

LCLS WBS DICTIONARY

WBS NUMBER					TITLE	DESCRIPTION
1	2	3	4	5		
1	09				CONVENTIONAL FACILITIES	The Conventional Facilities for the Linac Coherent Light Source (LCLS) will include renovations to the existing SLAC facilities and the development of new facilities. Included will be all major systems and subsystems contained herein that will be required to support the facilities related to the LCLS programmatic requirements. The scope of the WBS will include 16 elements: Sector 20 Injector Facilities, Magnetic Measuring Facility, Linac Upgrades, Research Yard Modifications, Beam Transport Hall, Front End Enclosure, Electron Beam Dump, Near Experimental Hall, Undulator Hall, X-Ray Transport & Diagnostics, Far Experimental Hall, BTH Service Building 2.1, 2.2, and 2.3, UH Service Building 3.1, FEH Service Building 8.1, Central Utility Plant, and CLOC Sitework from Bid Group 1 ONLY.
1	09				CONVENTIONAL FACILITIES (Continued)	Activities within these elements include, site preparation and development (including establishment of survey monuments for site alignment), beam line housings including a beam dump, renovations to existing facilities, buildings, service buildings, utility systems (including cooling systems), fire protection systems, roads, sidewalks, landscaping, berms, fencing and parking areas.
1	09	01			System Management & Integration	This element will provide the overall project management to implement and integrate the design, construction, commissioning, and close-out for all phases of the project related to conventional facilities.
1	09	01	01		Management	This element will provide overall level of effort management support for conventional facilities to include development of reports and peer reviews, attendance of meetings, insure integration of other systems interfacing with conventional facilities, software acquisitions and travel as required, managing the WBS including cost, schedule and resources; coordinate Title I, Title II and Title III efforts with AE firms and in-house support staff engineers, designers and drafters; coordinate Title III with subcontractors (including architectural and engineering firms) and general contractors and construction managers, and managing the close-out of activities including commissioning and final acceptance by end users.
1	09	01	02		CAM / CF Engineering	This element covers SLAC project management support during Title I, Title II and Title III activities throughout the WBS. The UTR will provide oversight for subcontractors (including architectural and engineering firms), labor service and in-house labor. During the construction phase (Title III), SLAC Engineering / UTR has the responsibility to monitor construction activities including safety program, tests for bolt torque, welding, concrete strength, pressure certification, fire systems and electrical testing for project compliance with technical specifications and regulatory compliance. ETC baseline redefined the Title as "Engineering / CAM" to include CF engineering support and AE engineering support for Beam-Path.
1	09	01	03		Construction Management	This element will provide a support role for various construction management activities in support of the WBS. CM will support all phases of activities to include pre-construction services, bidding, field supervision, commissioning, and close-out. Particular emphasis will be given to validation of WBS schedules and estimates, value engineering and general construction support activities including Safety plan, EP site sampling analysis/characterization and disposal plans, quality control and preparing bid packages to release for construction. ETC baseline redefined the scope for this element and transferred A&E Title 3 engineering support to WBS 1.09.01.02.
1	09	01	04		Mechanical Design (MD)	This element will provide SLAC MD drafting support and drawing research for as-builts in support of the WBS for Title I and Title II activities.
1	09	01	04	01	Mechanical Design Title 1 (Linac not included)	This element will provide MD effort (excluding Linac) in support of Title I activities.
1	09	01	04	02	Mechanical Design T1 Linac Facilities	This element will provide MD effort directly related to the Linac in support of Title I activities.
1	09	01	04	03	Mechanical Design Title 2 (Linac not included)	This element will provide MD effort (excluding Linac) in support of Title II activities.
1	09	01	04	04	Mechanical Design T2 Linac Facilities	This element will provide MD effort directly related to the Linac in support of Title II activities.

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1	09	01	04	05	Mechanical Design Title 3 Linac Facility	This element will provide MD effort directly related to the Linac in support of Title III activities.
1	09	01	04	06	Mechanical Design Title 3 (Linac not Included)	This element will provide MD effort (excluding Linac) in support of Title III activities.
1	09	01	05		Conventional Experiment Facility (CEF)	This element will provide SLAC CEF effort in support of the WBS for utility upgrades and misc engineering in-house support and project coordination in support of for Title I and Title II activities (Pre-Title I and Pre-Title II). Activities included in this element are field surveying, gathering user requirements, developing design criteria packages, obtaining user review and approvals, assisting in the request for proposal packages for engineering and construction firms, assisting in job walks for engineering and construction firms.
1	09	01	05	01	CEF Engineering Title 1(Linac Not Included)	This element will provide SLAC CEF effort (excluding Linac) in support of Title I activities.
