patching and maintenance in connection with penetrations, attachment of other work, and positioning of anything on roof, this Guarantee shall become null and void upon date of such alterations, but only to extent the work covered by this Guarantee. If the Owner engages the Roofing Contractor to perform said alterations, Guarantee shall not become null and void, unless the Roofing Contractor, prior to proceeding with the work, shall claim that said alterations would damage or deteriorate work, thereby reasonably justifying a limitation or termination of this Warranty.
- During the Guarantee Period, if the original use of roof is changed and it becomes used for, but was not originally specified for, a promenade, work deck, spray cooled surface, flooded basin, or other use or service more severe than originally specified, this Guarantee shall become null and void upon date of the change, but only to extent said change affects work covered by this Guarantee.
- The Owner shall promptly notify the Roofing Contractor of observed known or suspected leaks, defects or deterioration, and shall afford reasonable opportunity for the Roofing Contractor to inspect the work, and to examine evidence of such leaks, defects or deterioration.
- This Guarantee is recognized to be the only Guarantee of the Roofing Contractor on said work, and is in addition to Roofing Warranty furnished by the Roofing Manufacturer, and shall not operate to restrict or cut off Owner from other remedies and resources lawfully available to him in cases of roofing failure. Specifically, this Guarantee shall not operate to relieve the Roofing Contractor of responsibility for performance of original work in accordance with requirements of the Contract Documents, regardless of whether Contract was a contract directly with Owner or a Subcontractor with Owners' General Contractor.

#### ROOFING WARRANTY -- MANUFACTURER

A careful examination of the completed roof shall be made by the Manufacturer's representative to determine that required quantities of roofing materials have been used and that roofing materials have been applied in conformance with contract documents;

The Manufacturer warrants, subject to the limits stated herein, that its roofing when so applied is effectively watertight for a period of ten (10) years despite normal wear and tear by the elements, as well as warranting it against defects in workmanship or materials; which result in leaks.

The Manufacturer warrants to the Owner that, as set forth below, during a period of ten (10) years from the date of substantial completion of the single-ply roofing described below, the Manufacturer will at its own expense, make or cause to be made, any repairs that may be necessary, as a result of defects in workmanship or materials supplied by the Manufacturer which result in leaks or of normal wear and

tear by the elements which results in leaks, and will maintain said roof in water tight condition free from all leaks arising from such causes. For purposes of this Warranty, damage to the roof caused by hurricanes, lightning, tornadoes, gales, hailstorms or other unusual natural phenomena shall not be deemed to be "normal wear and tear by the elements".

**INCLUSIONS:** This Warranty does cover, and manufacturer shall be liable for the following:

- Roofing membrane, membrane flashings, metal flashings, mechanical fastening system, anchors, adhesives, seaming materials, slip sheets, fabrics, insulations, underlayments, and accessories furnished by the manufacturer as incorporated into the roof membrane system.
- Replacement of roof insulation and vapor barrier damaged by any leakage and/or failure of the roof membrane assembly;
- Repair of blisters, buckles, splits, breaks, cracks and seam failures in membrane system.

**EXCLUSIONS:** This Warranty does not cover, and Manufacturer shall not be liable for the following:

- Metal work, including metal counter flashings not a part of the roof membrane system, and such damage as may result from application of these materials;
- Any damage to the roof caused by structural defect in, or failure of, the building or defects in, or failure of, any structural roof deck, or other sheathing material, used as the base over which the roof and roof insulation is applied;
- Roof damage from special chemical conditions not disclosed to Manufacturer;
- Any damage to the building or contents thereof, except replacement of damaged roof insulation and vapor barrier as noted under "INCLUSIONS: above";
- Roof damage through use of materials after original installation not furnished by Manufacturer;
- Damage to the roof due to mechanical abrasion or abuse not caused by the Manufacturer.
- Reasonable care and maintenance will be the responsibility of the Owner.

**INSPECTION AND REPAIR:** During the term of this Warranty, the Manufacturer, its agents or employees, shall have free access to the roof during regular business hours. Upon written notice by the Owner to the Manufacturer within four days of the discovery of any leaks in the roofing system, or need of repair of roof, the Manufacturer shall have ten (10) days to inspect the roof. Following such inspection:

- The Manufacturer, at its own expense shall make such repairs to the roof as area required by the Warranty.
- In case Owner or his agent has notified the Manufacturer in writing that repairs are required and such repairs are not covered by the Warranty (including repairs required by Owner's alteration, extension or addition to the roof) the Owner, after having obtained the Manufacturer's consent in writing, shall make or cause to be made, such repairs at Owner's expense in accordance with specifications and procedures as established by the Manufacturer and this Warranty shall remain in effect for the unexpired portion of its original term. If the Owner fails to obtain authorization from the Manufacturer or if repairs are made by anyone other than the Manufacturer's authorized designee, this Warranty with respect to such area shall be automatically terminated.
- In the event the (1) Owner notifies the Manufacturer and has confirmed in writing the need of repair of roof and (2) the Manufacturer is unable to promptly inspect and repair same, and (3) an emergency condition exists which requires prompt repair in order to avoid substantial

damage to the Owner, then the Owner may make such temporary repairs as may be essential, and any such action shall not be a breach of the provision of this Warranty. The Owner will bear emergency repair expenses.

**INSPECTION SERVICE:** The Manufacturer agrees to reinspect the completed roof not earlier than 12 nor later than 24 months after completion of the roofing, and if it is determined that there are leaks in the roofing, then the Manufacturer shall make, or cause to be made at its own expense, such repairs as are necessary in the opinion of the Manufacturer, to assure watertight integrity of the roof within the scope of its responsibility under the terms of this Warranty.

## **DIVISION 8 - Doors and Door Hardware**

### Wood Doors

- Unless otherwise specified, interior doors will match existing or will be solid core birch.

### Metal Doors and Frames

- Exterior door frames to be hot-dipped galvanized, bolted to structure and painted.
- Interior doors to be supported with double, full-height studs on either side. They will not be galvanized or grouted.
- All doors shall be minimum 3'-0".

### Special Doors

- Overhead Coiling Doors--Doors must use motorized opening and resetting features to allow them to be placed in service after testing without any additional tools.

### Hardware

- All Locks and Cylinders will be Schlage.
- Keying will be as directed by University of Idaho Facilities Key Shop.
- All permanent keys will be shipped direct from the factory by registered mail to the Key Shop Access Coordinator at Facilities, University of Idaho.
- All keys, including blanks, shall be stamped, "Prop. U of I - Do Not Dup." Keys shall be blank on one side for special stamping by owner. Provide keys of nickel silver only. Schlage 35-131
- All Cylinders provided "1 or 0" bitted, all keying to be done by University of Idaho Key Shop.
- Full size removable cores to be used on all doors with exit devices.
- All Hardware finishes to be approved by the University of Idaho.

### Hanging Devices

- All door hinges – Ives 5BB1HW 5 Knuckle Ball Bearing –, Non–rising and Non-removable pins.

### Securing Devices

- All locksets and cylinders shall be Schlage,
- L-Series Mortise Locks
  - Office L9050 P
  - Classroom L9070 P
  - Cust/Mech/Storage L9080 P
  - Restroom/ L9040
  - Passage L9010
- ND Series Cylindrical Locks

Office	ND50PD
Classroom	ND70PD
Cust/Mech/Storage	ND 80 PD
Restroom	ND40D
Passage	ND10S

- Cylinders – Schlage - Keyed to University of Idaho restricted keying specifications.
- No double cylinders shall be installed on any doors.

#### Exit Devices

- Exit devices shall be as follows:  
Von Duprin 99 & 33 Series  
**USE RIM EXIT DEVICES ONLY:** Vertical rod devices must be pre-approved by the University of Idaho.

#### Closing Devices

- Mechanical Closers            LCN 4000 Series Surface Mount.  
Note: use closer of sizes recommended by manufacturer unless a larger size is specified.  
Adjust closer to comply with applicable codes. Use Parallel Extra Duty Arms EDA

□

- Auto Operators            LCN    4822 Auto Equalizer

#### Stops and Holders

- Overhead Stops            Glynn Johnson            90 & 100 Series

#### Software

- Access Control Wireless    CBORD            See below
- Access Control Hardwired CBORD See below
- **All Access Control equipment and devices to be provided by University of Idaho Facilities Access Control.**

### Approved Manufacturers

#### Item Manufacturer

#### Approved Equal/Substitute

Hinges – Ives	Stanley
Continuous Hinges – Ives	Pemko
Locksets – Schlage	No Sub
Cylinders – Schlage	No Sub
Exit Devices – Von Duprin	No Sub

Closers – LCN	No Sub
Push/Pull Plates – Ives	Trimco
Push/Pull Bars – Ives	Trimco
Overhead Stops – Glynn Johnson	No sub
Door Stops – Ives	No Sub
Flush Bolts – Ives	No Sub
Threshold & Gasketing	National Guard
Access Control Software - CBORD	No Sub

#### Storefront Doors

- No narrow stiles on aluminum frames.
- Locksets to be Schlage L-series, extra heavy duty, finish to match rest of building or
  - Hinges: for aluminum storefronts, continuous hinges by Pemko.
- Removable mullions: Von Duprin keyed removable
- Exit Devices: Von Duprin 99 with 994L break away trim
- ADA opener: LCN 4822 pneumatic

#### Glass & Glazing

- Specify Low-E, Argon-filled glazing.



# DIVISION 9 - FINISHES

## Gypsum Wallboard

- Finish will be smooth-wall throughout.

## Acoustical Treatment

- Acoustical ceilings will be white, lay-in, natural or machine-fissured, flat or tegular tile in a 2' x 2' grid pattern.

## Carpeting

- Seaming diagrams shall be submitted and approved.

