CM/GC Statement of Work

Prepared for the US Department of Energy under contract numbers:
SLAC DE-AC02-76SF00515
ANL W-31-109-ENG-38
LLNL W-7405-ENG-48
Submission and Approval

The Construction Manager and General Contractor (CM/GC) shall provide all the required services herein established including schedule management, cost management, estimates of probable construction cost, value engineering, constructability reviews, pre-bid and bidding phase, safety management, and final installation of all conventional facilities construction.

Stanford Linear Accelerator Center

John Galayda
Director
LCLS Project

David Saenz
Conventional Facilities System Manager
LCLS Project

Mark Reichanadter
Chief Engineer
LCLS Project

Robert Todaro
Procurement Officer
SLAC
# TABLE OF CONTENTS

0.0 GENERAL INFORMATION ................................................................. 5

1.0 CM/GC GENERAL PROJECT PROVISIONS ............................................. 15

2.0 PHASE 1 – PRE-CONSTRUCTION SERVICES PHASE ............................. 18

3.0 PHASE 2 – CONSTRUCTION PHASE .................................................. 29
ACRONYM LIST (NOT A COMPLETE LIST)

ACWP        Actual Cost of Work Performed
AE          Architect Engineer
BOC         Beneficial Occupancy
CAD         Computer Aided Design
CAE         Computer Aided Engineering
CFC         Certified for Construction
CFR         Code of Federal Regulations
CM          Construction Management
CSI         Construction Specification Institute
DOE         Department of Energy
ES&H        Environmental, Safety, and Health
FCO         Field Change Order
FCR         Field Change Request
FHA         Fire Hazard Analysis
FY          Fiscal Year
HVAC        Heating, Ventilation and Air Conditioning
I&C         Instrument & Control
IEEE        Institute of Electrical and Electronic Engineers, Inc.
NFPA        National Fire Protection Association
OSHA        Operational Safety and Health Act
P3          Primavera Project Planner
PCO         Project Change Order
PE          Professional Engineer
PEP         Project Execution Plan
PSSR        Procurement Schedule Status Report
QA          Quality Assurance
QAP         Quality Assurance Plan
R&D         Research and Design
RFP         Request for Proposal
SOW         Statement of Work
VE          Value Engineering
WBS         Work Breakdown Structure
CONSTRUCTION MANAGER & GENERAL CONTRACTOR
STATEMENT OF WORK

0.0 GENERAL INFORMATION

0.1 The Construction Manager & General Contractor (CM/GC) shall provide all the required services herein established including schedule management, cost management, estimates of probable construction cost, value engineering, constructability reviews, pre-bid and bidding phase, environmental, safety and health management, and final installation of all conventional facilities construction. The CM/GC shall demonstrate proven management expertise with quality control, schedule and budget management for projects of similar size and complexity. In addition, the CM/GC shall provide efficient and comprehensive project management through all phases of the project, with particular emphasis placed on the capability to work in partnership with SLAC, consultants, and contractors during design and construction.

0.2 This Statement of Work (SOW) is intended to be generally developed into two phases. Phase 1 - shall include the services of a CM/GC during the design phase and up to the start of construction. Phase 2 - shall include the services of the CM/GC from the start of construction of all subsurface construction and related service buildings, and the construction of all surface facilities including the office complex and its related service building. For the purposes of this document, start of construction shall be construed as on-site mobilization to commence Phase 2.
0.3 The CM/GC during Phase 1 shall provide a variety of project management services as described in this document including, but not limited to: design and constructability reviews (including value engineering), procurement support, construction management, development of a Project Management Plan, commissioning, and post-construction support in cooperation with SLAC personnel, building occupants and architect-engineers. It is the intent of this SOW that the CM/GC will not provide or perform any design effort, as all design effort is currently managed by SLAC through an established contract with an existing AE consulting firm.

0.4 During Phase 2 the CM/GC shall be responsible for ensuring that all labor, material, tools, equipment, excavation, shoring, testing, inspection, commissioning and all necessary General Conditions Work, that is required by or may be reasonably inferred from the subcontract documents to provide the construction services and construction work for the project titled The Linac Coherent Light Source (LCLS) in an acceptable manner. SLAC intends to use the “Construction Management Standards of Practice” issued by the Construction Management Association of America (CMAA) as a guide in developing this SOW and its general expectations through the performance of this project. This document establishes industry standards of service to define the full range of construction management services without limiting the methods and procedures by which those services will be provided for a particular project or program. CM/GC firms are encouraged to provide staff certified as construction managers by the Construction Manager Certification Institute sponsored by the CMAA.

0.5 The construction management services shall consist of managing materials, equipment
procurement, construction subcontracts, and all construction activities at the site including:

a) Review of AE designs for constructability and assisting AE forces to generate efficient construction packages.

b) Construction planning including generating resource loaded construction schedules, arranging construction packages, and determining construction activities sequences.

c) Managing subcontracts for conventional facilities.

d) Managing all construction activities at the site (material and equipment receipt, warehousing, security, fire protection, construction safety program, installation, disposal of all non-hazardous construction waste, etc.) Site access will not require a security clearance. However, site access shall be restricted to authorized personnel.

e) Assembly of the construction bid packages using drawings, technical specifications, and quality requirements prepared by the AE team. The bid packages will delineate the specific requirements expected, the quality of products furnished, and the QA requirements necessary to obtain a satisfactory and operable product. These requirements include:

1) Special and general conditions.

