

## **Design and Construction Standards**

### **Division 01 – General Requirements**

#### **General**

In general, follow the guidelines below when dealing with General Requirements. Unless specifically indicated otherwise, these guidelines are not intended to restrict or replace professional judgment:

1. When a Design Professional is not a part of the project, the general administrative duties relative to this section shall be the responsibility of the primary constructor (General Contractor, Construction Manager, etc.).
2. If there is no primary contractor (the Owner is sub-contracting all trades), then each trade will be responsible for the administration of their general requirements, in collaboration and coordination with the Owner.

#### **Section 01 00 00 Summary**

1. The Design Professional shall include a Summary of Work section in Division 1 of the Technical Specifications.
  - a. A general description of all elements of the project, including exterior work and any other related work, is required. This description, though brief, should be complete enough for each contract so that prospective bidders can understand the full scope. The use for which the project is being built shall be explained. Some parts of this description can be copied from the Program Statement
  - b. List the separate contracts under which the work will be accomplished and outline the scope of work included in each contract.
  - c. Work on the Other Projects: If other work, outside the scope of contracts for this project, will be performed simultaneously with the work on this project, explain how Contractors must cooperate with outside Contractors and with the University to avoid interference with each other's work.
  - d. Do not duplicate or conflict the General Conditions or the EMU Supplementary General Conditions found in the contract language.

#### **Section 01 23 00 Alternates**

1. Purpose of Alternates: A limited number of alternates may be used as a means of ensuring base bids within the available construction funds. The Professional shall consult the University regarding type, quantity, and priority of alternates.
  - a. Additive alternates shall be used in preference to deductive alternates.
  - b. Alternates will be kept to a minimum whenever feasible.
2. Designations for alternates shall be:
  - a. G-1, G-2, etc. for the General Contract.
  - b. P-1, P-2, etc. for the Plumbing Contract.
  - c. H-1, H-2, etc. for the Heating, Ventilating, and Air Conditioning Contract. (Do not use the letter "M" to designate this series.)
  - d. E-1, E-2, etc. for the Electric Contract.

- e. Alternates for other separate contracts should be listed by consecutive numbers prefixed by the letters used on the drawings to designate the contract.
3. Coordination of Alternates: Care must be exercised to coordinate Plumbing, HVAC, and Electrical alternates with General Contract alternates, with each other, and to list alternates in consecutive order; when possible, alternates which are contingent upon one another should be given the same number, as: G-2, P-2, H-2, and E-2. Awards of alternates must be in priority sequence. Therefore, Alternate 1 is priority 1; Alternate 2 is priority 2; etc.

#### **Section 01 30 00 Administrative Requirements**

1. All Vendors shall coordinate the management and administration of the project with the EMU Project Manager prior to commencing work.
2. All projects shall be appropriately tracked for both schedule and cost.
  - a. Schedule tracking shall compare planned schedule and milestone with actual schedule and milestones.
  - b. Cost tracking shall be to line item level and be compatible with the universities accounting and tracking systems. Coordinate detail and requirements with the EMU PM.
3. All records and data are subject to the Owner's review and/or audit.
4. All records and data are subject to the Freedom of Information Act (FOIA).

#### **Section 01 31 00 Project Management and Coordination**

1. Preconstruction Meeting: The Design Professional will schedule and furnish the agenda for a preconstruction meeting after award of contract. Among items to be discussed are provisions specified in this division of the specifications.
2. Progress Meeting: Include the following in the specifications (edit and revise to suit job conditions):
  - a. The General Contractor shall schedule a weekly job progress meeting with other prime contractors and major subcontractors and shall notify the Professional of the time and place of the meeting.
  - b. Subsequent meetings shall be held on the same day and hour of the week for the duration of the construction period; except, upon instructions of the Design Professional, the scheduled meetings may be increased or decreased as required by the progress of the work.
  - c. The Design Professional shall take minutes at each meeting. Typed copies of the minutes shall be distributed to all concerned parties.
    - i. Minutes may be distributed in electronic format.

#### **Section 01 32 00 Construction Progress Documentation**

1. Scheduling of Work: Fully describe all job conditions that will affect phasing and scheduling of the work. Particular attention shall be given to the scheduling of

remodeling in buildings that will remain in operation during remodeling. Examples of some items to consider are:

- a. *Temporary Facilities and Controls*: Regardless of new construction or renovation, interior or exterior work, there shall be provisions made to allow for temporary use, scheduling, security, and controls within the affected work zone.
  - b. *Providing and Maintaining Means of Ingress and Egress*: Temporary entrances and exits must meet code requirements.
  - c. *Maintaining Security for the University*: Areas that are being operated by the Using Agency must be secured from the construction area and vice versa.
  - d. *Shared Use of Docking Facilities*: Sometimes these facilities must be shared between the University and the contractors.
  - e. *Storing of Construction Materials and Delivery Schedules*: Temporary locations, secured when necessary, for the delivery and storage of construction materials. Schedules shall be coordinated with work hours, known traffic patterns, and Owner's use of the facility and adjacent facilities.
  - f. *Scheduling for Moves by University Departments*: If spaces must be ready for use or vacated by certain dates, name the spaces and give the dates.
  - g. *Dust Control and Noise Control*: Temporary partitions required for control of dust and noise should be shown on the Drawings, and provisions made in the Specifications.
  - h. *Maintaining Services*: Adequate space, access, and means shall be provided for the maintenance of not only the work zone, but of occupied areas. The Contractor shall be responsible to maintain any areas affected by his work.
2. Construction Photographs: The Design Professional shall furnish photographs as required for the work scope, duration, and recent project activity:
- a. For Legal Purposes:
    - i. Digital photographs of high resolution in JPG, TIF, or PDF format shall be submitted to the University each month. Prints may be 3-1/2" x 5" or larger.
    - ii. Quantities shall be minimum 12 per month or more depending on recent progress, activity, or known issue.
  - b. Additional Documentation:
    - i. Digital photographs of high resolution in JPG, TIF, or PDF format
    - ii. Electronic submission and data disk shall be submitted monthly
    - iii. Quantities shall be minimum 12 per week or more depending on recent progress, activity, or known issue.
  - c. Photographs shall show progress, work which will be concealed, problem areas, etc. The back of each hardcopy print will be identified with: project name, date photograph taken, exact location (such as Footing for Column B-9), and, if not obvious, the top of the photograph shall be marked. Negatives shall be indexed and identified.