1	09	01	05	02	CEF Engineering Title 1 Linac Facility	This element will provide SLAC CEF effort directly related to the Linac activities in support of Title I activities.
1	09	01	05	03	CEF Engineering Title 2 (Linac Not Included)	This element will provide SLAC CEF effort (excluding Linac) in support of Title II activities.
1	09	01	05	04	CEF Design Linac Facility Title 2	This element will provide SLAC CEF effort directly related to the Linac activities in support of Title II activities.
1	09	02			Title 1 & Title 2 Conventional Facilities	This element will provide both SLAC in-house engineering, drafting support, and subcontractor architectural/engineering support for the Title I and Title II design efforts for the following WBS elements: Sector 20 Injector Facilities, Magnetic Measuring Facility, Main Control Center Modifications, Linac Upgrades, Beam Transport Hall, Research Yard Modifications, Undulator Hall, Front End Enclosure, Beam Dump, Near Experimental Hall, X-Ray Transport & Diagnostic Tunnel, Far Experimental Hall and the Central Lab Office Complex.
1	09	02	02		A & E Services (S20 and MMFnot Incl)	This element will provide architectural and engineering support for the WBS (excluding S20 and MMF). Included will be Title I and Title II construction document development to include drawings, specifications, studies and analyses, engineering and geotechnical study tunnel reports, cost and schedule estimates, renderings and engineering calculations.
1	09	02	02	01	Title 1 Design	This element will provide the preliminary architectural and engineering support for Title I phase of the design development for conventional facilities. This design phase further develops the conceptual design to include engineering studies and analyses, risk assessments, preliminary drawings and engineering specifications, cost and schedule estimates, and life cycle cost estimates. This phase will consume up to a third of the engineering effort.
1	09	02	02	02	Title 2 Design	This element will provide the architectural and engineering support for Title II phase of the design development for conventional facilities, including final working drawings, specifications and complete bidding documents for conventional facilities. This phase commences after approval of the Title I design by the DOE.
1	09	02	03		A & E Services - (S20, MMF,MCC)	This element will provide architectural and engineering support for Sector 20 (shielding wall, RF hut and alcove modifications), Magnetic Measuring Facility and the Main Control Center upgrades. Included will be Title I and Title II construction document development to include drawings, specifications, studies and analyses, engineering reports, cost estimates, renderings and engineering calculations.
1	09	02	03	01	Title 1 Design (Sector 20)	This element will provide the preliminary architectural and engineering support for Title I phase. This design phase further develops the conceptual design to include engineering studies and analyses, risk assessments, preliminary drawings and engineering specifications, cost and schedule estimates, and life cycle cost estimates. This phase will consume up to a third of the engineering effort.
1	09	02	03	02	Title 2 Design (Sector 20)	This element will provide the architectural and engineering support for Title II phase of the design development for S20 Injector Facilities, including final working drawings, specifications and complete bidding documents. This phase commences after approval of the Title I design by the DOE.

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1	09	02	03	03	Title 1 Design (MMF)	This element will provide the preliminary architectural and engineering support for Title I phase. This design phase further develops the conceptual design to include engineering studies and analyses, risk assessments, preliminary drawings and engineering specifications, cost and schedule estimates, and life cycle cost estimates. This phase will consume up to a third of the engineering effort.
1	09	02	03	04	Title 2 Design (MMF)	This element will provide the architectural and engineering support for Title II phase of the design development for MMF, including final working drawings, specifications and complete bidding documents. This phase commences after approval of the Title I design by the DOE.
1	09	03			Construction-T3 Conventional Facilities	This element will provide the construction phase of activities to cover the receipt, inspection, assembly of the project conventional facilities, as well as any changes that are required during construction. Included will be support of: obtaining permits, safety plan, quality control, site preparations, buildings demolition, buildings construction, tunnels, shielding blocks, control rooms, preparation areas, laser rooms, experimental hutches (NEH), cooling systems, electrical systems, cable trays, ventilation systems, HVAC systems, drainage systems and utility systems. Installation of the interiors, commissioning, testing, punchlist, furnishing, final as-built drawings, operation and maintenance manuals, on-site safety and equipment training and other documentation of the facility are also prepared as part of Title III close-out activities. At the end of Title III the project is ready for activation and operation by the operations staff. [Note: cable tray within the Linac is not included].
