INSTRUCTIONS TO DESIGN PROFESSIONALS

Statement of Purpose and Objectives

The *Instructions to Design Professionals* has been created by the University of Pennsylvania Division of Facilities and Real Estate Services to provide a guide for design consultants to the University's procedures for executing capital projects. It is intended to ensure that consulting architects and engineers contribute to the goals of the University, serve the needs of the users, and make efficient use of University resources. Together with the Agreement between the University and design professionals, this document establishes the contractual obligations of each party.

The *Instructions to Design Professionals* references and links the reader to other documents, which help define procedures and the scope of services to be provided by consultants. This document addresses:

- Forms of Agreement
- The Project Team, Roles, and Responsibilities
- Project Communication
- Project Phases
- Building Commissioning
- Sustainability Policy
- Additional Design Issues
- Utilities and Building Systems
- Documentation Format and Graphic Standards

Forms of Agreement

The University of Pennsylvania engages the services of architects, engineers and other professionals for the design of its facilities through the use of the *Standard Form of Agreement for Architectural and Engineering Services*, the *Short Form of the Agreement*, or the *Services Form of Agreement* (all referenced in this document as the Agreement). The design professional is required to review and be governed by the contents of these Agreements, which are the primary documents establishing the relationship between the consultants and the University. In cases of conflicting information with other documents (including the design professional's proposal for services), or any omissions, the Agreement will govern.

The Project Team, Roles, and Responsibilities

Architect / Engineer (A/E): The A/E includes all prime design professionals with whom the University enters into a professional Agreement for design services, and their consultants. The A/E acts in the University's best interest as the design lead for the project team. The A/E may be a multidisciplinary firm providing comprehensive services, or a single-discipline consultant contracting directly with the University. Responsibilities are defined in this document, as well as other documents such as *The Penn Design Guidelines and Review of Campus Projects* (http://www.facilities.upenn.edu/uop/BldgDesignGuidelines.pdf) and the *Technical and MEP Guidelines* (http://www.facilities.upenn.edu/getDone/designguides.php3). The A/E is to be aware of the content of these documents and review questions regarding project application with the Project Manager.

The lead design professional is to provide for supporting consulting services as appropriate for the project (sub-consultants may include civil, structural, mechanical, life-safety, communications and information technology, electrical engineering services, and/or landscape architecture services.) The consultant's drawings and specifications are to be coordinated and presented for review by the University at the conclusion as appropriate. Each of the consultants shall be registered to practice in the State of Pennsylvania. The University reserves the right to reject any consultants proposed by the lead A/E.

***Project Manager (PM)*:** The PM is the University's representative from the Division of Facilities and Real Estate Services assigned to each project, is the primary agent of and contact for all University parties, and represents the interests of the University throughout all phases of the work. The PM is responsible for

management of the project and has primary responsibility for the project budget and schedule. The PM also works closely with the Office of the University Architect, the Office of the University Engineer, and all other University stakeholders to coordinate their varied areas of focus and coordinate their project review comments and feedback. The PM signs off on the completion of each project, approves payment for consultant services, and with the support of the A/E and Contractor, tracks all project expenditures and changes to scope and / or schedule.

Contractor: The University may elect to engage a Construction Manager or General Contractor (either are referred to in this document as the Contractor), who is responsible for the execution of the work in accordance with the contract documents prepared by the A/E, adherence to the project construction schedule and budget, and management of sub-contractors. If the University selects a Contractor prior to completion of the contract documents, the A/E is to cooperate fully with the Contractor, and provide periodic updates of drawings, specifications, and cost estimates to the Contractor as required. The contractor may be asked to perform construction feasibility reviews, investigate cost savings and value engineering opportunities, and may be involved in pre-construction activities (such as estimating and pre-construction services).

Project Committee: The Project Committee is comprised of representatives from the sponsoring School or Center, user groups, the Office of the University Architect, the provost's office, and/or other University stakeholders, and is responsible for reviewing and approving A/E work. The PM chairs the Project Committee, and is the point-of-contact for communication with the A/E.

Design Review Committee*:* The Design Review Committee (DRC) advises the Trustees of the University on approval of all projects that have a significant impact on campus. The committee is comprised of representatives from Facilities and Real Estate Services (FRES), faculty, Trustee representatives, and design professionals drawn from the extended University community. The committee meets monthly and as needed.

Cultural Resources Sub-committee: The Cultural Resources Sub-committee (CRS) of the DRC reviews all projects of historical importance on the campus, or within designated historical districts. The CRS is comprised of representatives from the University and the Philadelphia Historical Commission. The CRS meets monthly and as needed.

Project Communication

Meetings: The PM will schedule meetings as determined by the Agreement. The A/E coordinates agenda items for all meetings with the PM at least 24 hours prior to the meeting, and is responsible for writing and distributing meeting notes as described in the Agreement.

Progress meetings are to review project progress and discuss project issues with the Project Committee, user group representatives, University staff, and/or others as required.

Presentation meetings are scheduled by the PM as required to review the design with the Project Committee and / or the DRC or CRS, and are typically held at the conclusion of each phase of design and documentation. The A/E is to prepare digital images suitable for projection and archiving, in addition to other forms of presentation required for a full review of the design. The Office of the University Architect is responsible for preparing and distributing notes from the DRC and CRS meetings.

Correspondence: Project correspondence with the University is to be addressed as follows:

Attn: Project Manager
Division of Facilities and Real Estate Services
University of Pennsylvania
3101 Walnut Street
Philadelphia, PA 19104 –6289

Project Directory: The A/E is to assemble and maintain the project directory throughout the project. This directory is to include a listing of all primary and emergency contacts, decision-makers, discipline leads for the A/E, Contractor, all consultants, and key University personnel. The project directory is to also include the government, utility agency, and insurance carrier information as appropriate.