**Section 01 33 00 Submittal Procedures**

1. Depending on the extent of the Scope of Work, the extent of Submitted Materials may vary, however will generally include (Design Professional to verify and edit list):
  - a. Construction Schedule (including periodic updates)
  - b. Certifications & Inspections
  - c. Testing Results
  - d. Shop Drawings, Samples, and Mock-Ups
2. Construction Schedule: Include the following paragraph (or a paragraph similarly worded) in the specifications: Immediately following contract award, the General Contractor shall prepare a construction progress schedule covering all divisions of the work and shall submit copies of this schedule to all other prime contractors. Schedules, as received from other prime contractors, with necessary revisions, shall be incorporated into the original schedule. The final schedule, bearing the approval signature of all prime contractors, shall be submitted in quadruplicate to the Professional. Following review by the University, copies of the final schedule shall be distributed to all interested parties. The schedule shall be broken down to a degree that will permit proper and complete coordination of all trades in each division of the work. Tentative dates for interruption of utility services shall be incorporated.
  - a. Periodic updates of the Construction Schedule shall be provided, no less than once per month, comparing the planned schedule to actual progress.
3. Certification Required from Suppliers and Installers: The following is a list of certifications and other submittals which may be required, in addition to guarantees, to assure quality materials or workmanship, or both. The Design Professional shall review, edit, add to, and modify the list as necessary for the project requirements. For some of these requirements, correct wording of articles, to be incorporated in the technical sections, is provided in these guides.

a. General Construction:

<i>Work Scope</i>	<i>Certification Required</i>
Sewers	Test approvals from Local Community or other controlling governmental agency
Reinforcing steel	Mill certificate
Insulating concrete	Manufacturer's certificate roof decks
Structural steel	Erector's affidavit frame
Face Bricks	Results of efflorescence tests
Masonry Restoration	Experience record of contractor or Subcontractor doing the work
Steel joists	Manufacturer's certificate
Metal decking	Manufacturer's certificate
Sealants	Experience record of contractor or subcontractor doing the work
Metal Windows	Performance reports
Reflective	Performance reports insulating glass
Finish Hardware	Inspection by an Architectural Hardware consultant

Fire-rated ceiling	Certification by installer
Carpeting materials	Test reports and manufacturer's certificate
Non-standard	Test reports and resilient floor manufacturer's certificate materials
Painting	Statements by paint manufacturer and applicator
Fire-resistive	Manufacturer's certificate coatings
Laboratory equipment*	Financial statement of manufacturer, experience qualifications
Library equipment*	Financial statement of manufacturer, experience qualifications
Kitchen equipment*	Financial statement of manufacturer, experience qualifications
Radiation protection	Qualifications of installer
Elevators	Maintenance Service, certificate of Inspection

\* *Laboratory Equipment, Library Equipment, and Kitchen Equipment will be included in General Contract unless directed otherwise by the University.*

b. Plumbing:

<b><i>Work Scope</i></b>	<b><i>Certification Required</i></b>
Soil, waste, and vent piping	Inspection certificate
Underground service piping	Test reports
Interior piping	Test reports
Welders	Copy of certification
Water lines	Sterilization test report
Gas service	Test reports and recording line charts for purging and pressure and interior piping

c. Fire Protections:

<b><i>Work Scope</i></b>	<b><i>Certification Required</i></b>
Fire department	Certification that pipe threads and connections are suitable for use with local hydrants and fire department equipment
Inspection	National Automatic Sprinkler agreement and Fire Control Association standard inspection and maintenance form (NFPA 25)
Fire lines and Test reports fire pumps	Test reports
Welders	Copy of certification
System	Fire Marshal's certification of inspection and acceptance

## d. Heating, Ventilating, and Air Conditioning:

<i>Work Scope</i>	<i>Certification Required</i>
Balancing of air and water systems	Balance reports
Boilers	Tests for safety and function, inspection and other certificates
Refrigerant lines	Proof of testing in compliance with USASI Standard, and reports
Fan ratings	Test performance seals, performance curves
Air, water, and steam lines	Test performance
Welders	Copy of certification

## e. Electric:

<i>Work Scope</i>	<i>Certification Required</i>
Primary cable installations	High voltage d-c proof tests
Cable splicing	List of proposed cable splicers and sample splice, either part of project or simply a sample, must be made to determine eligibility for approval of splicing

4. Shop Drawings and Samples: In the Specifications, provide a section specific to Submittals, including Shop Drawings and Samples. This section should be written to include submittals for all prime contracts so that no separate section or article need be written in the specifications for these contractors; however, each section in the technical provisions should contain a reference to this section together with a list of items for which shop drawings or samples are required. A statement shall be included so that the handwritten signature of the primary constructor (General Contractor or Construction Manager) is required, in addition to his dated stamp of approval.
5. Drawings Requiring Checking by Consultants: The Design Professional shall determine the requirements for submittal of drawings pertaining to work done by consultants and shall stipulate the number of copies required
  - a. The Owner requires one copy submitted to them prior to the Design Professionals review, and one copy including the review comments after the Design Professional's review. Once copy bearing the review comments and approvals shall be included in the O&M Manuals.
  - b. Owner's copies do not imply or constitute acceptance or approval of shop drawings. The primary constructor and the Design Professional shall be the responsible parties for review of required submittals.
6. Samples: After consultation with the University, the Professional shall indicate the items for which samples are required and shall stipulate the number of each required. Samples and color chips must be approved by the University.
7. Samples for Inclusion in The Work: If samples are expensive or are complete assemblies suitable for inclusion in the work, e.g., precast concrete panels, locksets and door

- closers, laboratory or other equipment, state that approved samples may be installed in the work, provided the location of these items is made known to the Professional.
8. Models and Patterns: Specifications for ornamental work which requires models or patterns, shall specifically stipulate that models and patterns become the property of the University after the ornamental work has been installed.

#### **Section 01 35 00. Special Procedures**

1. Hazardous Materials Procedures: The University shall be notified **immediately** of Contractor's intent to handle materials that are considered hazardous such as asbestos, lead mercury, flammable fuels, explosive chemicals, PCBs, etc. Notification shall be made to Eastern Michigan University's Environmental Health and Safety and coordinate all efforts through this department.
2. All contractors are required to have a written Respirable Crystalline Silica Program in place and control all dust that may contain respirable-sized particles of Crystalline Silica. The plan shall meet the requirements of the Respirable Crystalline Silica Construction Standard (29 CFR 1926.1153) established by the Occupational Safety and Health Administration (OSHA).