1	09	03	01		Sector 20 Injector Facilities	This element will provide the requirements for Sector 20 Injector Facilities including the removal and rebuild/relocate Alcove Pump Room; RF Hut at approximately 200 square feet; Alcove modifications to include a new Laser Room, Load Lock Room and Control Room. This existing area consists of approximately 2,000 square feet of floor space at grade level adjacent to the Klystron Gallery. The area is in need of total renovations including roofing, siding, lighting, power, utilities, hvac and other interior modifications. The Laser Room and Load Lock Room will be environmentally controlled.
1	09	03	01	01	General Requirements	This element will provide the General Requirements costs for: summarization of the project, work restriction, price and payment procedure, project management and coordination, construction progress and photographic documentations, submittal procedures, references, temporary facility and controls, environmental protection, product requirements, cutting and patching, site clearance & preparation, selective demolition, and HVAC commissioning requirements.
1	09	03	01	02	Sitework	This element will provide the Site Construction materials and construction costs for: building demolition, site clearing, dewatering, excavation support and protection, earthwork, utilities, soil surface erosion control, storm drainage, hot mix asphalt paving, portland concrete pavement, and pavement joint sealants
1	09	03	01	03	Concrete	This element will provide the Concrete materials and installation costs for: castinplace concrete.
1	09	03	01	04	Masonry	NA
1	09	03	01	05	Metals	This element will provide the Metals materials and construction costs for: structural steel, steel joists, steel deck, cold-formed metal framing, metal fabrications, metal stairs, gratings, railings, and architectural joint systems.
1	09	03	01	06	Woods & Plastics	This element will provide the Rough Carpentry materials and construction costs.
1	09	03	01	07	Thermal and Moisture Protection	This element will provide the Thermal and Moisture materials and construction costs for: building insulation, metal wall panels, sheet metal roofing, sheet metal flashing and trim, roof expansion assemblies, roof accessories, horizontal lifeline fall protection system, fire-resistive joint systems, and joint sealants
1	09	03	01	08	Doors and Windows	This element will provide the Doors and Windows materials and construction costs for: standard steel doors& frames, access doors, overhead coiling doors, metal-framed roof hatches, and door hardware.

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1	09	03	01	09	Finishes	This element will provide the Finishes materials and construction costs for: gypsum board assemblies, gypsum board shaft-wall assemblies, acoustical panel ceilings, resilient floor tile, static-control resilient floor covering, exterior painting, interior painting, concrete floor stain, and high-performance coatings.
1	09	03	01	14	Conveying Systems	This element will provide the Conveying Systems materials and construction costs for: crane and hoist systems.
1	09	03	01	15	Mechanical	This element will provide the Mechanical materials and construction costs for: basic mechanical materials and methods, motors, hangers and supports, mechanical vibration and seismic controls, mechanical identification, mechanical insulation, valves, pipe expansion fittings and loops, meters and gages, domestic water piping, domestic water piping specialties, sanitary waste and vent piping, drainage piping specialties, storm drainage piping, HVAC water treatment, general-service compressed-air piping, general-service compressed-air equipment, plumbing fixtures, emergency plumbing fixtures, plumbing specialties, sump pumps, heat exchangers, heating boilers and accessories, water chillers, refrigeration monitoring and safety equipment, and steam heat exchangers,
1	09	03	01	15	Mechanical (continued)	modular indoor air-handling units, packaged outdoor central station air handling units, humidifiers, coils, fan-coil units, metal ducts, duct accessories, centrifugal fans, power ventilators, air terminal units, diffusers, registers, and grilles, intake and relief ventilators, air filters, HVAC instrumentation and controls, sequence of operation, testing, adjusting, and balancing.
1	09	03	01	16	Electrical	This element provide the Electrical materials and construction costs for: basic electrical materials and methods, overcurrent protective device coordination, grounding and bonding, electrical supports and seismic restraints, electrical identification, conductors and cables, medium-voltage cables, raceways and boxes, cable trays, wiring devices, lighting control devices, static uninterruptible power supply, variable frequency controllers, transient voltage suppression, secondary unit substations, enclosed switches and circuit breakers, enclosed controllers, switchgear, switchboards, panel boards, motor control centers, dry-type transformers (600v and less), power distribution units, interior lighting, and exterior lighting.
1	09	03	01	20	Project Close Out Sector 20 Injector Facility	This element will cover the receipt, inspection, assembly, commissioning, testing, punch list, and furnishing of the project facilities as well as any approved changes that are required during construction or assembly. Included in this final phase will be the receipt of operating and maintenance manuals, testing and on-site training for maintenance personnel, as-builts, and start-up of all equipment for validation of project (specification and drawing) compliance. At the end of the close out phase, the project will be ready for activation and operation by the operations staff.