## Noxious Installations

- Adequate isolation and ventilation must be employed when installing carpet, tile, vinyl goods, laminate, or any other product requiring adhesive. Building occupants likely to be impacted must be given one week notice. Doors to occupied spaces must be closed, and other openings must be sealed with plastic sheeting. At a minimum, prior to the start of work, positive mechanical ventilation must be established with a fan drawing air from the work area to the atmosphere. The ventilation system must allow for sufficient make-up air, and the air flow must not utilize corridors or other routes that would impact building users. The U of I Environmental Health and Safety Office may monitor the air quality during the installation, and may recommend that additional measures are necessary. Work must stop until these measures are in place.

## Painting

- Standard interior spec will be eggshell, latex-enamel.
- UI standard interior color is Columbia Off-White, commonly known as COW. This is a special mix prepared by the local Columbia distributor. However, Columbia is not a proprietary brand. Other manufacturers must custom mix paint to match COW.
- All handrails and similar exterior metals shall be painted Bronzestone unless otherwise selected on the project color-board.
- Bike racks shall be black.
- Bronzestone specification shall be Gavlon 510-0546LF - Brown, or equal.
- Curbs and hardscape related to universal access parking spaces shall be universal blue. All other no-parking areas such as fire lanes, fire hydrant zones, crosswalk and intersections buffers shall be denoted by a yellow curb.
- Fire hydrants may be yellow or red.
- Do not paint exterior concrete, concrete floors, or pre-cast.

# DIVISION 10 - SPECIALTIES

## Toilet Room Accessories

### General Notes

- Carefully examine sight lines into toilet rooms.
- Position urinals to avoid the need for urinal partitions.
- Specify wall-hung, white, elongated toilets with carriers, flushometers, and open-front seats with no lids. (In Div 15 also)
- Specify wall-hung, white lavatories with factory mounting brackets and no carriers. Selfrimming, countertop lavs may be considered if ADA-compliant location of soap dispenser is satisfactorily resolved. (In Div 15 also)
- Urinals shall be washdown or blowout type.(in Div 15 also)
- All stainless toilet room accessories will be a **Bobrick proprietary** specification.
- All stainless steel accessories shall be brushed satin finish.

- At the principal toilet room location, or where required by ADA code, a third, unisex, family or assisted, single-stall toilet room will be provided. This requirement will be determined in consultation with the UI Project Manager, and should be considered on all major capital projects and buildings to which the general public is invited. (In Div 15 also)
- The use of hands-free, electronic flushometers and lavatory faucets is encouraged. (In Div 15 also)

#### Toilet Partitions

- Partitions may be plastic laminate, enameled steel, or phenolic.
- Partitions must be anchored to floor and overhead structure.
- Partitions must be provided with coat hooks.
- Partitions must have self-closing hinges and ADA-compliant latch assemblies (a lever operator which does not require the use of a thumb).

#### Toilet Paper Dispensers

- Dispensers shall be through-the-partition type for adjoining stalls, and shall hold two standard rounds rolls. Bobrick model number **B-3570** Classic Series Toilet Tissue Dispenser and Sanitary Napkin Disposal.
- Dispensers shall be fully-recessed for any stall which adjoins a wall. Bobrick model number **B-35704**.

#### Towel Dispensers

- Towel dispensers shall be fully or semi recessed with integral waste receptacle. Dispensers shall accommodate round paper towel rolls and operate with a ratcheting lever. Bobrick model number **B-39601** Classic Series Roll Towel and Waste Receptacle recessed, or **B-39619** surface mount.

#### Sanitary Napkin Dispenser

- Napkin dispensers (vending machine) shall accommodate both napkins and tampons, and shall have an adjustable price setting. Bobrick model number **B-43500** Contura Series Sanitary Napkin and Tampon Vendor recessed, or **B-435009** surface mount.

#### Sanitary Napkin Receptacles

- Napkin receptacles shall be through-the partition type for adjoining stalls or fully-recessed for any stall which adjoins a wall. Bobrick model numbers **B-3570**, **B-357** or **B-35704**.

#### Soap Dispensers

- Soap dispensers shall be designed for use with liquid soap. They shall be wall-mounted and operate with a plunger or lever on the bottom of the unit. Under-counter pump types shall not be used. Dispensers shall be mounted to ensure that soap drips into the wallhung lavatory or the countertop when a self-rimming sink is used. Wall-mounted dispensers shall be Bobrick model number **B-4063** Contura Series recessed or **B-4112** surface mount. Lighter weight plastic dispensers may be mounted to the mirror with double-stick tape if necessary to comply with ADA requirements. Specification approval of brand and model must be obtained from the UI, Facilities, Building Services Manager.

#### Mirrors

- Mirrors shall be plate glass with stainless steel frames, and shall be as large as practical.

#### Book Shelf

- Each toilet room shall be equipped with a book shelf as close as practical to the door. These may be constructed of wood, steel, stainless steel or plastic laminate.

#### Coat hooks

- Each toilet room shall be equipped with a minimum of three coat hooks, in addition to those in the toilet stalls, positioned as close as practical to the door.

#### Grab Bars

- All universal access toilet stalls shall be provide with ADA-compliant, welded and ground, stainless steel grab bars. Bobrick model number **B-6816 or B-68137** concealed mounting.

#### Electric Hand Dryers

- At the principal toilet room locations in all major capital projects, or as directed by the UI Project Manager, a 208V electric hand dryer shall be provided in each toilet room. Electric hand dryers shall be Bobrick **B-748** Eclipse.

#### Baby Changing Stations

- At the principal toilet room locations in all major capital projects, or as directed by the UI Project Manager, a baby changing station shall be provided in each toilet room. Where a unisex, family/assisted toilet room has been provided, a baby changing station shall be specified in this toilet room in lieu of one each in the men's and women's toilet rooms. The baby changing station shall be a Bobrick model number **B-2210** surface mount Diaper Changing Station.
- A coat hook shall be provided at each baby changing station.

#### Visual Display Boards

- In offices, classrooms and other areas where applicable, dry marker boards shall be specified in lieu of chalkboards.
- Examine wall and floor treatment around and in front of boards for ease of cleaning.

#### Exterior Wall Louvers

- Louvers shall be black or bronzetone, anodized aluminum (not painted).

#### Wall and Corner Guards

- All drywall corners shall have corner guards.

#### Identifying Devices

- Room numbering sequence: Start with the lowest possible number (100, 200, etc.) for the corridors. Then, starting at one end, even numbered rooms will be on one side and odd numbers on the other. Departmental suites will have one base number. Offices within the suite will be identified with letter suffixes affixed to that base number. Every effort must be made to coordinate with the appropriate Facilities AES personnel to determine the final UI room numbering sequence before the final bid documents are printed. Do not enter room numbers on the drawings or fill in such things as room finish schedules until the UI numbers are established.
- Campus standard signage background shall be dark (burnt) red, equal to Gravoply II Brown 240-226 as manufactured by New Hermes, Inc. with white lettering; tactile where required by ADA codes.
- The interior signage standards contained in this section are not required to the exclusion of all other types and designs. Signage styles and tastes continue to evolve. And, there are signature building projects which dictate a higher level of design. Therefore, these standards will indicate the types (classes) of signs that would be expected, the data that would be included on the signs, and they will provide a minimum statement of quality. It is expected that approximately 75% of the projects on campus will utilize these standards. However, exceptions can and should be made in particular circumstances through agreement between the consulting architect and the UI Project Manager.
- See Volume II for signage spec.

## Fire Protection Specialties

- Communications devices installed in elevators and at Areas of Rescue Assistance shall be Talk-A-Phone Model ETP-100EB, flush mounted, ADA compliant hands-free emergency phone - distributed by Quality Elevator Products, Inc. - Chicago - 1-(800)-222-3688. This is a proprietary spec with no equal.

## Fire Extinguishers & Cabinets

- Fire Extinguishers
  - Acceptable types for installation include:
    - Multi-purpose (ammonium phosphate) dry chemical types for general use areas of buildings (office/classroom areas, corridors, computer cluster sites and storage rooms). Minimum 5 lb. size. Minimum U.L. rating 2A:40BC.
    - Water units for general use areas where paper or wood are the primary combustibles present. Stainless steel cylinder with rubber boot. Minimum U.L. rating 2A. **NOTE: If electrical equipment, breaker panels or flammable liquids are present, this unit is inappropriate.**
    - Carbon Dioxide for use in mechanical and electrical rooms and areas where storage of flammable liquids are present (labs, warehouses, etc.). DOT 3A spun steel or aluminum cylinder with diffuser hose and horn. Manufacture date stamped in shoulder of cylinder must be within 1 year of installation. Minimum U.L. rating 20:BC.
    - Regular Dry Chemical (sodium bicarbonate) for use in food preparation areas. Minimum U.L. rating 4A:60BC. **NOTE: An additional unit is required in kitchens for coverage of fires unrelated to the immediate cooking area (storage areas, electrical controls, etc.)**
    - Anti-freeze - for use in unheated areas where the predominant fuel is class A (paper, textiles, grain, wood, etc.) such as barns, hay storage, cattle sheds. Minimum U.L. rating 2A. **NOTE: For unheated areas with electrical and/or flammable liquid, the addition of a Carbon Dioxide unit is recommended.**
    - Approved Manufacturers are Amerx and General.
- Fire Extinguisher Cabinets
  - Semi-recessed.
  - Plexi-glass or glass paneled door.
  - Pressure or magnetic latch - **no key locks.**
  - Door stencil "Fire Extinguisher" in red on white or white on black. ▪ Sized to fit required extinguisher for specific location.
- Fire hose racks only when required by code
  - Pin-lock type racks with minimum 75' hose capacity.
  - Baked enameled red finish steel with label "Fire Hose - For Use by Occupants".
  - Satin brass or chrome finished valve - 1½" standard.
  - Valves, fittings, hose and nozzle to have national standard thread.
  - Nozzles to be fully adjustable fog-stream. Complete with rubber bumper and washers; lexan plastic or satin finish brass.
  - Fire hose to be 1½" with rocker lug fittings. Hose to be lined, polyester-nylon with tested pressure of 250psi minimum. Lining to be rubber or synthetic blend with no seams. Test and operating pressures to be stenciled on exterior of hose. Fittings - brass or satin finish aluminum.