#### **Section 01 45 00 Quality Control**

1. Services by Specialists: In addition to the field supervision and inspections required by the Professional's contract and by State agencies, the following services by specialists will be required on major projects. Fees for specialists' services will be handled by the Professional as a reimbursable expense. While these services will be performed, the Professional shall supervise the specified operations; the specialist shall furnish required reports directly to the Professional, the State and the University. Details of the type of services required, methods of investigation, frequency of investigations or tests, number and type of reports required, and method of payment for specialists' services shall be included in the applicable technical sections of the specifications. Unless expressly exempted by the University, the following services shall be performed by qualified independent testing agencies:
  - a. General Construction:
    - i. Soils compaction tests
    - ii. Piling and caissons, inspections and tests
    - iii. Concrete sampling and tests
    - iv. Sound transmission tests
    - v. Radiation testing
  - b. Plumbing Construction:
    - i. Supervision of purging of gas piping
    - ii. Sterilization of water piping
    - iii. Testing of completed installations prior to inspection by the State Fire Marshal or his designated representative.
  - c. HVAC Construction:
    - i. Systems balancing

- ii. Soil corrosion analysis for cathodic protection
- iii. Pressure test for leaks by gas utility company
- d. Electric Construction:
  - i. Testing of communications systems
  - ii. Testing of signaling systems
  - iii. Testing of fire protection equipment and alarm system

### **Section 01 50 00 Temporary Facilities and Controls**

1. Access to Facilities: While Eastern Michigan University is a publicly owned institution, its function and facilities are dedicated to serve specific operations and programs. Therefore, contractor personnel may be barred from using existing toilet, food service, or other facilities.
2. Temporary Utilities: Contractors must arrange for and pay for all temporary utilities required for prosecution of the work. Specifications shall be written to stress this point. Eastern Michigan University owns and operates most utilities throughout the campus. Peripheral areas and regional campus buildings may have service connections directly from the public utilities. The Professional will determine type and scope of each utility needed during construction document phase and, after discussion with The Physical Plant department, provide specific direction to the contractors in the project specifications regarding the arrangement for such utilities.
3. Obtaining Site Utility Information: EMU Facilities will provide the Designer with existing site utility information for construction and renovation projects. This information is schematic only. The Designer is responsible for obtaining more detailed and accurate information required for the project. The Designer should engage a utility locating service during design development or the early construction document phase and work closely with the utility locating service and the owner of each utility, including the University utilities operating groups to ensure all utilities are located accurately on the drawings used for the design of the building.
4. Utility Kick-Off Meeting: EMU utility personnel will meet in the initial phases of the design process to identify utility issues. Representatives from all campus utilities (steam, chilled water, electric systems, and telecommunications) will attend the meeting. Additionally, a representative of the EMU Public Safety Department will attend regarding issues of road closings and construction scheduling.
5. Coordination with EMU Utility Providers: The Professional is responsible for coordinating with EMU utility providers.
6. Utility Company Installations: Plans for running temporary lines through University property shall be reviewed by the Professional in conference with the University.
7. Connections to Existing Utilities: If connections to University utilities are permitted, the Professional shall obtain drawings of existing utilities and shall consult the University regarding services available and points of connections to services. All services shall be metered through meters furnished by the contractors and the University shall be reimbursed for water, fuel, and power consumed. The specifications shall contain instructions to the contractors to make requests for these services through the University.



8. Cost: Costs for providing temporary services shall be included in the contractors' bids.
  - a. Specifications shall clearly identify each contractor's responsibility for the installation of service lines and payment for services, whether services are furnished by the utility company or by the University.
    - i. General Contractor or Construction Manager shall pay for water, steam, fuel for heat, and electric power consumed. IT and telephone services shall also be obtained and paid for by the Constructor.
      1. In specific project circumstances, EMU may cooperate and collaborate on utility supply. Coordinate with the EMU Project Manager for opportunities to provide infrastructure support.
    - ii. Plumbing Contractor shall install and maintain water supply lines and make changes in lines as necessitated by conditions at the site.
    - iii. HVAC Contractor shall install and maintain heating systems and make changes as required.
    - iv. Electrical Contractor shall install and maintain electrical installations and make changes as required.
9. Duration of Services: The specifications shall clearly identify each contractor's responsibility for providing continuous utility services until date of final acceptance or beneficial occupancy (whichever comes first) including operation of permanent equipment and services.

#### **Section 01 52 00 Construction Facilities**

1. Field Offices and Sheds: Each prime contractor shall provide and maintain a clean, weathertight office at the site suitable for his own use, and for use of his subcontractors. All expenses including the installation cost, and the use of telephone, heat, light, water, and janitor service shall be borne by the contractor.
2. General Contractor's Office shall be of size suitable for the use of the contractor, his subcontractors, the Design and Construction department project manager, and the Professional's representative. Office shall be heated, lighted, have doors with locks, and private line telephone service. One space in the office shall be provided for use of the Professional's representative; space shall be equipped with plan table, filing cabinet, and telephone. The General Contractor or his authorized agent shall be present at the office, or elsewhere on the site, at all times while the work is in progress.

#### **Section 01 54 00. Construction Aids**

1. Temporary Elevators:
  - a. One New Elevator may be used for construction purposes. Facilities shall be made available to all contractors and subcontractors; all costs associated with use shall be assigned to the General Contractor. Written arrangements must be made with the University and must include:
    - i. Installation of protective covering of car interior, doors and entrance.

- ii. Weekly cleaning and servicing by the elevator installer at the Contractor's expense.
    - iii. Complete restoration of all elevator system components to like new condition ready for turnover to EMU.
    - iv. The repair and warranty period required by the contract will not be diminished by authorizing this use.
  - b. Existing Elevators shall not be used during construction without permission of the University.
  - c. Protective Pads and hooks for hanging the removable pads shall be furnished and installed in the elevator which is most suitable for furniture and equipment moving for use by the University.
2. Temporary Hoists:
  - a. Hoists: Specify that the General Contractor furnish hoisting facilities and that these facilities be made available to other contractors and to subcontractors. Other prime contractors may furnish facilities to suit their needs if suitable arrangements cannot be made with the General Contractor. Provide for hoisting of workers as well as materials and equipment if it will be cost effective.