1	09	03	02		Magnetic Measurement Facility	The Magnetic Measurement Facility (MMF) consists of the construction of approximately 4,800 sf area of lab space in an existing warehouse building. The improvements include construction of a CMM room, MM lab, office, girder assembly area and electrical and mechanical rooms. The existing building is approximately 25 ft high and the MMF area will be isolated by full height walls, and will have a clear height of 17 Ft. Provide new concrete foundations for the MM equipment. A new mezzanine area of approximately 1,300 sf, will be constructed of steel framed with concrete slab over a metal deck. Building services include fire protection system (wet sprinkler and fire alarm), plumbing, electrical and HVAC systems. The HVAC and electrical systems are to provide the required temperature controls for a minimal temperature tolerance of 0.18°F and relative humidity of 45% RH, ±5% in the MM Lab. Installation of a chiller and piping for process loads and a small air compressor and compressed air piping.
1	09	03	02		Magnetic Measurement Facility (continued)	To accommodate the new facility some modifications will be necessary. These changes include installation of a new electrical feeder (800 amps, 480 volts, 3 phase) and Motor Control Center for the building. Some additional modifications will include the relocation of existing racks, Haz Material Storage and office cubicles that support the Stores operation currently in place.

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1	09	03	02	01	General Requirements	This element will provide the General Requirements costs for: mobilization, safety, project management and coordination, construction progress and photographic documentations, submittal procedures, temporary facility and environmental protection, product requirements, cutting and patching, site clearance & preparation, selective demolition, and HVAC commissioning requirements.
1	09	03	02	02	Sitework	This element will provide the Sitework materials and construction costs for: building demolition, site clearing, dewatering, excavation support and protection, earthwork, utilities, storm drainage, hot mix asphalt paving, portland concrete pavement, pavement joint sealants.
1	09	03	02	03	Concrete	This element will provide the Concrete materials and installation costs for: castinplace concrete.
1	09	03	02	05	Metals	This element will provide the Metals materials and construction costs for: structural steel, steel joists, steel deck, cold-formed metal framing, metal fabrications, metal stairs, gratings, railings, and architectural joint systems.
1	09	03	02	06	Woods & Plastics	This element will provide the Rough Carpentry materials and construction costs.
1	09	03	02	07	Thermal and Moisture Protection	This element will provide the Thermal and Moisture materials and construction costs for: electrometric sheet waterproofing, building insulation, metal wall panels, thermoplastic membrane roofing, sheet metal roofing, sheet metal flashing and trim, roof expansion assemblies, roof accessories, and joint sealants
1	09	03	02	08	Doors and Windows	This element will provide the Doors and Windows materials and construction costs for: standard steel doors& frames, flush wood doors, access doors, overhead coiling doors, and door hardware.
1	09	03	02	09	Finishes	This element will provide the Finishes materials and construction costs for: gypsum board assemblies, gypsum board shaft-wall assemblies, acoustical panel ceilings, exterior painting, interior painting, concrete floor sealer/epoxy.
1	09	03	02	10	Specialties	This element will provide the Specialties materials and construction cost for: louvers and vents, and fire-protection specialties
1	09	03	02	14	Conveying Systems	This element will provide the Conveying Systems materials and construction costs for: crane and hoist systems.
1	09	03	02	15	Mechanical	This element will provide the Mechanical materials and construction costs for: basic mechanical materials and methods, motors, hangers and supports, mechanical vibration and seismic controls, mechanical identification, mechanical insulation, valves, pipe expansion fittings and loops, meters and gages, domestic water piping, domestic water piping specialties, sanitary waste and vent piping, drainage piping specialties, storm drainage piping, hydronic piping, hydronic pumps , HVAC water treatment, fuel gas piping, general-service compressed-air piping, general-service compressed-air equipment, plumbing fixtures, emergency plumbing fixtures, plumbing specialties, sewage pumps, sump pumps, heat exchangers, heating boilers and accessories, scroll water chillers, hydronic, and heat exchanger.
1	09	03	02	15	Mechanical (continued)	modular indoor air-handling units, humidifiers, coils, propeller unit heaters, metal ducts, duct accessories, centrifugal fans, air terminal units, diffusers, registers, and grilles, intake and relief ventilators, air filters, HVAC instrumentation and controls, sequence of operation, testing, adjusting, and balancing.
1	09	03	02	16	Electrical	This element provide the Electrical materials and construction costs for: basic electrical materials and methods, over current protective device coordination, grounding and bonding, electrical supports and seismic restraints, electrical identification, conductors and cables, medium-voltage cables, raceways and boxes, cable trays, wiring devices, lighting control devices, variable frequency controllers, circuit breakers, enclosed controllers, panel boards, motor control centers, dry-type transformers (600v and less), power distribution units, interior lighting, and exterior lighting.