2) Construction drawings and specifications

3) Equipment lists and installation requirements.

4) Project cost and schedule reporting requirements.

5) Quality assurance and quality control requirements.

6) Methods for payment.
7) Special processes or procedures to be prepared by the contractor.

8) Material certifications, receiving, inspection, storage, and handling documentation requirements

f) Provide support to SLAC operations forces performing integrated system testing, start-up, and operations activities.

g) Performing construction testing.

h) Monitoring construction subcontractors' progress versus schedule, including ES&H performance, confirm progress claimed on invoice payments, provide advice and interpretation of the AE drawings and specification requirements.

i) Providing a construction completion and acceptance turnover system.

j) Providing warehousing, materials control and preventive maintenance in accordance with manufacturer’s or collaboration laboratory instructions for equipment in storage or installed in facilities.

k) Security and access control at the construction site during construction.

0.6 This LCLS project shall include construction at the existing SLAC site. Included shall be the construction of utilities between the LCLS site and the existing SLAC site utility and communication systems, connections and modifications to existing roads and other infrastructure adjacent to the LCLS site boundaries, site renovations, building demolition, and site development for the following main features of the LCLS conventional facilities project: construction of an above grade concrete beam enclosure and its related service buildings and associated utilities; construction
of approximately ½ mile of underground tunneling with cover varying from 20 feet to 100 feet, tunneling infrastructure including all related utility service buildings and associated utilities; and construction of approximately 78,000sf office complex including common space, wet/dry laboratories, conference space and related utility service buildings and associated utilities. A conceptual site plan is shown on Figure 1 and an architectural rendering of the subsurface construction is shown as Figure 2.

Figure 1 – LCLS Site Plan
The facility descriptions are as follows:

**Beam Transport Hall (BTH)** – This facility (11,189 sf) will overlay and extend beyond the existing footprint of the Final Focus Test Beam (FFTB). It is a 745’ long facility to transport the electron beam from the existing Linac, through the Research Yard (RSY), and into the Undulator Hall. The concrete walls are required to be 72” thick while the roof is 48” thick for purposes of radiological shielding. The facility will require a new concrete slab foundation since the loads are significantly heavier than the existing facility. The inside dimensions are 15’-0” wide by 12’-6” high while the new finish floor is approximately 2’-0” higher than the existing RSY floor. 100% of this facility is at-grade and all contained within the RSY. This facility has zero occupancy during operation. The service buildings for this portion of the complex are two service buildings (1,804 sf) that are constructed of steel columns with metal siding and roofing. The service buildings will house the make-up air units in support of the BTH. This facility has zero occupancy during operation. 100% of this facility is above ground.
Undulator Hall (UH) – This facility (7,383 sf) is a 574’ long underground tunnel facility that houses undulators and ancillary equipment. The entire facility is completely underground and is separated from its adjacent facility by a thermal barrier at each end. It has very stringent vibration requirements therefore the foundation slab is unique in its design features. The walls and roof of this facility consist of reinforced gunite construction. Particular attention is given to tunnel walls to improve dust control. This underground facility has zero occupancy during operation. The HVAC mechanical and electrical system to support the stringent requirements of this facility will be housed in a 1,400 sf insulated service building constructed of steel columns with metal siding/roofing. This service building will be constructed at grade and ducted through the existing grade approximately 80’ above the invert elevation of the UH. 100% of this facility is underground.

Electron Beam Dump (BD) – This facility (1,973 sf) is a 132’ long underground concrete cast in-place facility used to separate the electron and x-ray beams. The inside dimensions are 15’-0” wide by 12’-6” high. The walls and roof of this facility consist of formed in-place concrete construction for the walls, roof and floor slab. This facility has zero occupancy during operation. 100% of this facility is underground.

Front End Enclosure (FEE) – This facility (1,422 sf) is a 100’ long underground concrete cast in-place facility that houses various diagnostics equipment to support the photon beam. The inside dimensions are 15’-0” wide by 12’-6” high. It is very similar to the Electron Beam Dump in its construction with formed in-place concrete for the walls, roof and floor slab. This underground facility has zero occupancy during operation. 100% of this facility is underground.
Near Experimental Hall (NEH) – This facility (12,500 sf per floor) is a two level underground facility (basement level and sub-basement level) whose primary function is to house 3 experimental hutches, prep, space, shops, and a larger bay. All main walls, roofs and slabs are constructed of reinforced concrete. A 300 sf electrical/mechanical service room is contained within the building square footage. 100% of this facility is underground.

X-Ray Transport & Diagnostics Tunnel (XRTDT) – This facility (14,762 sf) is an 820’ long underground tunnel used to transport photon beams from the NEH to the FEH. The inside dimensions are 18’-0” wide by 12’-6” high. The tunnel construction is similar to the construction of the Undulator Hall with the exception of the stringent HVAC and foundation vibration requirements. The walls and roof of this facility consist of reinforced gunite construction. This facility has zero occupancy during operation. 100% of this facility is underground.