### **Section 01 55 00 Vehicular Access and Parking**

1. Construction Area Maintenance and Access: If existing streets and roads on campus must be used, a detailed plan of the routes to be used must be worked out in cooperation with University personnel. The final approved plan shall be shown on the project drawings, and specifications must stipulate that no other streets and roads be used without written approval by the University.
2. Clean-Up Enforcement: Specifications shall contain provisions that Contractors must remove mud and spillage from public and university streets without delay. Failure to clean streets promptly could result in streets being cleaned by the University or other public agency at the Contractor's expense.
3. Repairs of Damages to Facilities: Specifications shall also contain provisions that damage to roads or other facilities on University property, resulting from hauling, storage of materials, or other activities in connection with the work, shall be repaired or replaced, at no expense to the University, by the Contractor causing the damage. Repairs or replacement shall be made to the satisfaction of the University.
4. Maintenance of Traffic Flow:
  - a. Planning for Temporary Control: The University Department of Public Safety must be notified at least two weeks in advance of any anticipated work affecting traffic flow. To assure maintenance of flow and to safeguard all parties involved in planning temporary routing, a field inspection should be made jointly by the Professional, The University, and Contractor personnel prior to performing any work that would interrupt normal traffic patterns. Rerouting of traffic shall be planned as to route and direction, in cooperation with the University Department of Public Safety and as approved by the University Design and Construction department.

- b. Traffic Control Plan: All construction activity impacting roadways (vehicular access) or sidewalks (pedestrian access) shall have a written traffic control plan (TCP) and access plan submitted for review and comment by the Department of Public Safety prior to the completion of the final construction and bid documents. In most cases, the TCP shall also require approval from the City of Ypsilanti and/or the State of Michigan Department of Transportation (MDOT). Traffic Control Plans must be included in the project bid documents.
- c. The responsibility and implementation costs for any required Traffic Control Plans (TCP) required before, during, or after the project construction activity, shall be the responsibility of the contractor. These costs shall include all labor and equipment necessary to meet the requirements of the TCP including all reimbursement costs to the EMU Department of Public Safety for special traffic direction, construction parking enforcement, or other personnel utilized to provide and assure the safety of EMU during the construction.
- d. Cost and convenience should always be subordinated to safety for the students, faculty, employees, and visitors on the EMU campus.
- e. Contractor's Responsibilities: The contractor, whose work requires interruption of traffic, shall be required to post signs in all affected areas, in sufficient numbers and with appropriate messages, to warn motorists entering the construction zone and to alleviate conflicts and confusion among motorists or pedestrians at intersections, crossings, turns, and other obstructions to normal traffic flow. Temporary lanes shall be well marked, and obstructions, barriers, lane changes, or detours shall be indicated by appropriate signage at each point of potential confusion, as well as at each change in direction of a temporary route. The University Public Safety Department shall be notified in advance of the anticipated time of return to normal traffic patterns. Upon completion of construction affecting streets or traffic flow, but before temporary control devices and lane markings are removed, the area shall be restored to receive traffic in the normal pattern. The University Public Safety Department shall be notified of the actual time of completion of restoration.
- f. Provisions for Special Duty Police Officers: If it is evident that traffic will become hazardous or restricted in any manner, uniformed special duty police officers must be provided by and at the contractor's expense. These officers shall be employed by contacting the University Director of Public Safety at least two weeks before officers' services are required. The contractor shall also forward a copy of the request to the University project manager. Specifications should be written to alert contractors to the possibility that special duty police officers might be needed at times other than, or in addition to, the contractor's normal work hours.
- g. Parking: Employees of contractors and subcontractors must secure parking permits from the University Parking Department and must park cars in areas assigned to them. Parking on streets or in restricted areas is prohibited. At the beginning of the work, each contractor shall report to the University Parking

Department the approximate number of parking permits which will be required for all employees, including employees of subcontractors. Each contractor shall provide the University project manager with a copy of his letter of application for parking permits.

### **Section 01 56 00 Temporary Barriers and Enclosures**

1. Ingress and Egress for Buildings: During joint occupancy of buildings, entrances and exits for public use must be provided to meet code requirements. A minimum of one ingress, and egress, and path of travel that is accessible to individuals with disabilities must be maintained to all user occupied portions of the building.
2. Sidewalk Barricades: Provide a detail for sidewalk barricades as required to discourage pedestrian traffic. The barricades are to be at least 42 inches high and of suitable width to completely obstruct passage beyond on the closed sidewalk. The barricade shall consist of: a rigid frame with a 2x6 wooden toe board affixed approximately one inch above the sidewalk across the entire width, cross bracing to hold the barricade in place, and orange safety fencing affixed to the frame. Specify/detail a sign stating "SIDEWALK CLOSED" affixed to the structure. Signage must meet all applicable ADA requirements.
3. Noise and Dust Control: In occupied buildings the Professional shall indicate areas for which noise and dust control must be provided and shall specify methods of control. If details of installations are involved, specify these in the applicable sections of the technical specifications. The General Contractor or Lead Contractor shall install barriers indicated by the Professional and shall provide other dust control barriers as required by construction operations.
4. Construction Fence: A 6 ft. high fence with top rail and gates shall be erected around the project site and storage yards. Fence and location shall be subject to the approval of the University Project Manager. Show fence location on drawings. At the completion of the project, the Contractor must remove the construction fence completely, including all portions of belowground footings. Fence post must be removed, not sawn off flush with the soil line. All core holes must be completely filled with appropriate material.
  - a. Usually a chain link wire fence with top rail on steel posts is sufficient; however, where appearance is a consideration, a privacy type fence might be required, provided the budget permits such construction.
  - b. Temporary plastic fence material may be used for projects with durations of less than one month if applicable provided they are maintained.
  - c. Barbed wire used on any part of the fence is prohibited.
  - d. 'No Trespassing' signs, which meet OSHA requirements, shall be specified.
5. Weed Control: Specify that the General Contractor must cut the weeds inside the construction fence as often as necessary to maintain a neat appearance at the project site.
6. Construction Staging Areas:
  - a. Construction staging should be planned in the Design Development phase of the project and included in the Design Development submittal. Construction staging plans should be developed in consultation with the following:

- i. Public Safety Department regarding traffic circulation, pedestrian walkways and construction parking.
  - ii. Grounds and Custodial Department – regarding maintaining trash/recycling services to ALL buildings in or around the construction area throughout the construction process
  - iii. Grounds Services regarding tree protection.
  - iv. Access Services Department regarding measures that should be incorporated to insure safe travel of pedestrians and vehicles during construction. These measures should be indicated on the Pedestrian Safety Plan that will become part of the final construction documents for the project.
  - v. Health and Safety Department regarding potential conflicts with fire lanes. If construction staging is located on an existing parking lot, the Contractor shall pay for the restoration after construction.
7. Off-Site Staging/Lay-Down Areas: In areas of the campus where limited space is available for construction staging, an option for off-site staging/lay-down area is sometimes available. EMU Grounds Department should be consulted about the details of this option. The Public Safety Department may also be contacted for locating an off-site construction trailer.
8. Building Security: During construction, one exterior door of any enclosed structure may be provided with a lockset with an EMU core. The General Contractor shall obtain core from and return same to the University Project Manager / EMU Lockshop. In the case that an EMU core is not utilized, master keys for access shall be provided to the Department of Public Safety, the EMU Project Manager, and other safety and security personnel as deemed necessary for the project.
9. Fence Gates: Except during working hours, gates shall be kept locked by the General Contractor at all times. One gate shall be double locked with an EMU padlock and the contractor's padlock in a manner that will allow access by unlocking either padlock. Other prime contractors may install their own padlocks if it is determined that they will require access to the area at time other than regular working hours.
10. Tree and Plant Protection:
  - a. Protecting trees during construction is of paramount importance. Aspects of the University's Tree Protection Plan are listed below.
  - b. A tree protection plan is required for all projects. The plan is developed in consultation with EMU Grounds Services and the University's Project Manager, during the schematic or design development phase, and becomes part of the design and construction documents. Facilities Planning, Construction Management and Grounds Services must approve it. Placement of tree and landscape protection measures, such as fences (plastic or metal), protective mulch, protective fabric, and logging mats, should be indicated, as detailed below. The plan is a separate drawing, at an appropriate scale, labeled "Tree Protection Plan," and:
    - i. Identifies size, species and location of all trees affected by the project.
    - ii. Indicates which trees and shrubs are to be removed from the site.

1. Note: When trees and shrubs are removed, care must be taken to protect trees and other landscape elements that are to remain.
- iii. Indicates which trees and shrubs are to remain.
- iv. Indicates routes of all trenches necessary for installation of underground utility lines.
  1. Note: Trenches must be designed to avoid encroachment into the critical root zone of trees. In some cases, tunneling may be necessary to avoid damaging tree roots.  
Also:
    - a. Identify areas away from protected roots to be used for staging soil
    - b. Provide fabric and mulch for soil storage if it is in the root zone of a protected tree
    - c. Indicate that severed roots over 1” are to be cut clean
- v. Indicates the areas designated for project construction staging, parking, material storage, and waste removal. Take the following measures to mediate compaction damage:
  1. *Severe compaction zones* (any staging within the drip line, travel lanes, vehicle parking in the root zone) - Provide fabric, logging mats and mulch.
  2. *Moderate compaction zones* (material storage) - Provide fabric and mulch, or mulch only.
  3. *No compaction* (e.g. trailer location) - No protection required
- vi. Indicate trees that require limbing to avoid damage during construction.
  1. Note: Limbing should be done by with consultation with the EMU Grounds Services or, in the event that this department cannot meet the project schedule, by a certified arborist. Adequate funds should be set-aside in the project budget to cover this cost.
- vii. Provide details of who will install and maintain protection measures
  1. Logging mats, fabric, and mulch: installed by Contractor or Grounds Services. If the Grounds Services will install measures, provide funding in the project for material and labor:
    - a. Tree protection fencing: installed by Contractor. Fences should be checked daily.
- viii. Provide clear signage in the construction area. Examples:
  1. “No Trespassing”
  2. “No Machines”
  3. “No Storage of Materials”

- ix. Resolve pedestrian conflicts (in consultation with the Department of Public Safety) that may be created by tree protection fencing with:
  1. Temporary sidewalks
  2. Signage
  3. Resolve vehicular conflicts (in consultation with the Department of Public Safety) that may be created by tree protection measures with:
    - a. Road re-routing
    - b. Signage

### **Section 01 57 00. Temporary Controls**

1. Air Pollution Nuisances Prohibited: The General Contractor or the Lead Contractor shall provide controls to prevent air pollution in accordance with all federal, state and local codes, the emission or escape into the open air from any source or sources whatsoever, of smoke, ashes, dust, dirt, grime, acids, fumes, gases, vapors, odors, or any other substances or combinations of substances, in such manner or in such amounts as to endanger the health, safety or welfare of the public, or cause unreasonable injury or damage to property, is hereby found and declared to be a public nuisance. It shall be prohibited for any person to cause, permit or maintain any such public nuisance.
2. Restrictions of Emissions of Fugitive Dust: The General Contractor or the Lead Contractor shall provide controls to prevent fugitive dust in accordance with all federal, state, and local codes. Fugitive dust cannot be emitted from any source without taking reasonably available control measures to prevent it from becoming airborne. "Reasonable available control measures" means the control technology which enables a particular fugitive dust source to achieve the lowest particulate matter emission level possible and which is reasonable available considering technological feasibility and cost effectiveness. These measures shall include but not be limited to:
  - a. The use of water or other suitable dust suppressant chemicals for the control of fugitive dust from the demolition of existing buildings or structures, construction operations or the grading of roads or the clearing of land;
  - b. The periodic application of asphalt, oil, water, or other suitable dust suppression chemicals on dirt or gravel roads or parking lots, and other surfaces which can cause emissions of fugitive dust;
  - c. The covering, at all times, of open bodied vehicles, when transporting materials that are likely to become airborne;
  - d. The paving of roadways and the maintaining of roadways in a clean condition; and
  - e. The prompt removal, in such a manner as to minimize or prevent resuspension, of earth or other material from paved streets onto which earth or other material has been deposited by trucking or earth-moving equipment or erosion by water or other means.