# DIVISION 11 -

## EQUIPMENT

### Fume Hoods (Metal)

- No auxiliary air fume hoods shall be allowed.
- In constant air volume situations, fume hoods shall be of the by-pass type.
- Face velocity of fume hoods shall be 100 feet per minute.
- Fume hoods shall be properly placed in relation to doorways, main aisle ways, and supply air/exhaust air vents.

### Owner Furnished Equipment

- The University will sometimes pre-order a piece of equipment, such as a chiller or certain furnishings, which may be expected to have a long delivery time. This is frequently done prior to bidding the project in which the equipment will be installed.
- The University will pay for the equipment and order it FOB job-site. The University will then advise all of the prospective bidders of the exact cost of the owner-furnished equipment. Immediately upon award of the contract to the successful bidder, the equipment order will be consigned to the contractor.
- The contractor will be responsible for, but not limited to, the following:
  - Receipt of materials including unloading, stacking and storing
  - Any freight claims for shipping damage or loss
  - Coordination with supplier in the event of mis-order or shortage
  - Assembling factory literature and instructions for O&M Manuals
  - Performing all material and labor warranty work
  - All costs related to the above items shall be included in the base bid
- In lieu of Sales Tax, a Use Tax must be paid by the contractor on the value of the ownerfurnished equipment. Immediately upon award of the contract, the contractor shall forward payment to the Idaho State Tax Commission in the amount of 5% of the cost of the equipment. Proof of this transaction is required by the University. The Use Tax must be included in the bid and shall not be shown as a separate line item.
- Equipment delivery is anticipated within the prescribed schedule window. If an extension becomes necessary, this will be negotiated between the University and the contractor. This Change Order will be a time extension only, and will be a no-cost change.

## FURNISHINGS

### Shelving

- Except for special circumstances, custom shelving will not be a part of the program. However, one wall of every office, lab and building service room will be provided with full-height shelf standards (only) attached to each stud as a part of the project.
- Shelving used for chemical storage must have a lip, minimum of ½" high, installed along the front edge.

### Window Treatment

- Blinds shall be 1" mini blinds, Levelor, Del Mar or equal.
- No window treatment film shall be applied to the washable surfaces of the windows.

### Entry Grating

- Sufficient space should be allowed in lobbies for recessed matting.

### Classroom Furnishings

- See Volume II for Classroom Design Criteria

# DIVISION 12 -

## SPECIAL CONSTRUCTION

### Special Purpose Rooms

- All new buildings shall have a Building Materials Storage Room to store the contracted overages and other building-specific materials. This room will be assigned to Facilities Maintenance and Operation and is not net assignable departmental space. It will be at least 100 square feet. It will be furnished with several outlets and shelf standards along one entire wall.
- All new and renovated facilities will have a Custodial Closet with a mop sink on each floor; centrally located as much as possible. These should be a minimum of 75 square feet. Each should be provided with a mop sink, several outlets and shelf standards along one entire wall.
- All new buildings (only) will have a Grounds Locker with a ventilated exterior door; no interior access. This should be approximately 50 square feet. It will be used for storage of a mower, hoses and grounds tools.
- An HVAC Filter Storage Room will be provided in all new and renovated facilities. This space will be large enough to store one complete change of filters, it shall be on the same level as the mechanical room which contains the air-handling equipment, it should be accessible by elevator, and it cannot merely be a space designated within the mechanical room because of code restrictions. It must be separate construction.
- Major capital facilities shall be designed to include a mail room. For smaller projects and renovations appropriate accommodations may be designed within a mutually agreeable space.
- Every building will be provided with a telecommunications and telephone room on each floor. Size and location to be determined during programming with U of I ITS department. Rooms will have suitable conduit access and one or more wall surfaces will be covered with fire-rated plywood backing. These telecom rooms shall be stacked on multiple floors.
- Make every effort to design small recycling alcoves in the corridor of each floor. (For additional solid waste and recycling requirements, see Division 2).

### Internal Building Security

- Offices and classrooms have special security needs (computers, AV equipment, etc). Walls that adjoin corridors or other public access spaces must extend to the overhead structure.

### Space Configuration

- In all new and substantially-renovated buildings, provide space for vending machines (number and type to be determined during programming). These should not be located in the "monumental" lobby. Provide power, water and drain as necessary. Provide conduit for future debit card use. Provide adequate and attractive method of recycling cans.

### Custodial and Maintenance Concerns

- Avoid nooks and crannies in corridors or lobbies. Corridors should allow for a clean sweep by industrial size cleaning machines.
- Water coolers and similar equipment should be wall-hung to allow for machine cleaning of floors.
- Avoid white grout or unsealed grouting. All should be pigmented and sealed as soon as possible following placement.
- Avoid mixing floorings, i.e. carpet and tile, where there are no clear dividing features.
- Avoid carpeting in high traffic areas such as corridors and classrooms.
- Do not specify resilient tile floors in toilet rooms or stairways.
- Ledges should be avoided.
- Exclusive of any acoustical treatment and special conditions, wall should be washable, with non-porous surfaces.

## **DIVISION 13 -**

### **Solid Waste and Recycling**

- All new and renovated facilities will be provided with a screened exterior concrete surface for (3) 1-yard recycling bins. Smaller recycling alcoves in the hallways of each floor would be convenient. (see Division 2 for details).

#### Hazardous Waste

- The handling of chemical, nuclear and other hazardous waste is governed by laboratory use regulations promulgated by the U of I Office of Environmental Health and Safety. Acid waste piping and chemical neutralization systems will be installed where required by the Clean Water Act. However, the Safety Office shall be contacted before starting the design on any hazardous waste system.

#### Seismic Review and Modification

- Seismic review and analysis of existing structures are not addressed in the current building codes. These codes are intended for new construction where the designer, building official, and contractor have control on the quality of the building. The strengthening of existing structures and structural modifications are limited by economic feasibility of such work. Documents such as ATC-22, the Uniform Code for Building Conservation (UCBC) attempt to provide a minimum level of performance for existing buildings during a seismic event. This minimum level is the prevention of total collapse of the structure. If the occupants can exit the building during or after an earthquake, the building has performed as required. Because the emphasis is on preventing total collapse, the contents of the building and the building itself may not be serviceable after an earthquake. Evaluation and review should be based on this premise. Total compliance with the current building codes may not be feasible since many portions of these structures cannot meet minimum requirements of detailing and strength without significant reconstruction. Review the lateral load resisting system with an eye towards the intended new uses and programming changes that will most likely affect the existing structural system.



# DIVISION 14 - CONVEYING SYSTEMS

## General Provisions

- All elevators and all Areas of Rescue Assistance (ARA) will be provided with handicap-accessible phones. The elevator phone will be programmed by the UI Safety Office to dial the Moscow Fire Department. The phones at the ARA's will dial only to the building fire alarm annunciator at the front door or designated fire department response location. (See Division 10 for phone spec).
- To satisfy the conflicting requirements of the elevator and building codes, a fire sprinkler head shall be installed in the top of the elevator shaft, in addition to the required detection devices. This sprinkler must be supplied by a pipe outside of the shaft, which is controlled by a shunttrip valve. The alarm and sprinkler devices must be serviceable through a rated access door mounted as high as possible in the side of the shaft. This access door must be provided with a suitable work platform, which incorporates adjoining structures or an attached ladder, and a constructed platform.
- Specifications must require a local rep for emergency service response within 30 minutes during the first year warranty period.
- Although not required by code, consideration should be given to sizing one elevator in each building large enough to accommodate an emergency services gurney.

# DIVISION 15 - MECHANICAL

## Mechanical General Provisions

- At the principal toilet room location, or where required by ADA code, a third, unisex, family or assisted, single-stall toilet room will be provided. This requirement will be determined in consultation with the UI Project Manager, and should be considered on all major capital projects and buildings to which the general public is invited.
- Cooling will be by means of absorption equipment. Except for special circumstances, cooling water must be supplied from remote central plant locations.

## Domestic Water System

- The campus domestic water distribution system is a separate utility owned and operated by the U of I. The Facilities Maintenance and Operations Water System Operator is the governing authority.
- U of I Facilities Maintenance and Operations has adopted the American Water Works Association (AWWA) Manual. All work on the campus water system or any backflow prevention requirements will be in accordance with the AWWA Manual.
- There are approximately 8 points of interconnection between the UI water system and the City of Moscow water system. These are normally closed, but may be opened to provide backup for either system in an emergency.
- Contractors may connect to UI fire hydrants for filling water trucks and for other high-volume uses. Such connections must be approved in advance by the UI Water System Coordinator. Flushing may be required prior to making the connection. Any connection to a fire hydrant must be made through an approved, reduced-pressure (RP) backflow prevention device.

## Basic Mechanical Materials and Methods

- Two reduced-pressure (RP) backflow preventers must be installed in a parallel assembly on both the domestic water and fire protection building services. Base spec on Watts.

## Valves

- Building water services shall have a shut-off valve and roadbox at the main as well as a building shut-off valve.
- All valves 2" and smaller should be ball valves with stainless steel balls.

## Fire Protection System

- Sprinkler Systems -- All areas of all new and renovated structures shall have a fire sprinkler system.
  - Wet-pipe systems
    - Wet-pipe systems to have an inspectors test valve with 1' piping and ½" orifice at most remote location from control valves to simulate a single head operation.
    - All flow/alarm devices to initiate building fire alarm system and shall be either flowswitch or pressure-switch type.
  - Dry-pipe systems
    - Dry-pipe systems to have inspectors test valve located at highest point in the system with ½" orifice and view port.
    - All flow alarm devices to initiate building fire alarm system and shall be pressure switch type.
    - All dry-pipe systems shall utilize an air-maintenance device in the air piping to maintain proper flow rates of air.
    - All air supplies shall be furnished by properly sized floor mounted, dedicated air compressor.