Far Experimental Hall (FEH) – This facility (10,792 sf) consists of caverns and tunnels that houses 3 experimental hutches, prep, shop space, and general office accommodations. The tunnel construction is similar to the construction of the Undulator Hall with the exception of the stringent HVAC and vibration requirements. The walls and roof of this facility consist of reinforced gunite construction. 100% of this facility is underground.

Far Experimental Hall Service Building – The FEH facility also requires a 3,028 sf electrical/mechanical service building that is above grade. The service building will house electrical service, make-up air units, air handlers and exhaust fans in support of the XRTDT and FEH facilities.
Central Lab Office Complex – This office facility (74,000 sf) will house ~ 260 LCLS researchers, engineers, technicians, administrative staff and visiting experimentalists. This is a 3 story facility entirely above grade facility. The service building for this complex will be housed in a 4,000 sf utility building constructed of steel columns with metal siding/roofing. See Figures 3 through 5 for Office complex site plan and architectural renderings.

Figure 3 – Office Complex Site Plan
Figure 4 – Office Complex Elevations

Figure 5 – Office Complex Elevations
1.0 CM/GC GENERAL PROJECT PROVISIONS

1.1 Staffing: The CM/GC shall provide a full-time Project Manager for the Work with the authority to commit resources of the firm to monitor, manage and administer all phases of the Project activities and to help achieve the completion of all pre-construction services and construction activities. CM/GC shall provide all necessary qualified personnel to perform CM/GC services under this Subcontract. If the CM/GC’s personnel fail to perform to SLAC’s satisfaction, SLAC may, upon 10 days written notice, require the CM/GC to remove such person(s) from the project and replace them with personnel acceptable to SLAC.

1.2 The cost of any requirement in Division 1 Specification Sections (Exhibits A-D) contained herein that is not identified as an item to be included in the CM/GC’s effort for Phase 1 and or Phase 2 shall be included elsewhere in the Bid Package. Identification of the method proposed to satisfy requirements included in the Division 1 Specification Sections, does not relieve the CM/GC from its obligation to ensure compliance with said requirements or its contractual responsibility to SLAC for such work.

1.3 The CM/GC shall prepare, provide and implement a project specific Program Management Plan (PMP) that shall include as a minimum the following documents:

- Construction Management Plan (CMP)
- Construction Safety Plan
- Procurement Plan
- Quality Management Plan

All documents within the PMP will serve as a roadmap for executing this project. The CM/GC will review the PMP with the Conventional Facilities Manager for approval prior to
executing the plan. A minimum of 10 working days shall be given to SLAC for review of the PMP.

1.3.1 Construction Management Plan (Construction Management Association of America, 2000 Edition, Quality Management Guidelines

The CMP is a written, project-specific plan which outlines the project’s scope, organization, and specific approach that the CM/GC will undertake to accomplish the various management tasks for the project. The Quality Management Plan should be integrated into the CMP to maintain a focus on project quality. The CM/GC shall maintain the CMP throughout the entire course of the project. The CM/GC shall provide an approved means for revisions to this document as changes become necessary.

In addition to the CMP, the CM/GC shall include scheduling data that includes Actual Cost of Work Performed (ACWP); actual schedule progress, milestones reached and earned value; variance analysis and corrective actions needed; display of the present critical path for conventional facilities; and a narrative describing the status of technical work, significant project accomplishments, and potential problems.

1.3.2 Construction Safety Plan

The CM/GC shall provide a written project-specific plan which addresses all aspects of the work and clearly identifies the individuals responsible for the overall project safety. The CM/GC shall make the Construction Safety Plan a part of every subcontractor’s contract and applicable to every level.
The CM/GC shall review and approve all subcontractor’s safety plans to insure compliance with CM/GC approved Construction Safety Plan, monitor safety performance against the Construction Safety Plan requirements, provide additional and independent safety inspections, stop unsafe activities, investigate all accidents and injuries, and require corrective action of unsafe conditions throughout the course of the project.

1.3.3 Procurement Plan

Maintain procurement status and schedule data for CM/GC procured items. A monthly Procurement Schedule Status Report (PSSR) shall be provided to show the status of subcontracts, purchase orders, and material/equipment deliveries. Identification of procurement activities that are overdue or that have scheduled dates within the next 90 days shall be easily identified. Capability to input forecast dates shall also be provided.

1.3.4 Quality Management Plan (QMP)\(^1\)

The CM/GC shall be responsible for developing and maintaining a project specific QMP which reflects the general approach of the CM/GC to accomplish the required quality for Phases 1 and 2 of the Project. The QMP shall fully support the CMP and shall include, but not be limited to the following:

- Overall project organization
- Project QA/QC organization

\(^1\) Construction Management Association of America, 2000 Edition, Quality Management Guidelines
• Management decision flow chart

• Formats for various elements of the CM services (i.e., formats for job meetings, minutes, progress payment application, field observation reports, shop drawing logs, notice of proposal change orders, etc)

• Detailed check lists or audit plans to provide for quality in the practice of CM functions (i.e., check lists for approving contractor’s schedules approving revisions to schedules, reviewing change order costs, obtaining approval within owner organization for changes, approval to start foundation construction, approval to start concrete pour, start steel erection, preliminary and final acceptance, etc)

• Project Quality Audit forms

2.0 PHASE 1 – PRE-CONSTRUCTION SERVICES PHASE
2.1 Upon written Notice to Proceed from SLAC, the CM/GC, in coordination with the Conventional Facilities Manager, shall immediately commence the services listed herein.