3. Temporary Erosion and Sediment Control: Soil erosion and sedimentation control (SESC) procedures are activities which are regulated by the State of Michigan on all EMU project sites that implement an earth change activity.
4. All earth changes of one acre or more or within 500 feet of Waters of the State require a plan that is in compliance with the Soil Erosion and Sedimentation Control Part 91 of Natural Resources and Environmental Protection Act Public Acts 451 of 1994, as amended. All other projects must provide a site plan and a description of the methods being employed to control run off and the resulting sedimentation which would otherwise enter the existing storm water system.
5. The A/E shall prepare the soil erosion and sedimentation control plans and specifications and submit the plans for review and approval to the Washtenaw County Soil Erosion and Sedimentation Department. The Washtenaw County Soil Erosion and Sedimentation Department is designated as an "Authorized Public Agency" and is responsible for administration of Part 91 of Act 451. The proposed plans for soil erosion and sedimentation control must be submitted for review and approval prior to the beginning of any site work.
6. Implementation of the soil erosion and sedimentation control plan, including required maintenance during construction and final removal as directed in the plans is the responsibility of the Contractor. Prior to the start of construction, the Contractor is responsible for obtaining all necessary permits.
7. In planning project erosion control measures the following guidelines should be followed:
  - a. Integrate the overall construction design and activities to fit the physical and vegetative features of the site.
  - b. Specify the staging of construction and stabilization activities to minimize the area and duration of disturbance.
  - c. Specify control measures that will minimize erosion as a first line of defense, such as: seeding & mulching, preserving vegetative buffers, surface roughening, grade stabilization structures, check dams and controlling wind erosion by covering stockpiles or wetting exposed soils.
  - d. Include perimeter protection controls that will prevent off-site sedimentation. Ex: perimeter barriers (silt fence), vegetative filter strips, anti-tracking pads, storm drain inlet protection, and sediment basins. Sedimentation control should not be used as a substitute for erosion control, but rather in conjunction with erosion control.
  - e. Specify that a sweeper shall be employed to remove sediment tracked onto the pavement at least on a daily basis. Include a requirement that sweepers must be used more frequently, as needed, based on site conditions.
  - f. Monitor and repair fences daily
  - g. Require the Contractor to establish an inspection and maintenance schedule.
8. Include as a minimum the following information for sites one acre or more in size or within 500 feet of Waters of the State:
  - a. A map or maps at a scale of not more than 200 feet = 1 inch. Map shall include a legal description and site location, sketch that includes the proximity of any proposed earth change to lakes, streams or both;



- predominant land features including lakes, streams and wetlands; and contour intervals or slope information.
  - b. A soils survey or a written description of the soil types of the exposed land area contemplated for the earth change.
  - c. Description and location of physical limits of each proposed earth change.
  - d. Description and location of existing and proposed on-site drainage and dewatering facilities.
  - e. Description and location of all temporary and permanent erosion and sedimentation control measures, including timing on installation and removal of temporary measures.
  - f. Program and schedule for maintaining all control measures.
9. Clearly indicate which measures are temporary and which are permanent. Require the contractor to remove temporary measures as per permit requirements.
10. Recommended control measures for all EMU sites involving earth change activity:
- a. The following SESC measures need to be included in plans. Other measures may also be required based on specific site conditions and projects.
    - i. Provide inlet protection on all adjacent and down gradient storm water inlets, catchbasins, and manholes. This may be accomplished using filter fabric, regular or high flow silt sacks, or other control measures.
    - ii. Install an entrance anti-tracking pad with a minimum of 50 feet in length. A geotextile filter fabric should be placed under 6 inches of limestone aggregate.
    - iii. Install perimeter barriers adjacent to and down gradient of the disturbed area.
    - iv. Place stockpiles and other spoil piles away from the drainage system to minimize sediment transport. Keep as few stockpiles as possible during the course of the project. If the stockpile and/or spoil pile must remain onsite overnight, or if the weather conditions indicate the chance for precipitation protect the pile from erosion.
    - v. Provide dust control.
    - vi. Provide sweeping to remove any track-out.
    - vii. Specify biodegradable products for erosion control blankets.
11. Temporary Erosion Control: The General Contractor or the Lead Contractor shall place temporary erosion and sediment control measures to minimize adverse impacts to storm water runoff. The selected control measures must also comply with appropriate provisions and plans approved by the Washtenaw County Soil Erosion and Sediment Control Division. Any plantings or mulches must also comply with all University Standards.
12. Silt Fence: The manufacturer's recommendation shall be followed with regard to shipping, handling, storage, installation, and protection from direct sunlight. The geotextile will be rejected if it has defects, tears, punctures, flaws, deterioration, or damage incurred during manufacture, transportation, storage, or installation. Each roll shall be labeled or tagged to provide product identification.

- a. The post spacing shall be as recommended by the manufacturer. The spacing of the post shall be adjusted such that the posts are located at the low points along the fence line. At joints, the overlap shall be nailed or similarly fastened to the nearest post with a lath.
13. Straw Bales: Straw bales shall be embedded and staked. Adjacent bales shall be chinked to eliminate gaps between the bales. Bales shall be placed such that bindings are parallel to and not in contact with the ground.
14. Temporary Silt Ditch: Construct a special temporary ditch in relatively rolling areas where, in the judgment of the Professional, adjacent property may be damaged from sheet type soil erosion. This special ditch is not intended to carry large volumes of water but to catch sediment from runoff. Construct silt checks within the ditch or at the outlet.
15. Temporary Seeding and Protection: Promptly perform the work of temporary seeding and protection to prevent visible erosion. Protect all seeded areas with mulch that precludes siltation. Perform temporary seeding and protection under the following conditions:
  - a. When it is impractical to bring an area to final line, grade, and finish so that permanent seeding protection work can be performed without subsequent serious disturbance by additional grading.
  - b. When soil erosion occurs, or it is considered to be a potential problem, on areas where construction operations are temporarily suspended.
  - c. When an immediate cover would be desirable to minimize erosion, siltation, or pollution.
  - d. On temporary roadways that are expected to remain in place for longer than 30 days and that are constructed of erodible materials.
16. Temporary Mulch: When temporary seeding and protection would be required, but the time of exposure is 30 days or less, perform temporary mulching to prevent visible erosion. Place temporary mulch to an approximate 2- inch loose depth.
17. Catch Basin/Curb Inlet Protection: Install and maintain catch basin or curb inlet protection on all existing inlets/basins receiving runoff from disturbed areas. All protection must be suitable for minimizing infiltration of silt into storm inlets. The protection must be installed and maintained in accordance with the manufacturer's instructions.
18. Construction Entrances: All ingress and egress points for construction vehicles (construction entrances) shall adhere to the approved temporary and permanent erosion and sediment control measures in accordance with the approved plan and permit conditions.
19. Temporary Storm Water Protection and Control:
  - a. National Pollution Discharge Elimination (NPDES): Any construction activity that disturbs one or more acre of total land is required to obtain a National Pollution Discharge Elimination System (NPDES) Construction General Permit (CGP) from Washtenaw County.
  - b. Notice of Intent (NOI) And Storm Water Pollution Prevention Plan: If a NPDES Permit is required, the Professional shall prepare and submit a Notice of Intent (NOI) and Storm Water Pollution Prevention Plan (SWP3) with

Washtenaw County. The NOI and Storm SWP3 must be reviewed by the University before submittal to Washtenaw County. The Contractor shall be responsible for obtaining the permit and a copy of the NOI, Storm Water Pollution Prevention Plan and letter from Washtenaw County granting permit coverage must be maintained at the construction site for the duration of the project.