- Drains -- All drains shall terminate outside the building to either a drain or concrete pad. All secondary drains shall be piped to suitable floor drain of minimum 2" pipe size. **No drains shall be installed to terminate at or in a drip cup.**
  - All sprinkler systems shall have an exterior bell or horn to indicate water flow alarms.
  - All valves, backflow preventers, post indicators and zone control valves shall have connections to the building fire alarm to monitor their open/closed status. Tamper switches shall not be connected to same monitor circuit as flow devices.
- Fire Suppression Systems
  - Where required by code, approved local application and total flooding systems can include dry chemical, liquid suppressant (water mist systems), aqueous film forming foam (AFFF), high expansion foam (HI-EX), Carbon Dioxide and other compressed gas systems.
  - All fire suppression systems should, during activation, initiate the building general fire alarm system for evacuation.
  - Approved manufacturers: Ansul, Kidde, Fenwal, or Pyrotronics
- Fire Pumps
  - A manifold shall be supplied and routed to a suitable discharge point (storm sewer, etc.) to allow for the required performance and capacity testing without the need for additional equipment. Manifold shall be provided with multiple 2½" discharge lines, each with isolation valve and permanently mounted pitot gauge to allow for incremental flow testing up to and including 150% rated capacity.
- Standpipe
  - Dry pipe (class I)
    - Minimum size outlets 2½".
    - NST threading required.
  - Wet standpipes (class II)
    - All outlets provided with 1½" NST valve for hose rack connections.

#### Plumbing Piping Systems

- Acid waste piping shall be Labline/Enfield or equal; not Fuseal, glass or Duriron.
- No "constructed" fittings permitted (mitering of weld fittings, use of tee-pullers on copper mains, no soldering of trap primers to flush valve tailpiece)
- Chromate plating, such as Erico or equal, is an acceptable alternate for flash copper plating on plumbing hangers and supports.

#### Plumbing Fixtures and Trim

- Mop sinks to be floor-mounted, fiberglass, wall-mount faucet with vacuum breaker and mop bucket support - Fiat or equal. Specify splash plates on the walls around the sink.
- Elongated white toilets with white open front seat, no lid, wall -mount with carrier.
- Wall-hung, white lavatories with factory mounting brackets and no carriers. Self-rimming, countertop lavs may be considered if ADA-compliant location of soap dispenser is satisfactorily resolved.
- Urinals shall be washdown or blowout type.
- Examine sight lines into toilet rooms and position urinals to avoid the need for urinal partitions.
- The use of hands-free electronic flushometers and lavatory faucets is encouraged. If specified, these should be hard-wired and not battery powered.
- Base spec on Delta commercial faucets (stainless ball) with ADA approved lever handles.
- Include vacuum breakers on all laboratory faucets (in addition to custodial sinks and other fixtures where required by code).
- Emergency eye wash stations shall be installed in laboratories and other areas required by code. In addition, they shall be installed where chemicals or hazardous materials may be used, such as Facilities shops and custodial closets. Emergency eye wash and showers shall be supplied with cold water only. The moderate temperature of the university's domestic

- water system precludes the need for blended water. Do not specify blending valves. All emergency stations should be installed with isolation valves with locking handles.
- Applicable codes require a minimum flow of 20 gpm from an emergency shower. The static pressure in the UI domestic water system combined with the required 1" supply often results in flows exceeding 60 gpm. All emergency shower supplies must be provided with a flow restrictor with a maximum rate of 30 gpm.
  - The moderate temperature of the university's water system dictates the need for coolers rather than drinking fountains wherever possible. Refrigerated coolers shall be a high-low, ADAcompliant pair, and they shall not be fully-recessed. The water service, drain and compressor shall be accessible behind an access cover, in front of the wall.
  - Certification of lead free water coolers and drinking fountains required on submittal. Must comply with ANSI/NSF 61 standards.

#### Plumbing Equipment

- All floor drain traps must have an integral trap primer as per the Uniform Plumbing Code. Trap primers shall be supplied by one or more manifolded valve-and-timeclock assemblies wherever possible. Avoid trap primers that are supplied by any device that operates on differential pressure or flow rate.
- Base flushometer spec on Sloan.
- Building meters are required on the following utilities: electricity, domestic water, chilled water, and condensate. Care must be taken to locate the condensate meter to ensure full flow through the meter. Secondary meters may be required where multiple uses are anticipated, such as charge-back or for-profit operations.

#### Water Filtration

- All new and substantially-renovated buildings will have a complete building water filtration system ahead of any branch lines (except hose bibs) on the building water service. At the least, this will consist of a mechanical (sand or other) filter. A charcoal filter may be required as well.

#### Lab Water

- For biological research and other similar facilities with a need for a large amount of pure water, glass washers, etc., a complete building reverse osmosis (RO), deionized water system may be specified. Refer to the Volume II for the requirements of this system. For all other applications, utilize laboratory-specific RO packaged systems only. (Volume II)

#### Non-Potable Labels

- All lab-water and other non-potable water systems shall have warning labels affixed. These labels shall be 3/4" x 2" minimum, yellow with black lettering, self-adhering stickers with the words "Warning - Non-Potable Water." Each faucet or other outlet must be labeled, and any other distribution system piping within a building must be labeled every 10'. In addition, one or more signs shall be mounted in highly visible locations within the lab, as close as possible to the non-potable outlets. These should be yellow signs with black lettering, approximately 6" high by 8" wide, with text as per above.

#### Pressure Vessels

- A/E shall notify UI Environmental Health and Safety Office when any pressure vessel is installed. They must be added (by EH&S) to the State inspection program.

#### Fire Hydrants

- Fire hydrants may be yellow or red.

#### Gas Installation Inspection

- The governing authority for natural gas piping installation in UI buildings is Avista Utilities. The contractor shall coordinate all testing and inspection through Avista.

#### Heating, Ventilating & Air Conditioning

- Ceiling diffusers should be easily removable for cleaning purposes. Area surrounding diffusers should be washable, non-porous surfaces. If washable, non-porous ceilings are not installed, then diffusers should be skirted with a surrounding washable collar.

#### Hydronic Piping Systems and Equipment

- Do not spec gasketed systems (Gruvloc or similar) for systems containing glycol.
- All low pressure steam and condensate fittings 2" and smaller, shall be 125# cast iron fittings which conform to the American Society for Testing and Materials Specification (ASTM) A126, Class B. 2½" and above shall be welded. All steam and condensate pipe will be schedule 40 black unless specified otherwise.
- Grade 5 bolts will be used on all flanges. Soft (A307) bolts may not be used.
- Spiral-wound metal and metal-reinforced gaskets shall be used in all flanges on steam and condensate systems.
- Butterfly valves used on chilled water piping and heat recovery piping shall be lug type. Wafer style butterfly valves are not acceptable.

#### Steam and Condensate Piping Systems

- Campus has medium pressure distribution system (60#). Entering steam station required. Everything within the building must operate on 15# steam.
- All condensate must be pumped back to the Power Plant.
- Utilize steam humidifiers.

#### Heat Recovery Unit

- Layout system to take maximum advantage of heat recovery systems (building exhaust and fume hoods).

#### Air Handling

- All fans, blowers, air-handlers and rotating pieces of equipment will be provided with fan-inlet guards on each fan (return and supply) and belt guards as part of the contract. Specify this manufacturer's option, or specify constructed guards if OEM units are not available. At the time power is connected and the unit is capable of operation, the motor will be locked out or hasps and locks will be installed on the air-handler case. These will be UI padlocks, not contractor locks, and the unit will not be operated until the guards are in place.

#### Motors and Motor Controllers

- All non-fractional equipment motors shall be 480V, 3-phase.
- Variable Frequency Drives (VFD) shall be installed on all motors 5 horsepower and above. VFD's may be installed on selected smaller motors for specific purposes at the direction of the project design engineer. All motors controlled by a VFD shall be rated for use with a VFD, and must meet the requirement of NEMA MG-1 Part 31.40.4.2.
- VFD's shall be Siemens or ABB only.

#### Air Inlets and Outlets

- The placement of the supply air vents and exhaust air vents/fume hood exhausts shall include consideration of the supply air and exhaust air vents/fume hood exhausts from other existing buildings and the prevailing wind direction.
- Fume hood exhausts shall discharge 10' above the adjacent roof, a minimum of 100' from the nearest air intake, with a discharge velocity of at least 3000 feet per minute.

#### Controls

- HVAC controls system will be **Siemens only - proprietary**.
- The project budget must include a line item for adding the new controls system to the UI/Siemens maintenance agreement (approximately \$4,500 per panel).

- The sequence of operations, material and equipment types, method of control, interconnection to ancillary systems and complete building management controls program is contained in a separate document jointly developed by Siemens and the U of I. Consulting engineers are instructed to work directly with the UI Project Manager to obtain the information necessary for inclusion in the project specification manual.

## COMMISSIONING

Commissioning deals with those elements of the building that have moving parts or interrelated operating systems, as opposed to the static elements of the building. The ever-increasing level of sophistication and automation that is being designed into current facilities has resulted in systems that are difficult for maintenance personnel to trouble-shoot. And, most automated building systems are seldom completely tied together in their final operational mode until late in a project, often after substantial completion. If they do not function as intended, the owner by default is required to make the components work. To avoid this circumstance the U of I requires all new and renovated facilities to be commissioned.

**Division of Public Works Process:** The Idaho Division of Public Works (DPW) requires commissioning of all state-funded projects over 2 million dollars in scope. A Commissioning Agent must be engaged by the Project Architect as part of the A/E team. The commissioning is largely limited to mechanical work (Division 15). Some electrical elements (Division 16) may be negotiated. Contact the Division of Public Works for the complete details of this process.