2.2 CM/GC PRE-CONSTRUCTION SERVICE

2.2.1 CM/GC shall provide other services that are reasonable and necessary to assist SLAC in the maintenance of the Project budget and schedule.

2.2.2 CM/GC, its officers, agents, employees, subcontractors, consultants and any persons or entities for whom the CM/GC is responsible, shall provide all services pursuant to the Subcontract Documents in a manner consistent with the standard of care under California law applicable to those who specialize in providing such services for projects of the type, scope, and complexity of this project.

2.2.3 The CM/GC shall generate a construction plan during Title II design. This planning shall include inputting construction schedule data into the conventional facilities schedule.

The construction plan shall take into account SLAC operations and shall include:

a) Definition of the roles and responsibilities of major CM/GC participants

b) Definition of construction packages.

c) Identification of warehousing, lay-down areas, construction offices, parking, and similar needs and definition of where these will be located and how they will be constructed for both the CM/GC and his subcontractors.

d) Identify long lead procurements and implementation plans for procurement.

e) Identification of construction power, water, borrow and spoil areas, waste disposal, erection of cranes, road improvements, and other major activities
needed to support construction and a description of how they will be handled.

f) Definition of how construction materials, procured equipment, and technical system components will be received, tracked, maintained, warehoused, and transported to the point of installation.

g) Definition of how construction of buildings and other major structures will be staged (what parts of the site will be under construction and when) and an analysis of the crafts needed at various locations on the site during the construction phase.

h) Working with SLAC ES&H and jurisdictional environmental compliance organizations to provide a Storm Water Control Plan for site construction work in accordance with State Environmental and Safety Regulations. It shall be understood that the AE firm will prepare construction documents for Erosion and Sediment Control Plan, and a Storm Water Management Plan.

2.3 PROJECT CONTROL/ESTIMATING

2.3.1 Within two weeks of the completion of the 50% Title 2 design (if schedule permits), and within two weeks of the completion of 100% Title 2 design documents, the CM/GC shall submit to SLAC, an independent written Project Construction Cost Estimate. The CM/GC shall meet with the AE firm and the Conventional Facilities Manager to reconcile discrepancies between its estimate and the AE firm estimate. The estimate
shall be based on detailed quantity takeoffs of the design Drawings and Specifications. The CM/GC shall obtain Conventional Facilities Manager’s written approval of estimate format and structure prior to proceeding with estimate.

2.3.2 Within three weeks of the completion of the 50% Title 2 (if schedule permits), and within three weeks of the completion of 100% Title 2 design documents, the CM/GC shall prepare a comprehensive critical path method, Preliminary Contract Schedule, showing all project related construction activities; including sequencing and durations for work tasks of the subcontractors throughout the life of the Project. Support for integrating appropriate portions of this schedule into the integrated project schedule, maintained by the project office, shall also be provided. The Preliminary Contract Schedule shall have the ability to be filtered for each subcontractor to illustrate their planned basic construction sequence and interface with other subcontractors. The Preliminary Contract Schedule shall identify the proposed Bid Packages the CM/GC recommends as appropriate to complete the Work per the Subcontract Documents and contract schedule. In the preparation of the Preliminary Contract Schedule, the CM/GC shall investigate the procurement lead-time required for delivery of time-critical items and incorporate these into the Preliminary Contract Schedule. For the 100% Title 2 Preliminary Contract schedules, the CM/GC shall cost load the schedule with the reconciled cost estimate and produce a monthly budgeted cost of the Construction Work.

Schedule information shall be sufficiently detailed to manage conventional facilities activities for the ability to inform the Conventional Facilities Manager of all major and critical construction activities. A major milestone for Beneficial Occupancy (BO) of
individual system areas should be continually updated and reviewed for actual need date by the various System Manager responsible for their areas of responsibility. The scheduling software shall be Primavera Project Planner (P3) or SLAC approved equal. CM/GC shall prepare a detailed work plan identifying all CM/GC tasks and subcontractor tasks required for the completion of the Construction Work as provided in this Subcontract.

Maintain schedule milestone status and schedule data for CM/GC team activities. A monthly Milestone Schedule Status Report (MSSR) shall be provided to show the status of milestones. Identification of milestones that have not been met or that have scheduled dates within the next 90 calendar days shall be easily identified. Capability to input forecast dates shall also be provided.

2.4 CM/GC DESIGN COORDINATION SERVICES

2.4.1 Prior to construction bidding and based on projected bid market conditions, the CM/GC shall recommend in writing to the Conventional Facilities Manager the percentage of bid contingency to carry for each Bid Package in the Project budget.