- c. The NOI and SWP3 must be prepared and submitted to Washtenaw County in a timely manner to allow adequate time for approval.
20. Drainage: The General Contractor shall provide temporary drainage trenches, drains, sumps, pumps, or other items required to afford satisfactory working conditions for the execution and completion of the work of all contractors and to protect all work. Water shall be diverted to or shall be pumped into existing storm sewerage systems and shall not be allowed to run onto ground surface area.
  21. Storm Water Run-Off: Include the pumping of tunnels, elevator pits, and other structures which collect storm water and waste water run-off from construction operations.

#### **Section 01 60 00. Product Requirements**

1. Product Storage and Handling Requirements
  - a. Transportation and Handling: Although scheduling of deliveries is the responsibility of the contractors, the Professional shall, by visual observation and by checking the contractor's estimates for partial payments, control deliveries to assure that storage spaces are not unduly encumbered with materials which cannot be installed in the work within a reasonable time.
    - i. Payment for materials in a stored condition is generally not acceptable for the University, and payment shall only be made for elements "installed". Provisions may be made for stored materials when:
      1. The EMU Project Manager concurs, and;
      2. Photographs and documentation of the stored materials is provided by the Vendor, and;
      3. Insurance, in the form of certificate, for the full value of the stored items is provided.
  - b. Storage and Protection: Specify that each contractor shall provide suitable weathertight storage sheds of sufficient size to hold materials required on the site at one time, for storage of materials which might be damaged by the weather. Outdoor storage of materials shall be confined to the areas within the construction fence. Temporary structures shall be painted with at least one coat of paint; color shall be approved by the University. No signs except small identification signs are permitted on sheds. Indoor storage shall be confined to unused spaces in the building. Corridors, stairs, and other public spaces shall not be used for storage. Special care must be exercised to protect electrical and HVAC equipment.

- c. Storage of University Equipment: Prior to completion of a building, large rooms at, or near, grade level with docking facility access shall be made available to the University for the secure storage of equipment. Details shall be arranged with the University Project Manager.

**01 70 00. Execution and Closeout Requirements**

- 2. Field Engineering
  - a. Layout Data: A licensed engineer or surveyor shall be employed to layout structure coordinates, site improvements, and utilities, to determine all lines and elevations, and to verify same from time to time as the work progresses.
  - b. Grade Lines, Levels, And Bench Marks shall be established and maintained by the General Contractor.
  - c. Building Layout Data: The General Contractor shall provide and maintain well-built batter boards at corners of buildings. As work progresses, he shall establish bench marks at each level and shall establish exact locations of partitions on rough floors as guides to all trades.
- 3. Protection of Adjacent Construction
  - a. Roof Protection: Specify that the Contractor shall provide protection for any roof area(s) that will be affected by the project. Protection shall consist of using ½-inch thick plywood with foam board attached. The composite board shall be laid with the foam towards the roof surface and shall be arranged to protect the roof from falling objects...i.e. hand tools, power hand tools and material. The protective covering shall be secured in a non-destructive fashion (i.e. weighted down) to avoid dislocation in inclement weather. This protection shall not relieve the Contractor from responsibility to repair any damage to the roof resulting from his work.
- 4. Cleaning: Final cleaning shall be for occupancy, and shall exceed daily or construction clean-up. All surfaces shall be free of dust, clean, and as intended to appear. Minimum level of cleanliness shall be APPA Standard Level 2 for Ordinary Tidiness.
- 5. Operation and Maintenance Data: Detailed requirements should be stipulated in the appropriate sections of the specifications. For items of General Construction, specify that information for care and maintenance be furnished for any item requiring more than ordinary custodial care. For mechanized equipment and electrical equipment, specify that operation manuals be provided, and for special equipment stipulate that, in addition to operation manuals, the original equipment manufacturer provide demonstrations and operating instructions by factory trained employees to designated University personnel who will be operating the equipment. The following are merely suggestions for the kind of data which might be required.
  - a. General Construction:

<i>Item</i>	<i>Data Required</i>
Simulated masonry	Surface treatment

Cut stone	Damp-proofing treatment
Glue-laminated wood	Finishes
Wood shingles and shakes	Preservative treatment
Fluid applied roofing	Instructions for patching
Single-ply membrane roofing	Maintenance and repair instructions
Aluminum, bronze, and S.S. doors and windows	Care of finishes
Electronic locking systems	Wiring diagrams and operating instructions
Special flooring	Finishes and maintenance data
Chalkboards / Whiteboards	Cleaning instructions
Motor-operated chalkboards	Wiring diagrams and operating instructions
Pedestrian control devices	Wiring diagrams
Sun control devices	Wiring diagrams
Equipment	Wiring diagrams and any special instructions required
Special Construction	Systems diagrams and any special instructions required
Elevators and hoists	Operating and maintenance instructions

b. Plumbing:

<i>Item</i>	<i>Data Required</i>
Piping systems	Printed diagrams - valve tag directory
Pumps, controls, and special systems	Wiring diagrams, operating instructions, parts lists, testing procedures

c. Heating, Ventilating, And Air Conditioning:

<i>Item</i>	<i>Data Required</i>
Control systems	Printed diagrams and operating instructions
Valves	Type-written valve tag directory
Pumps, controls, and special systems	Wiring diagrams, operating instructions, parts lists, testing procedures

d. Electric:

<i>Item</i>	<i>Data Required</i>
Communications systems	Point-to-point wiring diagrams and instruction manuals
Motor control centers	Overload heater charts
Equipment	Operating instructions
Fire alarm systems	Point-to-point wiring diagrams

- 6. Operation and Maintenance Manuals: The Professional shall review the contractor's submittals of manuals for correctness and sufficiency of data and, after approving the contents and format, shall obtain the number of copies required, including three copies for resubmittal to the University Project Manager.
- 7. Format for Manuals: Manuals shall consist of manufacturers' typed or printed operation instructions and maintenance data, shop drawings or catalog cuts, and other data listed herein; all bound in 8-1/2" x 11" hard- back binder.