Distribution Matrix: A distribution matrix is to be generated for all forms of communication including meeting minutes, monthly reports, cost estimates, schedules, construction documents, and other contract deliverables. The PM will approve the distribution of all project information.

Project Procedures Manual: For larger projects the A/E may be required to assemble a Project Procedures

Manual for use by the project team. The Project Procedures Manual is to contain information relative to project procedures, communication, and agreed upon processes. This document is to be used as a guide by the project team to coordinate their individual efforts.

The specific contents are to be developed with the PM and Contractor and may include information such as organizational charts, project description, project schedule, shop drawing procedures, project initiation and close out procedures, and other documentation required by the University. If a Project Procedures Manual is required for the project, the Project Directory and Distribution Matrix will be included in the manual.

The Project Procedures Manual may also include examples of certain documents to be used during the project, such as transmittal forms, RFIs, field visit reports, drawing title block, and change order request and/or approval forms.

Invoicing: During the course of the project the A/E is to submit invoices for payment to the PM not more often than monthly, as described in the Agreement. All applications for payment of additional services or reimbursable expenses are to be identified by the Agreement number and / or accompanied by an authorization letter(s) issued by the PM.

Publicity Approval: Consultants who work on University projects are required to receive written approval from the Office of the University Architect prior to seeking publicity regarding the project, submitting the project to architectural competitions, or engaging in similar activities. Such approval will not be unreasonably withheld if the A/E's effort does not conflict with University plans or policy. All photographs, models, sketches, and renderings prepared in the course of the design or prepared as additional services are the property of the University unless otherwise defined in the Agreement. Permission from the Office of the University Architect must be obtained for their use or reproduction.

Project Phases

Professional design and / or consulting services are accomplished by successive phases, in accordance with the Agreement. Typical phases of a capital project are: Pre-Design / Programming Phase; Schematic Design Phase; Design Development Phase; Construction Documents Phase; and Construction Administration Phase (including bid, negotiation, & award). Each phase of work is based on the previous, approved phase. The A/E is not to proceed to the next phase until instructed to do so by the PM.

Upon completion of each phase of a capital project, the PM will arrange a presentation meeting to the Project Committee, and, if the project has significant impact to the campus, to the Design Review Committee. The A/E is to submit the required copies of the appropriate documents in advance of this meeting, as directed by the PM. If the Design Review Committee requests modifications to the design, the PM may schedule another meeting for the A/E to present design revisions before proceeding to the next phase.

Also at the end of each phase, progress documents are to be distributed through the PM for review and approval by University stakeholders, including but not limited to the Project Committee, the Office of the University Architect, the Office of the University Engineer, the Division of Public Safety, Office of Fire and Emergency Services, and Facilities Management (Operations). The A/E is to provide written responses to these comments to the PM, and receive acknowledgement of the responses and authorization before proceeding. A meeting with the PM and other University stakeholders may be required to resolve any questions or concerns.

Unless otherwise directed by the PM, an estimate of probable construction cost is to be included as part of the deliverables of all design phases of capital projects. Estimates of probable construction costs are to include contingencies and contractor overhead and profit, and are to be organized by the Construction Specifications Institute (CSI) format with detailed breakdowns by specification section. If directed by the PM or as part of the established project deliverables, cost estimates are also to be broken out by major building components, systems, or anticipated phased construction.

Project schedule information

As a basis for developing the project fee and schedule, the A/E is to note the following typical schedule requirements. Note also that many of these issues and reviews are pursued concurrently, so that the critical path issues of the design, documentation, and project delivery schedule are not adversely impacted.

- The contract between the University and the A/E usually requires four weeks to be signed and executed. Design services will commence upon issuance of a notice to proceed, often in advance of issuance of an executed contract;

- The project committee reviews at the close each design phase will require approximately two weeks each.
- The City of Philadelphia permit approval process may require reviews by the Department License and Inspection and the Zoning Unit, and it may take as long as twelve weeks to gain final approval for new construction. The A/E is to work with the PM and the Office of the University Architect to address the City review requirements early in the design process, and to schedule submissions so as not to delay the project. For complex projects, a preliminary meeting is sometimes scheduled with the City representatives through the Office of the University Architect.
- The Contractor's bid/award process (pre-bid meeting, response to contractors questions, bid opening, bid review, de-scope meetings) could take up to eight weeks for a large project.
- The contract between the University and the Contractor typically requires four weeks to be signed and executed. Construction does not begin until a contract is executed. This period is often used by the Contractor to secure required trade permitting and begin gaining University approvals for required submittals.

Feasibility Studies: At times, work will be commissioned that does not include the preparation of construction documents or construction administration, such as a feasibility study. The purpose of a feasibility study is to define a potential capital project's scope, program, and cost in order to gain internal University capital project approvals. An accurate cost estimate, based on the full scope of work of a potential capital project must be identified in the study. Existing site or building conditions, campus infrastructure, and building engineering systems must be verified by the A/E as part of this study, without relying on the accuracy of prior documentation.

Pre-Design / Programming / Program Confirmation Phase

The A/E is to develop the project program for the proposed project, or confirm the project program if one is provided by the University. As part of this phase, the A/E is to confirm the original proposal, A/E team composition, schedule, and scope of work. Any changes from the initial proposal must be approved by the PM.

For projects that will significantly impact the appearance of the campus, the PM will schedule a review by the Design Review Committee to establish the design framework in accordance with the *Penn Design Guidelines and Review of Campus Projects* (http://www.facilities.upenn.edu/uop/BldgDesignGuidelines.pdf).