**Enhanced Scope Process:** The University of Idaho requires commissioning of all UI-managed projects, with the scope of the process determined by the complexity of the project. The consultants are required to enhance the specifications to include the necessary additional testing requirements. Following completion of the project, and immediately prior to the Substantial Completion inspection, a full building, functional performance test will be performed. This will be 96 hours in duration, and all contractors, subcontractors, factory reps and consulting engineers will be continually in attendance.

This level of commissioning responsibility is beyond the scope of work expectations that architects, engineers and contractors have assumed in the past. For that reason, the University's design criteria and construction documents must clearly state the expectations of the U of I, thereby enabling the consultants and contractors to consider commissioning in their fee negotiations and bids. In addition, the commissioning process must be a separate line item in any schedule produced by both the A/E consultants and the contractor.

It is essential that all of the components and related systems be proven operational before the University occupies any portion of the building or assumes responsibility for its operation. The U of I expects the appropriate consultants to certify that condition. And, the certification must be provided before the owner's training takes place and before the contractor calls for a Substantial Completion inspection.

The consultant(s) will witness, on site, the operation of all required components and system operation. The consultant will then provide the owner with an executed Commissioning Certificate.

**University Commissioning Team Process:** The University has developed a team of consultants who commission buildings independent of the consultants engaged on any given project. If this process is used, the University Commissioning Team will generate the necessary specification language that must be included in the contract documents. They will generate a matrix of responsibilities that must be included in the contract documents. This matrix will outline the responsibilities of each consultant, contractor, commissioning team member and the owner's representatives. And, the University Commissioning Team will generate the Functional Performance Test Sheets that will document the testing throughout the project.

The Facilities, Architectural and Engineering Services Project Manager (PM) will select the commissioning method to be used for each specific project. The consulting A/E team must coordinate with the PM and pursue the project based on the process which is determined to be appropriate for the job. Regardless of the process utilized, commissioning is a component of the project budget.

The University of Idaho requires commissioning certification on the following:

**INDIVIDUAL COMPONENTS:**

- \* Steam and hot water generators
- \* Heat exchangers
- \* Cabinet heaters and fan-coil units
- \* Air handlers
- \* Variable air volume boxes and terminal devices
- \* Motorized dampers, including face-and-bypass
- \* Motorized control valves and steam stations
- \* Pressure reducing valves
- \* Pumps
- \* Humidifiers
- \* Condensate traps
- \* Transformers
- \* Emergency generators

**INTERRELATED SYSTEMS:**

- \* Building management control systems
- \* Variable frequency drives and starters
- \* Acid neutralization systems
- \* Fire alarm and detection systems
- \* Fire sprinkler systems
- \* Security systems
- \* Automated electrical switching systems
- \* Lighting controls
- \* Elevator operation, including DLIS testing
- \* Elevator smoke doors

**Test and Balance (TAB)**

- The Test and Balance (TAB) contract shall be held directly with the University of Idaho or with a third-party commissioning agent if applicable.

## **DIVISION 16 - ELECTRICAL**

**General Provisions**

- The U of I has utility status and maintains its own 13,200V distribution system. All medium voltage connections (600V and under) will be done by the contractor as part of the contract. All 13.2 connections will be done by the U of I, contracted separately. The cost of the 13.2 work will be included in the project budget.

- Building meters are required on the following utilities: electricity, domestic water, chilled water and condensate. Secondary meters may be required where multiple uses are anticipated such as charge-back or for-profit operations.
- The U of I has adopted a Hazardous Energy Control (Lock Out/Tag Out) program. A copy of this will be provided to the contractor on each project. The contractor must comply with this program. If the contractor has a Lock Out/Tag Out program in place, this program may be submitted to the UI for approval.

#### Commissioning

- The University of Idaho requires Commissioning of all mechanical systems and many related electrical systems. Refer to Division 15 for particulars.

#### Basic Materials and Methods

- Base all material specs on Square D.

#### Conduits & Raceway

- Except for light whips, minimum conduit size shall be  $\frac{3}{4}$ ".

#### Motors and Motor Controllers

- Power supply to all motors must be capable of being locked-out.
- All non-fractional equipment motors shall be 480V, 3-phase.
- Variable Frequency Drives (VFD) shall be installed on all motors 5 horsepower and above. VFD's may be installed on selected smaller motors for specific purposes at the direction of the project design engineer. All motors controlled by a VFD shall be rated for use with a VFD, and must meet the requirements of NEMA MG-1 Part 31.40.4.2.
- VFD's shall be Siemens or ABB only

#### Emergency Standby Generator

- Provide generator in lieu of battery packs □ Generator should be natural gas-fired.
- Generator sized to handle code-mandated egress devices only - unless special lab conditions or animal facilities dictate otherwise.

#### Pad Mounted Transformers

- Service should consist of 2 - transformers: 1-480/277V and 1-208/120V □ Should be for loop feed system, Y configuration.
- All transformers must have a 4-wire system including a grounding loop.
- All transformers must have either parking bushings or feed-through bushings for the load break ells.

#### Transformer Pads

- Concrete pads shall be steel reinforced and shall be constructed as recommended by the equipment manufacturer. Tops of concrete pads shall be level with a slight slope in all four directions to drain, and shall project 4" above finished grade. A vault for primary, secondary, and grounding conductors shall be provided beneath the high and low voltage cable termination compartment to allow horizontal conduit entry and to permit greater freedom in handling cables. Secure the transformer to the concrete pad as recommended by the manufacturer.  
Edges of pads shall be chamfered. Provide one foot of fine gravel sub-base below the pad.
- Transformer station grounding shall be accomplished by installation of a #4/0 AWG bare copper grounding grid as follows:
  - Drive one 5/8" x 8'-0" copper clad steel ground rod such that when the installation is complete this ground rod extends 3" above the vault floor under the high voltage compartment.
  - Drive one 5/8" x 8'-0" copper clad steel ground rod similar to the above except under the low voltage compartment.



- Drive one 5/8" x 8"-0" copper clad steel ground rod at each of the four corners of the transformer pad, 6" outside the concrete pad edge to a depth such that the top of each ground rod is approximately 6" below finished grade.
- Provide a #4/0 AWG bare, stranded copper conductor connecting the corner ground rods together in a rectangular pattern approximately 6" outside the concrete pad edge. Provide another #4/0 AWG bare stranded ground conductor connecting this girdle to the ground rods under the high and low voltage cable terminating compartments. Connect the conductors to the ground rods using exothermically welded connections made at the elevation between natural earth and gravel sub-base.
- Provide a #4/0 AWG bare, stranded copper conductor to connect each of the two corners of the ground girdle that lie closest to the existing transformer pad to the existing ground grid. Connect the conductors to the existing ground rods using exothermically welded connections made at the elevation between natural earth and gravel sub-base.
- Maximum ground resistance of 10 ohms shall be provided by supplementing the grounding methods specified herein as required. Ground resistance shall be measured in normally dry conditions at least 48 hours after rainfall.

#### Service and Distribution

- All exterior buried conduit and ductbank enclosing circuits of 208V and up, primary and secondary, shall be encased in concrete. Ductbank enclosing 13,200V circuits shall be encased in red concrete.
- All circuits, including feeders and branch circuits, must have a separate ground wire pulled in them.
- Convenience outlets for custodial use shall be installed at a maximum spacing of 50', including hallways.
- Every restroom should have a GFI outlet high enough off the floor to avoid water.
- Electrical outlet on each stair landing.
- The U of I utilizes pneumatic operators for all ADA automatic push button door operators. Provide a 120V circuit for a mini-compressor at each location.
- The Idaho General Safety and Health Standards require additional ground fault protected (GFCI) outlets beyond those required by the UBC, IBC or NEC. GFCI outlets must be utilized in all exterior applications (exterior walls, roof, vaults, generator enclosures, etc). GFCI outlets must be utilized near any piece of equipment that contains, generates or dispenses water or steam (drinking fountains, safety showers and eyewashes, autoclaves, etc). And, every outlet in all laboratory rooms must be a GFCI outlet.

#### Panelboards

- Panelboards must have 33% spares.

#### Lighting Design Standards

- Lighting levels shall comply with the recommendations of the Illuminating Engineering Society (IES) and Idaho Department of Water Resources (IDWR) General Safety Standards. They shall also comply with the Idaho Commercial Building Energy Code and it does take precedence over illumination levels.

#### Electronic Ballasts

- Base the spec on Motorola
- Manufacturer must provide minimum 2-year warranty.

#### Special Applications

- Special applications like laboratory rooms are exempt from maximum design watt densities.

#### Lighting

- Lighting circuits shall be 277V.
- LED Lighting is the UI standard.

#### Installation considerations-

- Light fixtures should not be located over toilet room fixtures or counters.
- No lights should be installed over stairwells. Lights should be over landings, or wall mounted only.
- Only acrylic light diffusers (if translucent) will be used.
- Avoid glass fixtures.
- Covers should be easily removable without hitting walls, arches, etc.

#### Exterior Lighting

- Wall Packs affixed to the exterior wall are allowed only by specific permission from the UI Project Manager and Facilities Trades Director.
- Exterior fixture: Lithonia **KAD LED 30C 40K R3 MVOLT RPUMBAK**
- Walkway and street lighting (size as appropriate):
  - **Aggregate poles- Centrecon Series by Ameron is Proprietary no exceptions.**
  - **Roadways and Parking Lots-** MBR-8, 26'-3"
  - **Walkways-** SBR-5, 16'-5"
  - Fixtures – See Above for exterior lighting. Other: As specified by the UI Project Manager. Models vary depending upon location, crosswalks, intersections, parking lots, general walkways.
- Embedded (direct bury) poles shall not be used. Poles shall be anchor base, founded on cylindrical, reinforced concrete "flag pole" type footings. Pole footings shall be engineered to withstand horizontal loading per appropriate codes, but in no case less than 2' in diameter. Pole footing shall extend 2' above grade in parking areas and other areas where the pole is at risk of being struck by a vehicle. Pole footings shall be flush with finish grade along walks and in landscape areas where the risk of being struck by a vehicle is at a minimum.
- Fixture Heights
  - Pedestrian Scale: 16'-0" above finish grade. For use along pedestrian walkways and in small, intimate plaza areas.
  - Street Scale: 25'-0" above finish grade. For use along streets and drives. Sidewalks adjacent to streets may be equipped with the street scale fixture. Larger plaza areas may also be equipped with the street scale fixture.
  - Interior Parking Lot Scale: 30'-0" to 35'-0" above finish grade. For use in the interior of the larger parking lots.
- (See Volume II for details)

#### Historic Fixtures

- Fixture: Metallic Arts Historical-Decorative Gothic with 70W HPS lamp base
- Pole: Hadco P-1740 - length to order 9'-8", cast aluminum with hand hole. Paint to match Metallic Arts finish.
- (See Volume II for details)

#### Fire Alarm Call-in

- Any work involving the shut-down or possible accidental activation of any fire alarm must be coordinated in advance with Facilities Fire Alarm and UI/EHS.