a. Material shall be assembled as follows:

- i. Inside Cover: Title of job, Eastern Michigan University, address, date of submittal, name of contractor and name of manufacturer.
- ii. Second Page: Index
- iii. Third Page: Introduction to first section containing a complete written description of the equipment or system.
- iv. First Section: Written description of system contents, where equipment is located in building, how each part functions individually and how system works as a whole, concluded with a list of items requiring service and the service needed or reference to the manufacturer's data in the binder which describes proper service.
- v. Second Section: A copy of each shop drawing with an index at the beginning of the section.
- vi. Third Section: A copy of manufacturer's operating instructions with an index at the beginning of the section.
- vii. Fourth Section: A list of all equipment incorporated into job, contractor's purchase order numbers, supplier's name and address.
- viii. Affidavits, And Guarantees: In addition to the standard forms required by the contract documents, the following are required. When statements applying to these requirements are provided in these guides, the statements (or paragraphs similarly worded) shall be included in the specifications. The Professional can save a duplication of work at time of completion of construction if the specifications writer prepares a list of required affidavits, bonds, and guarantees as the specifications are prepared.

ix. Affidavits

<i>Item</i>	<i>Affidavits</i>
Carpeting Materials	Installer attests that correct materials were installed
Non-standard Resilient	Installer attests that correct materials were installed

x. Extended Guarantees

<i>Item</i>	<i>Affidavits</i>
Roofing	20 year maintenance guarantee
Flashing and Sheet	10 year maintenance guarantee

Metal	
Membrane Waterproofing	3 year maintenance guarantee
Sealants	5 year guarantee
Metal Windows	2 year guarantee for windows/5 year guarantee for weatherstripping
Wood laminated plastic faced doors	Lifetime guarantee
Tinted and Insulating glass	10 year guarantee
Chalkboards	20 year guarantee
Whiteboards	Lifetime guarantee for “ghosting” & staining
Water Chillers and Air Cooled Condensers	10 year guarantee

8. Final Inspection: All final inspections shall be documented and provided in the Close-Out Manuals, including but not limited to:
  - a. All Permit Inspections
  - b. Punch lists and completion as documented by the Contractor
  - c. Punch lists and completion as documented by the Design Professional
  - d. EMU / Owner reviews and approvals
9. Project Record (As Built) Documents:
  - a. Contractors' Responsibilities: Provide all necessary mark-ups, conditions, and information to the Design Professional to properly document and produce the As-Built documents.
  - b. Professional's Responsibilities: After final acceptance of the project, the Professional shall revise the construction document tracings and electronic files to accurately record the project as-built. Identify the addenda, bulletin, change order, alternate, etc. for each item. Submit the revised prints and electronic files to the University for review. Make any additional modifications and submit the tracings, electronic files, plus two (2) copies of prints made from the corrected tracings. Also provide five (5) copies of the specifications and general conditions modified by the addition of each accepted addenda, alternate, each accepted bulletin and change order and identification of the brands of materials which were accepted when choices were available to the contractors along with supporting electronic files. Identify the tracings and other documents with the label "Record Documents".
  - c. Electronic File Submittals shall be presented in a logical manner with appropriate directory and subdirectory structures and shall: reflect the final "As Built" conditions and adhere to the following guidelines:
    - i. Drawings:

1. Shall be delivered in the most recent version of AutoCAD for CAD drawings;
    - a. BIM documents shall be delivered in REVIT format
  2. Shall have externally referenced drawing files permanently bound to the final drawing file by the consultant prior to delivery;
  3. Shall have all reference files (font files, menus, shape files, etc.) delivered along with the final submittal. If copyrights prohibit this, such reference files shall not be used on the project;
  4. Shall strictly adhere to the current published AIA guidelines for layering standards.
- ii. Technical Specifications:
1. Shall be delivered in the most recent version of Microsoft Word.
- iii. Operating and Maintenance Manuals (as available):
1. Shall be delivered in either the most recent version of Microsoft Word and in Adobe Acrobat PDF format.
- d. Data Not in Electronic Format, but part of the final document submittal, (i.e. details that are 'sticky-backed' onto the plotted sheets), shall be noted in the electronic files completely, including a description of the drawing(s).
- e. Submittal shall consist of: A database file which compares the Program of Requirements Assignable Square Footage to that of the Schematic Design Document, the Design Development Document, the Construction Document, and the As-Built Document. This submittal must be in the following format:

TITLE BLOCK

Project Name:

Project Number:

Project total gross square footage (GSF):

Column #	Column Header
1	PoR Item Number
2	PoR Item Name
3	PoR ASF
4	Schematic Design ASF
5	PoR/Schematic Design ASF Difference
6	Design Development Room Number
7	Design Development ASF
8	PoR/Design Development ASF Difference
9	Construction Document Room Number
10	Construction Document ASF
11	PoR/Construction Document ASF Difference
12	As-Built Room Number



13	As-Built ASF
14	PoR/As-Built ASF Difference
15	Comments

- f. This file should also contain a subtotal by Program Item Number Group (e.g. all spaces under Program Item Number 1.0 would be subtotaled). A Project total ASF should also be included (totals all Program Item # Group ASFs).
- 10. Request for Professional's Final Payment: After the corrected tracings have been reviewed by the University and accepted. Final payment of fees will not be approved until acceptable documents are received.
- 11. Demonstration and Training:
  - a. Specify that training is to be done by the original equipment manufacturer. Training by the contractor or sales personnel is prohibited.
  - b. Training shall be identified separate from “start-up and check-out” in the specifications.
  - c. Specify that training shall be scheduled through the Facilities Operations department.
  - d. Training shall include all materials; i.e. OEM manuals, books, plans, and specifications necessary for equipment troubleshooting and maintenance by in-house maintenance department, as appropriate.
  - e. Specify that the OEM shall provide labor for miscellaneous support during the warranty term.

### **Section 01 90 00 Life Cycle Activities**

- 1. During the design phase of the project the Professional Designer shall consider and take into account the life cycle costs of all major equipment, functions, and materials specified for installation.
  - a. The Design Professional shall prepare a Life Cycle cost analysis for the project and submit these findings and recommendations to the Owner with the Schematic Design documents for review.
  - b. Sustainable practices and reviews shall be considered during these analyses.
  - c. Value Engineering practices shall also consider the short term pay-off and long term payback results. Provide written analysis on options including the pros & cons of such choices.

## **End of Division 01 – General Requirements**