2.4.2 CM/GC shall schedule and conduct a constructability review within 3 weeks after Notice to Proceed on the Title 2 design documents. This review is critical to SLAC as it ensures the project is designed and constructed with efficiency and reasonableness to the construction process. The review of the design, bid and contract documents for constructability should include as a minimum the following:
• Availability of materials
• Alternate construction methods
• Site access
• Limited work space
• Suitability for use
  o Construction materials
  o Design intent
• Clarity and completeness of documents
• Affect on contractor’s ability to implement their “means and methods”
• Trade labor availability
• Subsurface concerns

The CM/GC shall coordinate the constructability review with the AE firm and shall provide the Conventional Facilities Manager with a formal report that describes the process and findings within 2 weeks from the constructability review.
2.4.3 At the same time the CM/GC performs the various cost estimates as called for by this Scope of Work, it shall conduct reviews to determine and identify items that the CM/GC feels, in its professional opinion, could lead to a higher cost of bids for the Bid Packages; and/or change orders resulting from design ambiguities, coordination of work to be performed by various trades, errors, and/or omissions in the drawings and specifications prepared during the design work by the AE firm. The CM/GC shall present its results in a written report to the Conventional Facilities Manager; and meet with both the Conventional Facilities Manager and the AE firm to present and explain its findings.

2.5 VALUE ENGINEERING

A value engineering (VE) study will be conducted on the 50% Title 2 design documents. The CM/GC will be responsible for the study and will coordinate the participation of the AE firm, CM/GC, and various SLAC personnel. The CM/GC shall have the PM, Superintendent, and MEP Manager participate in the VE session and will respond to follow-up questions from the VE consultant as they prepare the VE report.

As a minimum, the CM/GC shall ensure that the VE session covers: Life Cycle Cost Analysis – an evaluation of the various project systems, materials, and equipment with respect to first cost, long term cost, anticipated life of the component and all other time related factors of the item; Maintenance, Operation and Compliance Standards; Maintenance – an evaluation of the anticipated cost for SLAC to maintain the operational efficiency of the items, as compared to alternate considerations; Operation – an evaluation of the anticipated energy and other cost for
the operation of the items; Compliance Standards - an evaluation of regulatory and code requirements of each item.

2.6 SITE INVESTIGATION

Within 60 calendar days after Notice to Proceed of Phase I, the CM/GC shall perform an investigation of the project site to confirm existing conditions. The CM/GC shall pothole critical areas of underground utilities to confirm conditions, (a SLAC Excavation Clearance form must be approved prior to any subsurface investigations). It shall be the responsibility of the CM/GC to obtain all required SLAC approvals on the SLAC Excavation Clearance form. Existing utilities visible from the surface or from manholes or visible within adjacent buildings are to be verified where they are critical to define the scope of work for the project. The CM/GC shall review the existing utility drawings to verify accuracy. The CM/GC shall review the project geotechnical reports as per paragraph 2.6.1.

2.6.1 CM/GC shall review existing documentation as provided by the AE firm and SLAC to establish a basis of existing site conditions. It shall be the responsibility of the CM/GC to provide and submit a report to the Conventional Facilities Manager that describes the anticipated conditions to include but not be limited to subsurface obstructions and or interferences, utilities, structures, etc. The AE firm will utilize this report in the final design of the project.
2.7 SAFETY & HEALTH PROGRAM

2.7.1 CM/GC shall prepare the Environmental Safety and Health Program and the Construction Safety Plan and submit to SLAC for review and approval. It must be of paramount understanding to the CM/GC that the safety of all personnel during construction is of prime importance to the project. The CM/GC and all its subcontractors shall comply with OSHA regulations 29 CFR 1926 and applicable sections of 29 CFR 1910 during construction activities. The CM/GC shall establish health and safety goals for the project, the least of which shall be no lost time accidents during construction and incentives to promote and maintain a strong ES&H involvement at all work levels. The CM/GC team shall have a written construction safety program (Safety and Health Program in conjunction with the Project Construction Safety Plan) that describes in detail, the activities planned to meet these goals with emphasis on the methodology for analyzing and controlling project hazards and task specific hazards, as well as the procedures for evaluating subcontractor safety and health performance and ensuring subcontractor compliance with project safety and health requirements. The cornerstone of the program shall be the execution and implementation of the documented Pre-Task Planning for all activities. Frequent construction safety oversight and audits will be performed by SLAC project ES&H safety personnel.

2.8 CM/GC BID PHASE SERVICES

2.8.1 The CM/GC shall be responsible, for sequencing, assembly, scope definition and preparation of Bid Packages and all cover information for individual packages to assure that all items as indicated in Subcontract Documents, including coordination of details and subcontractor required General Conditions Work are included with bid documents. The CM/GC shall not create or permit duplication of work between Bid Packages
and/or General Conditions through scope descriptions, or by any other means. The CM/GC shall analyze the Bid Packages, identify elements of uncertainty or risk prior to the bidding, endeavor to eliminate conflicts, duplications and omissions and mitigate SLAC’s exposure to bidding error through instructions to bidders.

2.8.2 The CM/GC shall assemble Bid Packages in a complete, coordinated and most cost-effective manner for SLAC. CM/GC shall obtain all necessary design documents from the AE firm and with the assistance of the Conventional Facilities Manager to arrange for printing, binding, wrapping and delivery to the bidders, and shall maintain a list of bidders receiving the Bid Documents. SLAC shall pay for all postage, delivery and printing costs.