#### Fire Detection & Alarm Systems

- The State of Idaho has adopted the IBC/IFC. Design should be based on that code and those portions of NFPA 72 which do not conflict. Reviewed and Approved by UI Fire Alarm Technicians.
- System shall be micro-processor driven and utilize either digital or analog communication between control unit and field wired devices. All control unit functions shall be field programmable through panel mounted keypad or through RS-232c or USB connection. Software required for setup, programming, reprogramming and trouble-shooting shall be provided to UI Facilities. Panel shall be capable of auxiliary functions for testing and maintenance. Functions available to program include “Drill”; ability to disable specific HVAC smoke detection devices for maintenance; and “Test Mode” , whereby audible notification appliances are disabled for device testing. All system conditions, including input, shall be annunciated through LCD output device at control unit and remove LCD annunciator. Control Unit shall not be installed in any area where ambient temp could exceed 80o F, or where excessive humidity or dust might be present. Control unit shall incorporate an “Event Memory” and the ability to access and view each event in memory from the keypad.
- Circuit zoning shall be provided to identify devices in alarm by building area. Zones shall be separated and identified by floor, area, device type and/or fire area.
- HVAC smoke detection circuits shall be wired to individual zones and annunciated separately.
- Auxiliary function relays shall be programmable and be internal to control cabinet to control dampers, fan shutdown, etc.
  - Digital Devices – Hochiki Protocol
- Detection device address shall be capable of field changes, either through individual device or through mounting base via switch or portable programmer.
- Address alarm outputs at panel shall be English descriptor, designating location by area, device, room and/or room number. Device shall be labeled to University of Idaho Standards.
- Device sensitivity shall be automatically and continuously monitored and/or adjusted by control unit and identified for maintenance when sensitivity varies from listed range.
- Auxiliary function relays shall be fully programmable and internal to control cabinet for control of dampers, fans, etc.
- Multiple detection devices incorporating more than one type of sensing head must be calibrated to provide a higher level of influence for one type of detection in the alarm decision algorithm. This percentage of influence must be identified per device.
- Approved Manufacturers: **Silent Knight proprietary.**
  - Annunciator
    - Annunciator, whether digital or analog, shall be capable of full silence and reset functions via key switches, membrane keypad or toggle switches. ○ All system status, alarm and trouble conditions shall be annunciated through LCD English descriptor or LED indicators. Each such indicator must be clearly labeled indicating zone or device, condition and location.
    - Function or key switches must be enclosed or otherwise incapable of tampering.
  - Communicator
    - Communication of all system events to the UI proprietary central station shall contact ID. ○ Communication device may be internal or act as a secondary panel to main control unit.
    - Signals sent for alarm and trouble/open circuit, shall be designated by floor or building area. All system conditions and status shall be transmitted with no delays.
    - Approved manufacturers: Silent Knight proprietary.
- Equipment/Devices (All system materials and installation to conform to NFPA 72, UFC 1007, NEC and ADA requirements.)
  - Smoke Detection ○ Smoke detection shall never be installed:

- In laboratory fume hood exhaust. ○ In maintenance or mechanical areas.
- Attics.
- Exterior of buildings.
- Any location where temperature may be below 40°F or above 100°F, or where high humidity, dust, insects or airborne particulates might be present.
- Smoke detectors will be photo-electric.
- Manual Pull Station ○ Manual stations shall be dual-action type, requiring operator to make two (2) distinct and separate actions to initiate alarm.
  - Devices to be non-coded.
- Ensure that existing safety devices (e.g., exit signs, sprinkler heads, smoke detectors, etc.) are not blocked or rendered inoperable due to renovation.
- Ensure that the coverage or function of existing safety systems (e.g., sprinkler systems, smoke and heat detection systems, etc.) are not changed due to renovation.

#### Fire Alarm System Equipment

- Fire Alarm Control Panel, hereafter referred to as the FACP, shall be manufactured by Silent Knight (proprietary)
  - Addressable FACP: Silent Knight #5820XL or 5808-IFP 1000 or IFP 2000 depending upon battery calculations and the required battery power.
- Initiating and control devices shall be manufactured, or listed as compatible, by Silent Knight – Hochiki Protocol.
- Notification appliances shall be manufactured by Gentex, or System Sensor.
- Relays controlling AC power circuits including, but not limited too, fire dampers, elevator controls, door holders, HVAC equipment, shall be manufactured by Air Products Controls.
- Auxiliary power supplies shall be manufactured by Silent Knight.
  - Conventional: Silent Knight #5499.
  - Intelligent: Silent Knight #5895XL.
- Remote annunciators shall be manufactured by Silent Knight.
  - Addressable systems shall use Silent Knight #5860 annunciator.

#### Central Station Reporting

- The contractor shall provide and install a Silent Knight digital fire-alarm communicator, including any wiring necessary to interface with FACP.
- Contractor shall provide capability for fire alarm panel to report an assortment of conditions, to be determined by University of Idaho fire systems technician(s). This shall be accomplished either through the built-in capability inherent to a Silent Knight fire alarm panel, or through the use of programmable relays installed in the fire alarm control panel. These conditions shall include, but not be limited to, the following:
  - System Trouble
    - Sprinkler Supervisory (if sprinklers are installed) signal.
    - Sprinkler Water Flow (if sprinklers are installed) alarm.
    - Separate alarm condition for *each and every* floor.
- Contractor must be aware that, in certain circumstances, special areas, wings, equipment, etc., will require special reporting capability. Therefore, it is essential that the owner's requirements for these conditions be determined prior to the bidding process.

#### Additional Fire Alarm System Requirements

- All conductors shall be minimum size #16 AWG solid copper.
- All wiring shall be installed in conduit and shall be minimum 3/4" trade size.
- All single insulated conductors installed on fire alarm systems shall conform to the following color code:

- Notification appliance circuits (NAC): Red (+) and Black (-).
- Class B Alarm initiating circuits (IDC): Orange (+) and White (-).
- 24 Volt DC power circuits: Yellow (+) and Blue (-).
- Control circuits: Brown and/or Pink
- Signaling Line Circuits (SLC): Orange (+) and White (-).
- Multi-conductor cables approved for use in fire alarm systems shall be utilized for remote annunciator and intelligent power supply circuits and may be substituted for single conductors on individual SLC circuits. Cable shall be Type FPL only.
- System annunciator shall be located at the “front” door, pre-determined Fire Department response location, and shall be readily visible in the entrance lobby or vestibule.
- Zone elevator smoke detectors separately.
- Stairway fire doors, corridor doors and other doors as determined (likely to be propped open) shall have electromagnetic hold-open devices. Utilize a dedicated circuit for the hold-open devices.
- Occupied buildings undergoing renovation must be provided with a sufficient temporary alarm and detection system to guarantee safe egress from the structure. This installation shall be a component of the contract. The minimum requirements shall be a pull-station at each exit, and a number of alarm devices (ADA horn/strobes) to be code-compliant. Detection devices shall be used where special circumstances dictate. All installation and wiring may be exposed and suspended in a temporary manner. The U of I Environmental Health and Safety Office is the governing authority for adequacy of the temporary measures.
- Contractor will be required to complete the U of I Fire Alarm system closeout procedure form (see Appendix) NFPA Record of Completion.
- Fire alarm system control panels shall be connected to the normal building 120/208V power system. Do not connect these panel to the emergency power system.
- Stairway fire doors, corridor doors and other doors as determined - likely to be propped open - shall have electromagnetic hold-open devices. Utilize a dedicated circuit for the hold-open devices.
- Elevator smoke detectors must be a separate zone.

## TELECOMMUNICATIONS AND DATA SYSTEMS

- 1.1 All work performed on this project will be installed in accordance with the current edition of the National Electric Code, the current edition of the National Electrical Safety Code, the current edition of the BICSI Telecommunications Distribution Methods Manual, the current edition of the BICSI Cabling Installation Manual, the latest edition of the ANSI/TIA/EIA Standards published by Global Engineering

Documents as TIA/EIA Telecommunications Building Standards, and all Federal, State, and local codes and ordinances.

The BICSI Telecommunications Distribution Methods Manual, the BICSI Cabling Installation Manual, and the ANSI/TIA/EIA sections 568 and 569 are on file in the Telecommunications Infrastructure Services Office located in room 26 of the Administration Building University of Idaho, Moscow, Idaho.