A/E deliverables

- The A/E is to work with the PM to identify any pertinent applicable existing site or building documentation, and to identify any required site surveys, geotechnical analysis, or test borings that will be required
- The project program establishes the goals of the project by listing the spaces, functions, and/or proposed renovations needed by the school or center. The Project Program is developed or confirmed with input from the Project Committee, and serves as the basis for the Schematic Design Phase.
- An estimate of probable cost, based on preliminary studies carried out or revised during this phase.

Schematic Design Phase

During Schematic Design, the A/E is to create initial design documents to define and convey the scope of work. In consultation with the Project Committee, the A/E is responsible for the completion of the project program for approval by the University. Program priorities and assumptions are to be re-evaluated to determine if spaces and functions can be shared or co-located, with the goal of reducing the scope of the project, and increasing space and resource efficiency. The A/E is to verify all existing conditions and to avoid assumptions regarding existing building systems and/or site utilities.

Integrated design exercises are to be conducted where appropriate to bring together the A/E's consultants and key University participants in the design / build / operate process, to identify potential conflicts and coordinate design goals. The emphasis of these exercises is to focus on improving overall building or facility performance.

Schematic design documents are to show the architectural and/or engineering concepts, site relationships, landscaping approach, massing, site and / or building circulation patterns, environmental and energy-use strategies, and building systems as required to meet the functional, economic, environmental, and aesthetic goals of the project. The A/E is to work with the PM and the Office of the University Engineer to review utility requirements, building system concepts, campus utility availability, and energy efficiency strategies.

The A/E is to review the results of any test borings, site survey, and geotechnical analysis with the PM and other University representatives, as required. The A/E is to provide the scope of work for any geotech or survey work required.

A/E deliverables

- Project program (if not identified in a pre-design phase);
- An area analysis (a comparison of program needs to proposed design);
- Overall site or building location plan, showing the relationship between existing and renovated space or existing and proposed, and landscape design (if required). Any special requirements for related landscape improvements and services or utilities are to be included;
- Documentation of existing utilities, proposed connections, and phasing plans for all utility work, especially where existing utilities are to be affected by new construction. The documents are to include a description of any proposed interruptions of utilities service and / or proposed shutdowns caused by new construction. New building drawings are to include designation of site utilities, feeds, and any required systems infrastructure. Record documents of existing campus infrastructure can be attained through the PM;
- Schematic floor plans, preliminary sections and elevations, and building massing studies where appropriate;
- Preliminary drawings and narratives to indicate various building systems (structural, mechanical, electrical, plumbing, etc.), their general performance and life-cycle efficiency characteristics, including analyses of alternative systems, wherever applicable;
- Schematic outline specifications, including initial selection of interior and exterior finishes, fixtures, devices, equipment, and appliances;
- A project schedule that identifies the start and finish dates and durations of each project phase (including the construction), milestones, and meeting schedules, as approved by the PM. Phasing requirements are to be included as necessary for the execution of the work;
- An estimate of probable construction cost:
- Written responses to comments from University stakeholders.

Design Development Phase

During design development, the A/E is to develop a level of design detail necessary to define a clear, coordinated description of all aspects of the project. The A/E expands the level of design integration, design concepts are coordinated among all team members, and cost metrics (capital, operations, and life-cycle) are developed and evaluated against performance considerations. The A/E is to review the project schedule to ensure that adequate time is reserved for implementing the decisions and directives of the Project Committee.

Projects that were reviewed by the Design Review Committee and / or the Cultural Resources Sub-committee during schematic design may be reviewed again during this phase, as directed by the PM. The A/E is to arrange for a presentation to fully describe critical interior and exterior finish materials for review and approval.

A/E deliverables

- Updated building program, highlighting changes from the schematic design;
- Site plans, with dimensioned locations of each building element, existing and finished contours, ground floor elevations, location and extent of roads, walks, parking areas, utilities (existing, new, and relocated), site construction, limits of work, and all the required information for the City of Philadelphia Institutional Development District zoning application. (The A/E is to provide necessary documents and to assist the Office of the University Architect in submitting all zoning and building applications);
- Site plans and building plans are to indicate locations of utility connections, new feeds and distribution pathways if required, and all related systems infrastructure;
- Landscape plans, showing the type and location of all landscape elements and all site construction (planting, retaining walls, steps, lighting, walks, roads, and other details as required);
- Floor plans, including updated architectural, equipment and finish plans;
- Reflected ceiling plans, showing materials selected and locations of major ceiling elements;
- Updated sections and elevations, including detailed wall sections showing construction methods and materials. Include foundations, floor and roof heights;
- Additional presentation materials as required to explain the interior and exterior design;
- Structural drawings, indicating structural system and major elements;
- Mechanical, electrical, and plumbing drawings, including layouts and distribution diagrams and apparatus and fixture cut sheets. Major equipment is to be accurately indicated on plans and elevations

in terms of size and location. Coordinate drawings to eliminate conflicts between trades and/or disciplines;
- Revised outline specifications, to including materials and color selections;
- Updated project schedule, with start and finish dates of each project phase (including construction administration), deadlines, and meeting schedules, as approved by the PM;
- Updated estimate of probable construction cost;
- Operating costs for the first five years of the new building or space use are to be submitted to the PM as indicated in the Agreement and as directed. Where available, the University will assist in this cost assessment by providing operations and maintenance historical data as pertinent. Energy costs are to be included in this report but calculated separately. For renovation projects, the A/E is to identify those components of the project that will affect the facility's operating and maintenance costs and provide an estimate of the net change, paying special attention to factors such as change in use and new equipment that will alter existing energy consumption. The A/E is to present proposed energy and resource-saving strategies as part of this exercise;
- Written responses to comments from University stakeholders.