2.8.3 The CM/GC shall review, recommend, develop and estimate allowances, alternates, unit prices and other requirements for inclusion in the Bid Packages. If the CM/GC elects to require subcontractor performance or payment bonds, it may include such item as an alternate that shall not be used as the basis of award. The cost of subcontractor payment or performance bond, or insurance purchased in lieu there of, if any, will be included by SLAC in Subcontract Modifications for Bid Package(s).

2.8.4 The CM/GC shall develop lists of possible bidders to solicit bids for the Bid Package(s), provide pre-bid subcontractor prequalification criteria, and conduct prequalification of subcontractors when directed by the Conventional Facilities Manager. The CM/GC shall conduct an outreach effort to attract broad interest among qualified bidders. It shall be the responsibility of the CM/GC to contact potential bidders to develop a sufficient
pool of bidders. The CM/GC shall secure the commitment to bid from a minimum of 3 bidders for each Bid Package. CM/GC shall issue the Bid Packages as required by the General Provisions, after the Conventional Facilities Manager and Subcontracting Officer reviews and approves the Bid Package and issues Letter of Bid Package Review. Such review will confirm that CM/GC has complied with the provisions of this section. CM/GC shall make any changes to Bid Packages as directed by SLAC.

2.8.5 The CM/GC shall, as directed by the Conventional Facilities Manager, respond to bid questions during the bid period and at pre-bid conferences, pre-construction conferences and walk-through.

2.8.6 The CM/GC shall evaluate the bids received in detail for technical deficiencies. The CM/GC shall analyze the bid results for potential error, review the apparent low bids for responsiveness and compliance with this Subcontract, and shall recommend award or other action to SLAC. The CM/GC shall determine if potential bidder(s) are not responsible or if bid(s) are non-responsive; CM/GC shall provide a debriefing of its recommendation, to the LCLS Project Management, regarding bidder(s)/bid(s) and provide Bid Package Certification to SLAC. The CM/GC shall review the bid results for such bidding climate issues as bid responsiveness, adequacy in the number of bidders and the spreading or grouping of bid results. CM/GC shall make recommendations as to which add or delete alternatives (if any) to be awarded if necessary. The CM/GC shall make aware to LCLS’s Procurement Officer that such changes in scope are requested by the subcontractor.
2.8.7 The CM/GC shall record bids received. The CM/GC shall prepare spreadsheet analyses indicating all bids received and comparing the lowest responsible bids with the cost estimate for that Bid Package. These results shall be submitted to the Conventional Facilities Manager a minimum of three days prior to an award to the successful bidder/s. Should the event arise, it shall be the responsibility of the CM/GC to provide a debriefing session (as necessary) to each bidder. The CM/GC shall make aware to SLAC’s Procurement Officer that such an event is requested by the subcontractor.

3.0 PHASE 2 – CONSTRUCTION PHASE

3.1 GENERAL

The CM/GC shall insure that all materials, labor, and services required by the Subcontract Documents to construct the Work for the Contract Sum and within the Contract Time during Phase 2 or also described as the Construction Phase. The Contract Sum will be adjusted by unilateral Subcontract Modification after each Bid Package in Phase 2 has been bid and certified by the CM/GC and approved by the Conventional Facilities Manager and Procurement Manager for award, within 45 after receipt of Bid Package results. SLAC may elect to hold and issue all or several bid packages in a single unilateral Subcontract Modification.

3.2 GENERAL CONDITIONS WORK

The CM/GC shall provide all items identified in this section and in the CM/GC provided General Conditions to subcontractors in the Phase 2 bid price. In addition, the CM/GC shall
provide all other items required by the Subcontract Documents and any other General Conditions Work items, required to complete the Work.

3.3 RESERVED

3.4 PERSONNEL

3.4.1 FIELD STAFF

3.4.1.1 The following list of Field Personnel shall be provided as a minimum for the percentage of time shown for the Construction Phase duration. Any additional Field Personnel that the CM/GC determines may be necessary to manage, implement, and supervise the Work shall be included in its base bid of Phase 2:

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Title/Function</th>
<th>% Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Project Manager</td>
<td>100</td>
</tr>
<tr>
<td>1</td>
<td>Superintendent</td>
<td>100</td>
</tr>
<tr>
<td>1</td>
<td>MEP Manager</td>
<td>100</td>
</tr>
<tr>
<td>1</td>
<td>Project Engineer</td>
<td>100</td>
</tr>
<tr>
<td>1</td>
<td>Project Secretary</td>
<td>100</td>
</tr>
<tr>
<td>1</td>
<td>Safety &amp; Health Manager</td>
<td>50</td>
</tr>
<tr>
<td>1</td>
<td>On-Site Safety Representative (Daily)</td>
<td>100</td>
</tr>
<tr>
<td>1</td>
<td>Structural Engineer</td>
<td>10</td>
</tr>
<tr>
<td>1</td>
<td>Geotechnical Engineer</td>
<td>25</td>
</tr>
<tr>
<td>1</td>
<td>Quality Control Superintendent</td>
<td>50</td>
</tr>
</tbody>
</table>
1 Planner/Scheduler 50
1 Project Claims Analyst 10
1 Testing Engineer (Concrete, Masonry) 10
1 Environmental Engineer 25
1 Fire Protection Engineer 10
1 Cost Estimator 25
1 3 Man Survey Crew 25

The above stated list is an estimate of the anticipated Field Personnel. The CM/GC shall validate this anticipated list. In doing so, the CM/GC, with approval from the Conventional Facilities Manager, add or remove from the list.