## PART 1- GENERAL

### 1.2 SCOPE

#### A. Work Included

1. Provide a complete information transport system including horizontal, vertical, and riser cable (copper and fiber), cross connect blocks, patch panels, racks and voice /data outlet devices required for a complete Avaya Technologies " SYSTIMAX GigaSPEED" **certified** cabling system.
2. The Telecommunications Contractor must be a factory authorized and trained "Value Added Reseller" for the Avaya Technologies " SYSTIMAX" cabling system.
3. The Telecommunications Contractor shall be responsible for all parts, labor, and all other associated apparatus necessary to completely install, test, label, and turnover for acceptance by The University of Idaho the information transport system detailed herein. Items among those required are as follows:
  - a. Interbuilding Feeder Cable and Terminations shall consist of one or more of the following:
    1. ARMM Sheathed Copper Cable
    2. Optical Fiber Cable, Corning Glass
  - b. Installation and placement includes proper termination and protection, including but not limited to lightening suppression, grounding, etc.
  - c. Intrabuilding Backbone Cable and terminations shall consist of one or more of the following:
    1. ARMM Sheathed Copper Cable
    2. Optical Fiber Cable, Corning Glass
  - d. Bonding and Grounding
    1. Equipment racks, cable trays, cable runways, conduits, and metallic shielded cables in the MDF (Main Distribution Frame) and the IDF's (Intermediate Distribution Frames) shall be electrically bonded to the main building ground using current NEC approved connections.
    2. The Telecommunications Contractor shall install a common continuous length of GREEN #6 AWG ground from the ground buss bars located in the MDF and IDF's to the telecommunications equipment racks, trays, and cable sheaths. Connection to the main electrical service ground shall be coordinated and completed by the Electrical sub-contractor.
    3. The Telecommunications Contractor shall install grounding lugs on equipment racks, cable trays, cable runways, and conduits.
    4. The Telecommunications Contractor shall install ground wire in accordance with current NEC standards for grounding lugs on equipment racks, cable trays, cable runways, and conduits. The metallic shield of feeder and backbone cables entering or leaving a MDF or IDF shall be electrically connected to a bonding bracket or ground buss bar.
  - e. Terminated station drop cable consisting of 3 each sheaths Avaya 1071 or 2071 (unless otherwise specified) per outlet. One BLUE sheath cable, one WHITE sheath cable, and one YELLOW sheath cable, of unshielded twisted pair (UTP) cabling. Cable shall be 4-pair Avaya "GigaSPEED", 24AWG solid, depending on application, either non-plenum or plenum rated cables for voice and data connections.

1. All UTP 4-pair cables shall be terminated at the station telecommunications faceplate under EIA/TIA 568A wiring configuration (pinout) using Avaya MGS400BH-246 modules and Avaya triplex faceplate M13L-246. Blue cable will be connected to the #1 module, white cable to the #2 module, and yellow cable to the #3 module.
  2. All UTP 4-pair cables shall be terminated in the MDF/IDF locations on Avaya "PATCHMAX" PM-GS3-24 Port Patch Panel using the T568-A wiring template.
  3. Any single 4-pair station cables ( payphones, courtesy telephones, elevator telephones, or ancillary devices not connected to the normal 3 port faceplate will be terminated in the MDF/IDF locations 110AW2-300 wiring blocks using 110C-4 connecting blocks.
  4. All AARM riser and feeder cables will be terminated in the MDF/IDF locations on 110AW2-300 wiring blocks using 110C-5 connecting blocks
- f. Installation of horizontal or vertical media shall be done without any splicing or taping
  - g. Telecommunications Contractor shall do performance testing of all installed media consistent with ANSI/TIA/EIA-568-B.1 standards.
  - h. Telecommunications Contractor shall label the cable group (blue, white, and yellow individual cable to each faceplate) with room number and faceplate number for that group. The label is attached to the cable assembly at a point that is visible at the MDF/IDF location after the cable is terminated. (The label can be a light color tape with the information written with a Sharpie permanent marker.)
  - i. The Telecommunications Contractor shall label the triplex faceplates and patch panels with a black on clear (Brother P-Touch or equivalent) with the labeling scheme provided by the owner, an example is as follows:
 

664	A	001-01
A	B	C

where Line 1 is Building Number, Closet, Room Number, and Jack number within that room. Line 2 are the three information outlets A, B, and C.
- B. Related Sections: If not addressed in this Section or the Construction Drawings, the Telecommunications Contractor shall comply with the requirements and specifications contained in Bidding Requirements, Contract and Bond Forms, Conditions of the Contract.
  - C. Submit on all materials in accordance with division 1 and General Conditions Sections
  - D. Omissions in the proposal of any provision herein described shall not be construed as to relieve the Telecommunications Contractor of any responsibilities or obligation requisite to the complete and satisfactory delivery, operation, and support of any and all equipment or services.
  - E. Contractor will contact Avaya representative and have the cabling registered for the Avaya Systimax Structured Connectivity Solution Extended Warranty and Application Assurance Program.

## PART 2- PRODUCTS

### 2.1 GENERAL

- A. The cable connectors, outlet devices, and other materials constituting the information transport system shall conform to the following specifications. Each product specification is accompanied by a specific product recommendation. The recommended products have been extensively evaluated and constitute a set of products of demonstrated functionality and compatibility. If substitutions to the recommended products are proposed, the Telecommunications Contractor shall submit complete manufacturer's product literature

- demonstrating compatibility with other related products, and samples for evaluation and approval, prior to installation.
- B. No "custom" items shall be used, except as specified on the Construction Drawings or as reviewed and approved by both the Architect and the Owners representative, as required to meet unusual physical requirements of the installation site.
  - C. All products shall be new and shall be brought to the job site in original manufacturer's packaging. Electrical components shall bear the Underwriter's Laboratories label. All telecommunications cable shall bear the manufacturer's label in accordance with NEC 800 based on flammability testing as follows:
    - 1. CMP Plenum-rated Communications Cable
    - 2. CMR Riser-rated Communications Cable
    - 3. CM Communications Cable
  - D. The building riser cables shall be a minimum Level/Category 3, 24 AWG, CMR rated, twisted pair cable. All cables shall be terminated in the MDF and IDF locations on Avaya 110AW2300 blocks labeled for backbone wiring. Each IDF shall be fed by a riser cable that is home run as indicated on the drawings. Cable counts will be a minimum of 2.5 pairs/faceplate for the floor served.
  - E. The fiber riser cables shall be a composite using Depressed Clad singlemode and 62.5/125 micron multimode CMR rated, fiber optic cable. All fiber shall be Corning glass. All fibers shall be terminated using Avaya STII+ field installable fiber optic connectors, and attached to the rack mounted patch panel. 20 feet of slack shall be left at each end and kept in a service coil. Approximately 10 feet of unsheathed fiber shall be coiled in the termination shelf.

## 2.2 VERTICAL RISER BACKBONE CABLING

- A. The cable shall be minimally compliant to the ANSI/TIA/EIA-568B.1 Standard (see specifications in the above listed standards) and shall be CMR rated.
- B. All Backbone/Riser Wiring shall be placed in pathways provided for telecommunications following the design for the building. All conduit and raceways shall be filled as per EIA-569 Standards before starting to fill the conduit or raceway.
- C. No Backbone/Riser Wiring runs shall be spliced or taped
- D. All Backbone/Riser Wiring runs shall be labeled at both ends as specified.
- E. Copper Distribution:
  - 1. Backbone/Riser Cable for each IDF location will originate in the MDF
- F. Copper Termination:
  - 1. The Backbone/Riser cables shall be installed in 110 distribution wiring blocks (Avaya 110AW2-300) and terminated using Avaya 110-C5 connecting blocks in the MDF and IDF termination points.
  - 2. Use white or gray designation strips held in a Avaya 188UT1-50, Comcode 103895504 clear plastic holder in the MDF, and white or gray designation strips for the same copper riser in the IDF location. The multiple pair riser cables are terminated using the standard telephone color code. Wire pairs stripped out of the cable for punch-down shall maintain the same twist-per-inch to the point of termination as the wire pairs inside the cable. Shielded Copper Riser Cable: Multi conductor cables for voice, video, and data backbone/riser applications are listed below.
  - 3. The shielded and unshielded twisted-pair Multi conductor cables shall meet or exceed the specifications listed below.
 

Physical Specifications:

    - a. Gauge: 24 AWG
    - b. Pair Size: Minimum 2.5 pairs/faceplate for floor served
    - c. Weight: Consult manufactured specifications
    - d. Outside Diameter: Consult manufactured specifications
    - e. Insulation Thickness: 0.006 in
    - f. Jacket Thickness: 0.045 in (100 pair) to 0.100 in (1800 pair)

4. Electrical Specifications:

    - a. Maximum Average DC Resistance: 28.6 ohms/1000 feet



- b. Maximum Average DC Resistance Unbalance: 5%
  - c. Mutual Capacitance at 1 kHz: 20nF/1000 ft.
  - d. Maximum Capacitance Unbalanced (pair to ground): 1000pF/1000ft
  - e. Maximum Attenuation (dB/1000ft):
    - 1) At 0.064 MHz: 2.8
    - 2) At 0.256 MHz: 4.0
    - 3) At 0.512 MHz: 5.6
    - 4) At 0.772 MHz: 6.8
    - 5) At 1.000 MHz: 7.8
    - 6) At 4.000 MHz : 17.0
    - 7) At 8.000 MHz : 26.0
    - 8) At 10.00 MHz : 30.0
    - 9) At 16.00 MHz : 40.0
  - f. Characteristic Impedance (ohms):
    - 1) At 0.064MHz : 125+/- 15%
    - 2) At 0.128MHz: 115+/-15%
    - 3) At 0.256MHz: 110+/-15%
    - 4) At 0.772MHz: 102+/- 15%
    - 5) At 1.0-16.0 MHz: 100+/- 15%
  - g. Worst Pair Loss NEXT (dB loss /1000ft.)
    - 1) At 0.15MHz: 54
    - 2) At 0.772MHz: 43
    - 3) At 1.0MHz: 41
    - 4) At 4.0MHz: 32
    - 5) At 8.0 MHz: 31
    - 6) At 10.0MHz: 26
    - 7) At 16.0MHz: 23
  - h. Approved products: Avaya ARMM 24 AWG CMR 25-1800 pair
- G. Horizontal Copper Station Cable- The twisted pair cable for station drops shall typically be 3 separate sheaths of Avaya 1071 in non plenum applications or Avaya 2071 in plenum applications, are 24 AWG "Gigaspeed" using a Blue Jacket cable for cable 1, a White Jacket cable for cable 2, and a Yellow jacket cable for cable 3.
- H. Horizontal Copper Telecommunications Cable- Outlets labeled as "W" (Wall Telephone, Courtesy Telephone, Elevator Telephone, Ancillary Device) shall be a single sheath of Avaya 1071 for non plenum applications, 2071 for plenum applications in a White sheath. I.
- Intra-Building Fiber Distribution:
- 1. The fiber riser cables shall be a composite using Depressed Clad singlemode and 62.5/125 micron multimode CMR rated, fiber optic cable. All fiber shall be Corning glass. All fibers will be terminated using Avaya STII+ fiber optic connectors attached to the appropriate rack mounted fiber shelf. J. Fiber Optic Patch Panels:
    - 1. Fiber optic shelf shall be a Avaya product with a closeable front door and rear cable management space and be 19" rack mountable. Avaya LST1U or LSC2U, or 600A shelves are acceptable