Construction Documentation Phase
The A/E is to complete fully coordinated construction documents, suitable for competitive bidding of the work. Specifications are to be provided in the standard format of the Construction Specifications Institute, and are also to include the General and Special Conditions (to be developed in conjunction with the PM). If the construction methodology requires multiple bid packages, the A/E is to prepare such documents as required.

As directed by the PM, the A/E is to complete documents for submittal for zoning and permit applications during the Construction Documentation Phase. The approved permit sets are to be kept at and readily available at the project site during construction. At the conclusion of construction activities, these documents are to be delivered to the PM for archival purposes in the Data and Documentation Office of the Office of the University Architect.

At approximately 90% completion of this phase, the PM will arrange a review meeting with the A/E, to be attended by all project stakeholders. The A/E is to incorporate all appropriate comments into the bid documents prior to bidding. Bid documents are to undergo a thorough in-house quality control and coordination review by the A/E prior to bidding.

The Construction Documentation Phase is complete at the issuance of all construction drawings and specifications, which include, but are not limited to, construction drawings, specifications, and instructions to bidders.

A/E deliverables
- Progress documents, as required by the Agreement;
- 90% Review Documents;
- Mock ups, as required by the Agreement;
- Final material samples, finish selections, and mock-ups as required;
- An updated estimate of probable construction cost;
- Written responses to comments from project stakeholders;
- Completed construction documents for bidding.

Construction Administration Phase (including Bid, Negotiation, & Award)
During the bid, negotiation, and award process, the A/E is to participate in the pre-bid conference to describe the work, answer any questions regarding the documents, review bids for completeness, de-scope the bids, analyze pricing versus estimates, and recommend award. As designated by the PM, the A/E is to provide clarifications or addenda to bidders (which are issued by the PM).

The A/E is to assist the University in the administration of the construction contract, providing clarification and interpretation of Contract Documents. The A/E is to make periodic visits to the site to observe the progress and quality of the work and conformance with the contract documents, attend construction progress meetings, and prepare and issue record notes of these meetings. The A/E shall exercise due diligence to safeguard the University against construction defects, deficiencies, noncompliance with drawings and specifications, and/or unsatisfactory workmanship. If, in the opinion of the A/E, the work is not being carried out in a sound, efficient, and skillful manner, the A/E is to notify the PM immediately, is to submit a written assessment of any items of the work that are unsatisfactory.

The A/E is responsible for the preparation of contract bulletins, supplemental instructions (including sketches or document revisions, if necessary), addenda to the project documents, and review and approval of shop drawings, samples, warranties, and guarantees. The A/E is to transmit to the PM one copy of approved shop drawings and submittals immediately following their approval, and assist the PM in negotiation, preparation, approval, processing and recording of the cost and scope of change orders.

All significant changes during the construction phase that affect the visual or functional characteristics of the project design are to be brought to the attention of the PM immediately. Significant changes may require an additional presentation to the Project Committee and/or the Design Review Committee.

A/E deliverables and responsibilities:

- If drawings need to be issued in response to a scope change or to clarify design intent, the A/E will provide the PM and the Contractor with a description of the change and highlight (bubble) the extent of the change in the documents. The drawings, and a narrative description of the change if necessary, is to be accompanied by a transmittal reason for issuance;
- The A/E is required to respond promptly, in writing, to all Requests for Information (RFIs) from the Contractor according to timeframe defined in the Agreement. The response may require review and approval of the University. RFIs may require a field sketch. If the response from the Contractor indicates a change in scope or cost, the Contractor is required to submit a cost estimate and any anticipated changes in the project schedule to the PM and receive authorization to proceed prior to implementation;
- Construction or field sketches are issued to illustrate a change to the construction documents. Such sketches are to include a title block indicating the project name and number, a sheet number, date of issue, and a reference to the existing document being changed. These documents are to be accompanied by a transmittal indicating the reason for issuance. The A/E is to maintain a list of all construction sketches issued and is responsible for ensuring that the change is incorporated into the record documents;
- Field visits and field reports by the A/E are to be documented in a log kept by the A/E. The log is to indicate and record the A/E's required periodic visits to the construction site, including who visited the site, the date, and purpose of visit. A report is to be issued to the PM and copied to the Contractor indicating the status of construction and any findings of particular note or not in accordance with the construction documents;
- Certification of Substantial Completion: As the work nears completion, the PM will work with the Contractor to schedule a final inspection by the A/E. Prior to this inspection, the Contractor will develop a list of items to be completed or corrected (i.e. punchlist) and fix the time within which the items are to be competed. At the final inspection, the A/E is to review all aspects of the project, including the punchlist items, for their conformance with the contract documents, and make the following determination:
  - The project is complete and accepted;
  - The project is accepted subject to completion of the items listed (i.e., punch list);
  - The project is not complete and another date for a final inspection will be set.

  The A/E is to work with the Contractor as directed by the PM to achieve satisfactory project completion as defined in the Agreement.
- At the close of the project, and as a condition of final payment to the A/E, the A/E is to deliver to the PM a complete package of record documents, which is to include a complete set of project drawings and specifications, incorporating changes or updates from every discipline and sub-consultant. Documents are to be provided in accordance with the Documentation Format and Graphic Standards, the last section of this document.

Post-Occupancy Studies: At the conclusion of a project, the University may elect to commission an A/E team to execute post-occupancy studies or reports. Deliverables, scope, and format of such studies or reports are to be defined by the University to meet specific project needs, and are typically carried out under a separate contract.

Building Commissioning

Commissioning is the process of ensuring that building systems are designed, installed, functionally tested, and capable of being operated and maintained as designed to meet the University's needs. Retro-commissioning is the process of evaluating and upgrading systems in existing buildings to restore high performance.