3.5 OFFICE STAFF

Provide all necessary effort and staff to supplement the Field Personnel listed above.

3.6 JOB SITE OFFICE(S)

In addition to those requirements set forth in the Subcontract Documents, CM/GC shall include all Field Office expenses, including but not limited to postal costs, office supplies, and maintenance for office equipment, office furniture, telephone service and utility service for CM/GC facilities, plan reproduction, and office drinking water. In addition the CM/GC shall provide as necessary, adequate equipment and/or facilities that the CM/GC determines necessary to manage, implement, and supervise the work. All cost for installing and removing such equipment and/or facilities shall be included in CM/GCs Base Bid.
3.7 TEMPORARY CONSTRUCTION

3.7.1 Provide all temporary construction items listed throughout the project as the work requires, for the benefit of the project and the CM/GC’s subcontractors. This Exhibit must be included in all subcontractor bid packages.

3.7.2 Project Sign (see specification section 01210 Exhibit B).

3.8 SAFETY

The CM/GC shall be responsible for job site safety and shall follow all applicable laws, regulations, SLAC policies and requirements and specifications, and furnish all items specified in CM/GC provided General Conditions to subcontractors for the duration of the work for the benefit of the project and the CM/GC’s sub-subcontractors. The CM/GC shall develop and monitor implementation of an overall Safety Program for the Project. The program shall be in compliance with applicable federal, state, local laws and regulations, SLAC policies and requirements and subcontract documents. The CM/GC shall review, monitor compliance and coordinate the implementation of individual subcontractors’ Safety Programs. The CM/GC shall confirm that the subcontractors’ Safety Programs include, but are not limited to, a minimum of weekly safety walkthroughs and inspections with the Conventional Facilities Manager and other SLAC staff, weekly Safety Toolbox meetings (with documented meeting minutes and signatures of workers attended), daily safety checks of the Project, and daily pre-task plans. The CM/GC’s Safety and Health Manager shall be responsible for implementing, controlling and monitoring the CM/GC’s own Safety Program and reviewing and monitoring the Subcontractors’ Safety Programs for compliance with all applicable requirements.
3.8.1 Safety signage shall be placed in obvious locations to heighten safety awareness throughout the Project.

3.8.2 Personal protective equipment for CM/GC’s personnel and job site visitors shall be maintained by the CM/GC and replenished as necessary.

3.8.3 See additional safety requirements in General Requirements Section 01010 (Exhibit A) and Specific Requirements Section 01210 (Exhibit B).

3.8.4 The CM/GC shall submit monthly to the Conventional Facilities Manager and LCLS ES&H Safety Officer, a report of their safety progress on the project. The report shall include as a minimum, a log for all safety meetings, a list of safety deficiencies and near misses, the resolution and number of days taken to correct each deficiency or near miss, number of OSHA recordable cases, number of lost workdays and lost workday cases, number of days without a lost workday case and total number of hours without a lost workday case. All data relating to accidents or injuries should include the nature and result of the injury, first aid treatment, analysis of cause(s) of the accident and field implemented corrective actions to reduce or eliminate similar accidents in the future. The data on OSHA recordable cases, lost workdays, lost workday cases and total number of man hours worked shall be publicly displayed at the site to enhance the awareness of safety throughout the project.

3.9 TEMPORARY PROTECTION

Provide all temporary protection throughout the Project as the Work requires, for the benefit of the Project and the CM/GC’s subcontractors.

3.10 TEMPORARY UTILITIES
Provide all temporary utilities throughout the Project as the Work requires, for the benefit of the Project and the CM/GC’s subcontractors. Temporary utilities shall include all labor and materials for hook-up and disconnection, relocation as the Work requires. SLAC will pay for utilities in accordance with Special Requirements Section 01210 ¶ 3.03c.

3.11 CONSTRUCTION EQUIPMENT

Provide all construction equipment items throughout the Project as the Work requires, for the benefit of the Project and the CM/GC’s subcontractors. Construction equipment shall include all labor and materials for mobilizing and demobilizing, maintaining, storing, rental, usage, and operating cost.

3.12 MATERIAL HANDLING & HOISTING

Provide all material handling & hoisting items throughout the Project as the Work requires, for the benefit of the Project and the CM/GC’s subcontractors. Material handling & hoisting shall include all labor and materials for mobilizing and demobilizing, maintaining, storing, rental, usage, and operating cost.

3.13 CLEAN UP

CM/GC to be responsible for all clean up at the end of each day. CM/GC may transfer some of the continuous clean up responsibilities to its subcontractors, but SLAC shall still hold CM/GC responsible for continuous clean up in the event it feels the Project is not being maintained in a clean manner or meeting the requirements of the Specifications.