### 2.3 CROSS-CONNECTS AND ACCESSORIES

- A. The cable used in the MDF and IDF's for copper voice only station drop cable and copper riser terminations shall be 300-pair Avaya 110AW2-300 wiring blocks. Comcode 107059925 B. All rack terminated station cables shall be terminated on Avaya "Patch Max" 24 port patch patch panels with **T568A** pinout designation. Recommended Product: Avaya PM-GS3-24 Port Path Panel Comcode 700173735
- C. All riser and tie cables (greater than 4-pair) on blocks shall be terminated on the 110AW2-300 blocks using the Avaya 110C5 connecting block. Recommended Product: Avaya 110C-5 Comcode 103801254
- D. The jumper and wire routing guides which in all cases are mounted directly below each 110AW2-300 block shall be a Avaya trough design. Recommended Product: Avaya 110A3

Jumper Trough. Recommended Product: Avaya 110 Jumper Trough Comcode 107831133

## 2.4 STANDARD INFORMATION OUTLET DEVICE

- A. All wire listed as 4-pair UTP shall be terminated at the Telecommunications Outlet using a modular 8-conductor, 8 position device with **T568A** designation Recommended Product: Avaya MGS400BH-246 information outlet Comcode 700206717. Faceplates shall be flush mount single-gang, triplex. Recommended Product: Avaya M13L-246 Comcode 108168519

## 2.5 NONSTANDARD TELECOMMUNICATIONS OUTLET DEVICES

- A. Telecommunications Outlets labeled "W" (Wall Telephone) shall be terminated at the faceplate location with a single-gang single port wall jack. Recommended Product : Avaya M10LW-246 Comcode 108258450.

## PART 3- EXECUTION

### 3.1 PRODUCT INSPECTIONS

- A. All cable shall be inspected prior to installation to verify that it shall be of proper gauge, Contains the correct number of pairs, and otherwise meets specifications. Any physical Damage to the cable is unacceptable. Uniform jacket thickness, tightness, or buckling shall be checked. All outlet devices, cross connect blocks, and other components shall also be inspected prior to installation. Damaged cable, or any other components failing to meet specifications shall not be used in the installation. Within one week of inspection the Contractor shall submit a statement certifying that all cable and components meet specifications or were replaced.

### 3.2 CABLE INSTALLATION - GENERAL

- A. The Contractor shall ensure that the telecommunications cable is installed with care, using techniques which prevent kinking, sharp bends, scraping. Over tightening of tie wraps, cutting or deforming the cable jacket or other damage. During the inspection by the Owner's Representative, evidence of such damage shall result in the material being declared unacceptable. The Contractor shall replace unacceptable cable at no additional expense to the Owner.
- B. All telecommunications cable shall be installed in grounded metal conduit or raceway as indicated on the Construction Drawings. Telecommunications cable shall not share raceway with electrical power wiring as already stated in the National Electric Code (NEC).
- C. Pull line shall be installed in all raceway, both empty and occupied. Each end of the pull line shall be secured and labeled. Distance measurements from the MDF to IDF rooms shall be recorded and submitted. Pull strings shall be left in all conduits after installation.
- D. Allowable Cable Bend Radius and Pull Tension (typical)

1. 4-pair UTP	2 inch bend radius	20lb. tension
2. 100-pair cable	7 inch bend radius	500 lb. tension
3. 4-strand Multimode Fiber	2.5 inch bend radius	200 lb. tension
4. 12-strand Multimode Fiber	4 inch bend radius	300 lb. tension
5. 4-strand Singlemode Fiber	2.5 inch bend radius	200 lb. tension
6. 12-strand Singlemode Fiber	4 inch bend radius	300 lb. tension

### 3.3 COPPER HORIZONTAL DISTRIBUTION

- A. For horizontal distribution, copper cables shall be installed between the MDF/ IDF and each end-user work area outlet. The length of each cable shall not exceed 90 meters.

horizontal wiring shall be star-wired from the MDF/IDF to end-user work area with no intermediate connections. Cables shall not be spliced or taped.

- B. Termination- Copper Horizontal Distribution: All UTP 4-pair Avaya GigaSpeed cable shall be terminated on Avaya PM-GS3-24 Port Patch Panels. Wire pairs stripped out of the cable for punch-down shall maintain the same twist-per-foot to the point of termination as the wire inside the cable sheath. At the Telecommunications Outlet end of each cable, the individual pairs shall be terminated on the information outlet. The wires shall be terminated as EIA/TIA 568A wiring configuration (pinout) on the MGS400BH-246 information outlet and M13L-246 triplex faceplate. There shall be sufficient slack left in the wall box for access to the faceplate. No more than 1" of any cable shall be left unsheathed after the information outlet has been terminated. Excess cable shall be neatly coiled separately and placed in the Telecommunications Outlet box before attaching the faceplate. The faceplate shall be mounted securely to the Telecommunications Outlet boxes so that there is no free play, but not so tight as to warp the surface of the faceplate. Screws of appropriate length (check to see that they do not damage cable inside the Telecommunications Outlet box) shall be used to secure the faceplate.

### 3.4 CABLE LUBRICANTS

A. Lubricants specifically designed for installing telecommunications cable can be used to reduce the pulling tension as necessary when pulling cable into conduit. After installation, exposed cable and other surfaces shall be cleaned free of the lubricant residue.

1. Acceptable Product: Dyna-Blue, American Polywater, or approved substitute.

### 3.5 STATION HORIZONTAL CABLING

A. At the Telecommunications Outlet location, a minimum of 18 inches of cable shall be provided for terminations. In the MDF/IDF closet locations, sufficient cable length shall be provided to allow routing and terminations as described below. This shall require 20 feet of cable or more depending on the specific closet and backboard layouts.

### 3.6 INSTALLATION TESTING

- A. All testing shall be witnessed and approved by the Owner's Representative. The Owner shall be notified two weeks prior to any testing.
- B. Before requesting a final inspection, the Contractor shall perform a series of end-to-end installation performance tests. The Contractor shall submit for approval, a proposal describing the test procedures, test result forms, and timetable.
- C. Acceptance of the simple test procedures discussed is predicated on the Contractor's use of the recommended products. The complete installation shall be evaluated in the context of each of these factors.
- D. At a minimum the Contractor shall test:
  1. All riser cable from MDF terminal blocks to each IDF terminal block
  2. All station horizontal cable pairs from MDF/IDF closet termination to information outlet at the Telecommunications Outlet.
  3. The optical fiber pairs from the MDF fiber distribution connection point to the IDF fiber distribution connection point. E. Copper Media Testing:
    1. The testing of the copper media shall be as follows, meeting ANSI/TIA/EIA 568-B:
      - a. Wiremap
      - b. Length
      - c. Attenuation
      - d. NEXT (Near End Crosstalk)
      - e. ACR (Attenuation Crosstalk Ratio)
      - f. Power Sum NEXT
      - g. Return Loss

- h. ELFEXT (Equal Level Far End Crosstalk)
  - i. Power Sum ELFEXT
  - j. Propagation Delay
  - k. Delay Skew
2. These test procedures are based on EIA/TIA 568-B tests  
Performed using a commercial cable tester (Micro-Test Pentascanner, Fluke DSP4000, Wavetek etc)

#### F. Fiber Testing

- 1. After installation, performance tests of the fiber cable shall be made using the correct connector and adapter for multimode or singlemode fibers. Each fiber shall meet the following performance level for the graded parameters of attenuation in bandwidth:
    - a. Using a wavelength of 850 nm, the maximum attenuation of 4.0 dB/kilometer shall not be exceeded, and the fiber shall be deemed to have a minimum bandwidth of 160 Mhz/kilometer, in both directions.
    - b. Using a wavelength of 1300nm, the maximum attenuation of 1.5 dB/kilometer shall not be exceeded and the fiber deemed to have a minimum bandwidth of 500Mhz/kilometer.
  - 2. These tests shall be performed by Contractor with optional presence of Owner.
- G. When errors or defective components are found, the source of each error shall be determined, corrected, and the components re-tested at Contractor's expense, following the testing procedure described in this document.
- H. The Owner reserves the right using Contractor's labor to require a random test of up to 10% of the total installed cables.
- I. Test records shall be maintained using a format that is included on the tester used. They may be given to the Owner in either magnetic (preferred) or paper format.

#### 3.7 FIRE STOPS

- A. During the final review and inspection period, and following the Owner's Representative's inspection of installed and tested-as-acceptable cabling, but prior to final acceptance, all sleeves passing through floors, roofs, and exterior walls shall be filled with approved fire-stop material in accordance with NEC-300-21. All fire wall penetrations shall be filled with suitable fire-stop material as specified in Section 07840. Unused sleeves shall be capped.

#### 3.8 BACKBOARDS

- A. Backboards shall be ¾ inch AC plywood fire treated or standard ¾ inch AC plywood painted with fire retardant paint on all sides mounted 8' high on at least one wall of the telecom closet.

End of Section  
End of Standards