The intent of commissioning is to provide:

- Precise adjustment of HVAC systems and controls;
- Better building documentation;
- Improved training of building operators;
- Shortened occupancy transition period;
- Lower operation and maintenance cost;
- Lower utility bills; and
- A healthier and more comfortable work environment.

For complex projects, the University prefers that a commissioning agent be hired distinct from the Contractor and lead A/E firm. Commissioning requirements for each project are to be determined at the project inception, and the A/E is to document the commissioning requirements as part of their basic services. During the design and construction phases, the A/E is to assist the commissioning agent as part of the A/E's basic services.

Sustainability Policy

The University is committed to creating a campus environment that moves beyond merely sustainable, to one that actively improves the quality of life and the environment for its users. The A/E is to support the University's goals by providing design services that:

- Reduce dependence on non-renewable resources by using products with recycled content and by promoting adaptive reuse of existing structures. On-site separation and recycling of construction and demolition debris is required for all projects;
- Reduce transportation costs by selecting locally manufactured products;
- Site new structures mindful of orientation, shading, and the effect on adjacent buildings and spaces;
- Create healthy, pleasant outdoor environments that reduce exterior lighting demand and minimize stormwater runoff;
- Minimize maintenance and operating costs by integrating innovative building systems engineering approaches at inception of the project;
- Improve indoor environmental quality by selecting adhesives, coating, and paints with low content of volatile organic compounds (VOCs);
- Maximize building flexibility to satisfy the varied demands of current and future users and residents;
- Reduce energy consumption through the use of appropriate technology (natural cooling, daylighting, passive solar design, and so on.)

The sustainability goals of each project will be defined at the outset of the design process.

Additional Design Issues

The University requires that A/E firms adhere to and incorporate the following additional design and documentation standards and practices into all of their work.

Long-Term Planning: The A/E is to keep in mind that decisions regarding design, materials, and methods of construction are to be considered as part of long-term improvements to campus. Cost effectiveness is to be considered over the life of the project, unless directed otherwise. Site planning by the A/E is to consider existing and proposed facilities, infrastructure, and services, natural topography, and potential future development as articulated in the *Penn Design Guidelines and Review of Campus Projects*. (http://www.facilities.upenn.edu/uop/BldgDesignGuidelines.pdf)

Materials and Equipment Selection: Materials specified must be durable and readily available, and are to be chosen with environmental considerations in mind. Materials and systems are to be selected with regard to:

- Aesthetics;
- Durability;
- Safety;
- Cost effectiveness;
- Maintenance, access, and ease of replacement;
- Availability of warrantees, service personnel, and manufacturer's support;
- Use of standard parts, similar to comparable equipment/materials in use on campus;
- Availability of training for University personnel for operation and maintenance;
- Low life-cycle costs;
- Low use of energy or resources in construction;
- Environmentally sustainable disposal method at the end of the anticipated life cycle;

- Local availability.

Support space requirements: The A/E is to identify space for all custodial, delivery and loading, storage, and recycling and waste removal functions. Mechanical rooms, support rooms, and corridors are not to be identified or specified as habitable spaces or storage rooms. Rooms used for teaching, or by staff or faculty, are to have exterior windows. Staff break rooms or lounges are to have operable windows that open to the outside wherever possible.

Life Safety / Code Compliance: The A/E is to provide proper planning, design, and documentation to meet the requirements of all applicable codes, laws, and regulations, and provide all documents necessary for submission, review, and approval by the Philadelphia Streets Department, the City Planning Commission, the Philadelphia Zoning Board, the Philadelphia Department of Licenses and Inspection, and/or other regulatory agencies having jurisdiction. Permit documentation is to be clearly labeled as such, dated, and signed and sealed by the A/E as required. The architect is to fully support the University in its procurement of all relevant regulatory approvals.

Permit and zoning applications are made by the Office of the University Architect and coordinated by the PM. If the authority having jurisdiction requires additional documentation or requests changes to the submitted documents, the A/E is to work with the Office of the University Architect to complete this process in a manner acceptable to the University.

Factory Mutual is the insurer of University facilities, and projects are to be designed to meet all standards required. The A/E is to submit projects to the PM for Factory Mutual review as directed, and the A/E is to incorporate into the project documents any changes suggested as part of this review process.

Accessibility: The A/E is to refer to the Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG) as the design standard for accessibility. The University is committed to becoming a barrier-free campus, and is working to remove and prevent all physical barriers to accessibility to all University spaces and landscapes.

In renovations and new projects on campus, the design goal is to provide a means to access all spaces without assistance or special knowledge, and without segregating persons in wheelchairs from the general population. For this reason, the construction of permanent accessible ramps along typical paths of travel is required at any changes in level inside buildings or in the landscape. Reliance on wheelchair lifts or other mechanical devices to negotiate changes in levels is not acceptable. Likewise, cardswipes for operations of doors using student and staff identification cards is preferred over keypad devices, which can be difficult to operate for persons with limited manual dexterity. Where pushpads are required for automatic operation of doors, both a hand-height pad and a foot-height pad (for use by persons who use a wheelchair but have limited arm and hand mobility) are both to be installed.

The project documentation is to include instructions to the Contractors to maintain all required accessible routes for persons with disabilities in or adjacent to the project site, including public pathways, interior corridors, accessible building entries, accessible toilet facilities, and accessible parking spaces. Special care is to be taken to ensure that temporary modifications of public pathways and/or corridors during construction are carried out in a manner consistent with the requirements of the ADAAG, including such aspects as clearances, changes in grade, steps, or obstructions. Where required, the contractor is responsible for installing signage, compliant temporary ramps, handrails, and/or other related items to ensure accessible routes are maintained.