3.14 OTHER

The CM/GC shall include in its Phase 2 all other costs for labor and materials for items required by the Subcontract Documents and reasonably expected for the scope of this Project
for implementing, supervising, and managing the Work, including, but not limited to warranty, punch list, field personnel, supervision and management of the Work, meetings, inspections, observing the Work, coordinating the Work, scheduling and planning the Work, shop drawing and submittal review/coordination, safety, clean up and other items as described in the referenced exhibits.
3.15 COORDINATION/MANAGEMENT OF SUBCONTRACTORS AND CONSTRUCTION WORK

3.15.1 The CM/GC's control of the Work shall include the immediate direction of the specific means and methods of subcontractors' activities or forces, or their scheduling of individual work tasks; including that required to create, update or revise the contract schedule per the subcontract documents and to assure the project is completed within the contract time.

3.15.2 The CM/GC's responsibility shall include timely coordination of the contract schedule between subcontractors to resolve and expedite resolutions of any work that may be disputed between subcontractors.

3.15.3 The CM/GC shall determine the adequacy of subcontractors' personnel, equipment, safety programs and availability of materials and supplies. If these items are determined inadequate, the CM/GC shall develop a plan of recovery with the subcontractor(s) and shall enforce the applicable provisions of the subcontract documents within its authority given by this Subcontract.

3.15.4 The CM/GC shall conduct and record regular mechanical/electrical/plumbing coordination meetings to review coordination drawings and other coordination issues with all related subcontractors.

3.15.5 CM/GC shall conduct regular daily walk-through of the project with the Conventional Facilities Manager and project personnel. In addition, at least 2 formal reviews with
SLAC Site Engineering & Maintenance staff at appropriate periods to focus on maintenance issues (including accessibility).

3.15.6 CM/GC shall coordinate the delivery, storage and inventory of SLAC supplied materials and equipment to the subcontractors.

3.15.7 The CM/GC shall continuously require and follow up with subcontractors about their job site maintenance and their conformance in providing a safe work place. CM/GC shall enforce all safety-related requirements in the subcontract documents. CM/GC shall assure at all times, access to site emergency personnel and all outside emergency personnel requiring access to the construction site and other areas of the site. The CM/GC shall manage and monitor security of the construction site for safety and impacts on neighboring facilities adjacent to the site and take immediate action, if required, when non-compliant conditions are discovered. The CM/GC shall develop a security plan and submit for approval a minimum of 60 calendar days prior to commencement of any construction activities.

3.15.8 The CM/GC shall direct the initial startup and testing of utilities, building, electrical and mechanical systems and equipment. The CM/GC shall coordinate subcontractor's training with SLAC’s Conventional Experimental Facilities (CEF) lead personnel in conjunction with the Conventional Facilities Manager. The CM/GC shall videotape the subcontractors' training sessions for future reference and provide a copy of the videotape to SLAC with other project closeout documents.
3.16 PROJECT/SUBCONTRACT ADMINISTRATION

3.16.1 The CM/GC shall, through the Conventional Facilities Manager, or as directed by the Conventional Facilities Manager, coordinate its efforts between subcontractors and the AE firm to clarify interpretation of drawings and specifications; work with the AE firm on the interpretation of plans and specifications; review all requests for clarification and appropriateness prior to forwarding to the AE firm.

3.16.2 The CM/GC shall coordinate and administer the shop drawing review and approval process and advise the Conventional Facilities Manager and the AE firm immediately of any unusual site conditions or subcontract document requirements affecting shop drawing approvals; and review submittals for format, compliance and general completeness prior to forwarding to the AE firm for review. The CM/GC’s Contract Schedule shall establish submittal schedules that allow sufficient time for review and interpretation. The CM/GC shall verify and document that the shop drawing process is adhering to the submittal schedule.

3.16.3 To insure that design packages meet project requirements and that appropriate funding arrangements are in place, a mechanism shall be provided for their release for procurement and/or construction contract bid and award via signature of the Conventional Facilities Manager.

3.17 CONFIGURATION MANAGEMENT

The Conventional Facilities Manager will prepare Project Change Orders (PCO) when
needed and coordinate evaluation of impacts for PCO’s. The CM/GC shall assist by providing the needed technical, cost, and schedule data. Deviations from design documentation shall be documented in Field Change Request (FCR), shown on as-built drawings, and approved by the organization performing the AE design agency role. Copies of all FCR’s shall be sent to the project for incorporation in the project files. However, FCR’s need not be transmitted to the project for approval unless they impact project cost, schedule, or that result in a design change that impacts documentation. Design Change Notice (DCN) system shall be used for design changes once construction has begun.

3.18 CONSTRUCTION WASTE MANAGEMENT

The CM/GC shall provide the Construction Waste Management program (Exhibit D) including, but not limited to establishing the plan, setting up and paying for the agreements with the recycling service vendor, coordinating use of the service with the subcontractors, holding all required meetings and providing all required documentation.

3.19 COMMISSIONING

Commissioning (ratification of design and construction) will take place after all startup, testing and balancing required in the specification has been completed. SLAC will provide a representative that will develop a commissioning plan and coordinate the commissioning of all mechanical, plumbing, electrical, fire alarm, fire protection and A/V systems. The CM/GC shall coordinate the participation of the subcontractors in the commissioning effort.

END OF SOW