Accommodating Various Communities: The University is committing to accommodating the needs of its various communities. Design professionals are to consider the following in all new buildings, particularly buildings that serve a public function:

- A gender-neutral unisex toilet equipped with a baby-changing station, signed accordingly. Note that if a flip-down diaper-changing table is located in an accessible toilet, it cannot obstruct the space required by a person using a wheelchair, and such tables must be accessible to people with disabilities. Gender neutral toilets accommodate both parents with small children and persons with non-normative gender identities;
- Incorporate lockable, private rooms that can be used for breast-feeding or routine medical procedures (such as insulin injections, checking blood-sugar levels, and so on). Such rooms are to be equipped with a comfortable armchair or daybed, with electrical power available adjacent to the chair.

These recommendations can be accommodated in new buildings at minimal cost, by locating unisex toilets

(which also meet ADA requirements and can be made to accommodate baby-changing stations) near to a ground floor public space, and providing places nearby that afford the privacy required for breast feeding or minor, self-administered medical procedures. Design decisions regarding these matters are to be made in the context of added costs, user demand, long-term maintenance, and security.

In existing buildings, design professionals are to incorporate these accommodations, subject to the same considerations, during major renovations, and/or when toilet rooms are updated.

Where possible, in new buildings and renovation projects involving showers, locker rooms, or changing rooms, accommodation should be made to include single-person shower facilities independent of male or female specific spaces.

In all such private and lockable rooms, a panic alarm system is to be installed, integrated with the building security system, to allow users to call for emergency assistance.

Historic Buildings Requirements: The Philadelphia Historical Commission has certified a number of campus buildings as historically significant. Prior to beginning design on any such building, the PM is to schedule a meeting with the Cultural Resources Sub-Committee to review the proposed scope of changes to the building. Further meetings with this sub-committee may be required at every phase of the design and construction. For such projects, a preservation consultant is to be included in the A/E team for the duration of the design and construction process, as a fully integrated team member. The consultant's qualifications are to be reviewed and approved by the Office of the University Architect.

When undertaking renovation projects to buildings that have a significant historical character, the A/E is to engage a consultant with expertise in preservation and building conservation to carry out preservation services as part of the A/E team. The A/E is to work with the preservation consultant to ensure that the preservation goals are included as part of the project documentation, and executed during construction.

- All projects involving work on exterior masonry facades are required to obtain and record with the Office of the University Architect a mortar analysis to determine the original mortar color and composition. The analysis is to document joint detailing and profile as well as composition and pigmentation. Different samples are to be taken at each successive phase of construction of the existing building.
- All projects that involve replacement of doors or windows are required to obtain and record with the Office of the University Architect a paint and finish analysis to determine the original appearance of these elements. Special attention is to be paid to profiles of sashes, surrounds, and frames, so that an exact match is obtained for any replacement or restoration of windows or doors.
- If applicable, the A/E, working with the Office of the University Architect, is responsible for attaining approvals from the Philadelphia Historical Commission for all exterior work.

Landscape Architecture: All projects that include a significant landscape architecture component (as defined by the Office of the University Architect), are to employ a landscape architect as an integral part of the A/E team for the duration of the project. Landscape architects are expected to adhere to the University's landscape standards for all work, and work in consultation with the University Landscape Architect.

Utilities and Building Systems

Water and gas service, chilled water, steam, fire suppression, storm and sanitary drainage, electrical service, and building mechanical service (including heating, ventilation, and air conditioning), and all other systems are to be provided by the most economical and accessible means, considered over the entire life-cycle of the building or renovation. For specific standards and guidelines, the A/E is to refer to *The Mechanical and Electrical Standard Design Guidelines* (http://www.facilities.upenn.edu/getDone/designguides.php3).

Guaranteed Pavement Information System (GPIS): The University of Pennsylvania, in compliance with the City of Philadelphia Right of Way Management Ordinance (City Bill No. 050056), is working with the Department of Streets Right of Way Unit and its Guaranteed Pavement Information System (GPIS) regarding the design and installation of underground utilities in the public right of way.

As the Owner's agent, the Design Professional's services are to include representing the University by applying for and conforming to the GPIS system for all new and modified underground utilities proposed in a City of Philadelphia public right of way (as defined by GPIS).

Drainage System: The storm water, roof drainage, sub-soil drainage, and building waste-water system designs are to provide for the specific requirements of the project, taking into account the existing sub-soil water table levels and the capacity of the existing sewer and drain system. This information is to be coordinated with the foundation and basement waterproofing systems. Permeable paving and vegetated roof systems are examples of ways to reduce storm water runoff.

Electrical & Tele / Data Systems: The electrical system is to provide for power, lighting, tele/data communication systems, fire alarm systems, and all requirements of public safety. Many laboratory and other buildings that house critical functions are required to have dual electric feeds and/ on-site emergency power to critical equipment or locations, in addition to standard life-safety and emergency power requirements. All work is to be coordinated with key University stakeholders, such as the Office of the University Engineer, Fire and Emergency Services, Public Safety, and Information and Computing Services.

Steam Distribution System: Steam is available throughout the campus at high or medium pressure, depending on the location. The high-pressure lines are 170-225 psig. The medium pressure lines are 70-110 psig. To the extent possible, the A/E is to incorporate the use of this system, with central monitoring and control, as directed by the University Engineer or PM. Since most University facilities have some minimal summer steam requirement (for reheat, domestic hot water, sterilization, etc), the A/E is to design to provide for steam system capability to meet both the summer and winter loads in an efficient manner.

Heating, Ventilation, and Air Conditioning Systems: All new buildings are to be fully air-conditioned. The University Engineer is to review and approve the specified HVAC system. Each HVAC plant or method of air distribution is to be designed for maximum economy and efficiency. All systems must tie into University-wide control monitoring system. The A/E is to incorporate the existing central chilled water systems into all projects to the greatest extent possible.

All exterior mechanical equipment is to be shown to scale on all elevation drawings prepared by the A/E, from preliminary design to final construction documents. If the final size is not known during document preparation, the A/E is to show the largest possible size that may be used.

The A/E is not to locate exposed equipment on roofs. Exhaust fans, cooling towers, air handling units, and other HVAC equipment are to be incorporated into the body of the building or within penthouses, and air exchange is to be effected through louvers incorporated into the building and consistent with its aesthetic character. Cooling towers and air-handling units are not permitted to be visible from any place on campus or from other buildings. Window units are not to be specified.

Security Systems and Emergency Response: Coordinate with the University's Division of Public Safety to incorporate security systems required by the University, including alarm systems, fire alarm and fire suppression systems, and emergency communication systems. The A/E is to coordinate documentation using the university's preferred system providers for design and installation details.

Utility Shut Downs and Installations: All contract documents are to make clear that no University utility, including water, steam, chilled water, and electrical service will be turned on or off by any Contractor without the express permission of the Office of the University Engineer, conveyed by the PM. No new service equipment is to be installed and turned on without first properly installing and calibrating metering devices. The PM can provide detailed utility and/or building shutdown procedures, issued by the Operation & Maintenance Department of the University's Division of Facilities and Real Estate Services, that are to be referenced in project documentation and followed for all shutdowns.

Maintenance / Equipment Access: The design of doorways, ramps, driveways, and passageways are to ensure that all equipment can be removed and replaced without removing any walls, doors, or other equipment, and that trucks and cranes can be employed at the point of exit. The design is to allow safe, adequate passageways for servicing of equipment. The A/E's design is to avoid the use of sealed hatches, and provide room for service access to all items and space for a workbench in major mechanical rooms. The A/E is to show tube pull, removal routes, and so forth on the drawings. A dedicated freight elevator may be required to serve upper-level mechanical rooms.

System control and electrical panels must be located at working height and well lighted. Ventilation is to be provided to maintain comfortable working and operating conditions for equipment. The A/E is to minimize locating any mechanical equipment in ceiling spaces, including valves and dampers. If any such items requiring

service must be located above the ceiling, the ceiling must have permanent markers indicating locations, and the ceiling must be removable with no concealed spline.

Documentation Format and Graphic Standards

All written documentation is to be submitted in Microsoft Word electronic format. Submissions may be on Zip discs or on CD, labeled accordingly. Paper copies are to be provided as determined during the project initiation meeting or according to the Agreement.

Schematic Design, Design Development & Construction Drawings: Electronic files are to be submitted in TIFF (4) or AutoCAD format. (See TIFF and CAD requirements below). Submissions may be on Zip discs or on CD, labeled accordingly. Paper copies are to be provided as directed by the PM.

Context requirements for exterior renovation or alteration projects: Documentation of projects that involve changes to the appearance of building exteriors are to include scaled drawings of the entire facade of the building, including all floors and penthouses or equipment above grade and the full width of the facade under consideration. New work is to be noted and clearly identified graphically to describe the scope and extent of external alterations. This requirement applies to such work as louver replacement, security screens, exterior lighting, telecommunications work, painting, finishes, and restoration, in addition to other exterior work. If directed by the PM, the A/E may be required to produce sight-line studies to analyze the views of new work from various points along campus walks or from other buildings.

Key plans for interior renovation or alteration projects: Documentation is to include a key plan locating the project within its building and noting the floor on which the project is located.

As-Built and Record Drawing: Record drawings and documents are to be supplied in ALL of the following forms.

- Full size hardcopy blackline prints; either bond or vellum.
- AutoCAD R14 or 2000 electronic format. (See CAD Requirements)
- TIFF(4) scanned image file. (See TIFF requirements, below. Note that .jpg files are not acceptable. Design professionals wishing to submit .pdf files are to provide a sample to verify that it is acceptable to the University.)
- Microsoft Word (for written documents and specifications)

Electronic submissions may be on Zip discs or on CD, labeled accordingly. Drawings are to be labeled to reflect Record or As-Built status.

Content Requirements of As-Built and Record Drawing: The coversheet or first sheet of each drawings set is to include:

- Complete project title, including the client school or center;
- Location of the project, including a key plan;
- Project identification number provided by the PM;
- Numbered list of drawings with titles;
- Complete names and addresses of consultants and sub-consultants;
- Governmental agencies involved in the project, if any;
- Date.

Other requirements for As-Built and Record Drawing sets include but are not limited to:

- Room numbers on drawings must reflect those ultimately used in the spaces;
- Diagrams of all piping systems, including but not limited to condenser water, chilled water, refrigerant, steam and condensate, radiation, heating coils, fire lines, domestic water, and drains. Show all valves, gauges, strainers, meter, and other appurtances;
- Diagrams of each air handling system, including main duct runs, in the form of a riser diagram or isometric. Provide the sizes of main ducts as an aid to identification;
- Schedules of all mechanical, electrical, and plumbing equipment are to indicate capacities, heads, electrical characteristics, flow rates, and other critical data. Identify each unit by number, duty, and area served;
- Automatic Temperature Control systems schematic diagrams are to indicate control sequences on drawings and specifications, and an explanation of specialized systems and materials.

TIFF File Requirements: Scanning of drawings is to be performed at a resolution of 200 DPI, two color (black and white) depth, despeckled to indicate no less than 4 pixel original representation, axis skew aligned to within 5% of original line angle direction with image scale expansion not to exceed 3% of original in the scanner

device feed direction. All original black and color markings are to be recognized and rendered by the scanning and digital enhancement process with no less than 95% of the quality retained by the second image and 0.02 inch line definition retention. The resolution of these TIFF files are to be such that the cross section of each and every line is to never be less than three pixels in width.

Scanned files are to be made from hard copy prints of drawings considered by the A/E to be the final and definitive version, to include all title block and signature information. Scanned files may be electronically converted from CAD files provided title block information is complete and plotted scanned file is identical to hard copy plot from original CAD file.

Scanned file names are to be 21 characters and consist of three data groups separated by a dash. Zeroes are to be inserted to the left of each data group to meet required character length. First group is to be 5 characters and contain the approved Penn "Building Number." Second group is to be 6 characters and contain a "P" followed by the Penn project number. If a project number is not available, enter the year followed by the month for the most recent drawing date. Third group is to be 8 characters and contain the unpunctuated drawing number (not the CAD filename). Begin from right for drawing numbers exceeding 8 characters.

Examples: 00310-P00102-000000A1 (drawing w/ project number)
02090-200502-00000P14 (drawing w/o project number)

CAD Drawing Requirements: Layering, layer naming and file naming of CAD submissions for Record Drawings are to be documented and provided by the A/E. Submissions are to conform to the American Institute of Architects CAD Layer Guidelines, Second Edition. Sheet Files are to be provided for each hard copy drawing comprising the final drawing set. A separate file is required for each sheet. The origin of a sheet is to be located at the lower left outside corner of the sheet border. A sheet is not to contain any information placed outside of the sheet border.

All layers required for correct plotting of a sheet, and only those layers, are to be visible when the sheet is saved prior to delivery. All XREF's, blocks, images, overlays, etc., are to be "bound" to each sheet file to include all borders, common floor plans, and complete title blocks, and drawings are to be purged of all unused layers, blocks, and components before submission to Penn. Where possible, all text fonts are to be chosen from those supported by AutoCAD R14 or 2000. Other supplied CAD files (3-D, sketches, etc) are to be contained in a separate folder or other location apart from the CAD construction documentation files.

Space Management CAD Files
In addition to Record Drawings, the A/E is to supply Space Management CAD floor plan drawings in electronic format for new construction or any renovation that substantially changes the room layouts for more than 2500 square feet on a given floor. Space Management floor plans are required as soon as new room layouts are finalized and at least six weeks before the space can be occupied.

Floor plans are to be drawn at full scale and include room numbers and names or functions. Each drawing sheet is to contain only one complete floor plan, centered in the drawing field.

Space Management CAD Files Detailed Requirements

- CAD file names are to be configured as "building number" FLR "floor number." Example: 580FLR1.
- Room numbers and room descriptions are to be centered in the space they refer to. Text height for room numbers and room descriptions are to be 12 inches.
- Closed polylines are to be used to enclose the internal area of each room and space. A closed polyline is to be used to enclose the external area of each floor.
- Floor plans are to be oriented parallel or perpendicular to sheet borders so that north is generally at the top of each sheet.

Layering and color requirements for drawing elements are to be in accordance with Table A.

Table A:

Layer Description	Color	Layer Name
Room Description and Number	Magenta	Room_text
Shafts, Walls	Red	All_walls
Polylines	Green	Polylines
Stairs/Elevators/Railings	Blue	Stairs_elevators
Windows	Yellow	Windows
Doors/Swings	White	Doors
Fixed Equipment/Plumbing Fixtures	Cyan	Equip
Casework	Red	Casework

Campus Utility Map Updates

The Office of Data & Documentation, within the Office of the University Architect, maintains an updated campus utility map. At the close of each project that involves changes to the external routing, arrangement or location of any utility on campus, the A/E is to prepare AutoCAD drawings, derived from the campus utility map, to allow for updates by the Penn facilities staff.

The utility information is to include, but not be limited to: electrical power, steam, chilled water, telecommunications wiring, water supply, stormwater systems, sprinkler piping, sewers and gas lines. Updated documentation is also to include duct banks, underground wiring or utility pathway, sizes, substations, manholes, descriptive text and other changes to utility services. CAD files shall utilize the layering system, line types, symbology and all other characteristics of the campus utility map. New utility information shall clearly indicate where changes have been made.

Operation & Maintenance Documentation/Products and Materials Summary

The A/E's specifications are to require contractors to deliver O&M manuals to the PM as part of the project closeout documentation. These manuals not need to be supplied in electronic format. All material is to be delivered in a 3-ring binder labeled on the cover and spine with pertinent information related to the project. The manual is to contain an index sheet(s) listing material included for each division, arranged numerically by division. The manual also is to be tabbed to separate each division. Each Contractor may submit a separate O&M manual covering only his divisions provided material is configured as described above. Product information supplied separately bound by the manufacturer or vendor does not have to be included in the binder provided it is adequately identified with project and division.

Products and Materials Summary

As part of the closeout documentation for capital projects, the A/E is to submit a Products and Materials Summary spreadsheet, as directed by the University Project Manager. A sample spreadsheet is available at http://www.facilities.upenn.edu/uop/Products&materials.xls . These forms can be modified as required for specific projects, but are to list manufacturers, equipment types and model numbers, finishes, and building components to facilitate minor repairs and alterations carried out by the University.

Other Information

All photographs, models, sketches, and renderings prepared in the course of the design or as an additional service are the property of the University and are to be delivered at close-out or before, unless otherwise noted in the Agreement. Materials prepared electronically are to be submitted in CAD, or other format as approved by the Office of the University Architect at the time of presentation. (See CAD Requirements.) Electronic submissions may be on Zip discs or on CD, labeled accordingly.