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1	2	3	4	5		
1	09	03	02	20	Project Close Out Magnetic Measurement Facility	This element will cover the receipt, inspection, assembly, commissioning, testing, punch list, and furnishing of the project facilities and hardware, as well as any approved changes that are required during construction or assembly. Included in this final phase will be the receipt of operating and maintenance manuals, testing and on-site training for maintenance personnel, as-builts, and start-up of all equipment for validation of project (specification and drawing) compliance and commissioning report. At the end of the close out phase, the project will be ready for activation and operation by the operations staff.
1	09	03	03		BTH West	The Beam Transport Hall West commences from the end of the Muon Shield (~159.246 m) to the beginning of the BTH.
1	09	03	03	01	BTH West - Site Preparation	This element includes the demolition and removal of existing cables and cabletrays, piping, electrical conduits and wiring to allow the modification and installation of new electrical and mechanical systems and beam components.
1	09	03	03	15	BTH West - Mechanical	This element will provide the mechanical materials and construction costs for: fire protection and Low Conductivity piping, ventilation and balancing/testing of water systems. Plumbing includes a compressed air header and isolation valve and drainage piping system.
1	09	03	03	16	BTH West - Electrical	This element will provide the installation of the project primary electrical distribution systems to the main panel source of the area. The distribution of electric power will follow downstream and will include secondary electrical panels, transformers, disconnects, panel boards, electrical system grounding for 480V, 3 phase; 208/120V, 3 phase; and 120V single phase and cable trays. This element will include the installation and modification of general lighting, welding outlets, GFCI outlets and duplex outlets for 120V electric power.
1	09	03	03	20	BTH West - Commissioning & Project Close Out	This element will cover the receipt, inspection, commissioning, testing, punchlist, and furnishing of the project facilities and equipment, as well as any approved changes that are required during construction. Included in this final phase will be the receipt of operating and maintenance manuals, testing and on-site training for maintenance personnel, as-builts, and start-up of all equipment for validation of project (specification and drawing) compliance. At the end of the close out phase, the project will be ready for activation and operation by the operations staff.
1	09	03	04		Linac Facility	This element will provide upgrades to existing water-cooling and electrical systems from Sector 20 to Sector 30 of the SLAC Linac. Upgrades will include additional cooling water systems to support the RF gun and new Low Conductivity Water (LCW) requirements especially in sectors 24 and 25. Modifications will include upgrade to the existing electrical distribution system and switchgears. This element includes modifications to the LCW temperature control system and Sector 24 Stairwells installation.
1	09	03	04	05	Metals	This element will provide the metals materials and construction costs for: structural steel, steel joists, steel deck, cold-formed metal framing, metal fabrications, metal stairs, gratings, ornamental metal, ornamental railings, and architectural joint systems.
1	09	03	04	15	Mechanical	This element will provide the Mechanical materials and construction costs for procurement installation of new chiller, pumps, heat exchangers, Low Conductivity piping, and balancing/testing of water cooling systems. The work includes modification to accelerator water cooling piping systems.
1	09	03	04	16	Electrical	This element will provide the installation of the project primary electrical distribution 480 volts, 3 phase systems and a new Motor Control Center (MCC). The distribution of electric power will follow downstream and will include secondary electrical panels, transformers, disconnects, panel boards, electrical system grounding for 480V, 3 phase; 208/120V, 3 phase; and 120V single phase. All power will be delivered to the vicinity of the technical system components to within 5 feet. This element will include the installation of general lighting, utility duplex outlets for 120V electric power.

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1	09	03	04	20	Project Close Out Linac Facility	This element will cover the receipt, inspection, assembly, commissioning, testing, punchlist, and furnishing of the project facilities and hardware, as well as any approved changes that are required during construction or assembly. Included in this final phase will be the receipt of operating and maintenance manuals, testing and on-site training for maintenance personnel, as-builts, and start-up of all equipment for validation of project (specification and drawing) compliance. At the end of the close out phase, the project will be ready for activation and operation by the operations staff.
1	09	03	05		Research Yard/B102,B211,B113 & Storage Trailers (RY)	This element will provide the various activities required by SLAC and a general contractor (GC) within the existing SLAC Research Yard. Some of the buildings that may be affected as a result of the LCLS project are building #064 Final Focus Test Beam, building #113 (hi-bay portion only), building #102, various storage containers and trailer #204. This element will also provide FFTB Removal and Preservation of Technical Equipment.
1	09	03	05	01	RY - Site Preparation/General Requirements	This element will provide the site preparation and general requirements costs for: summarization of the project, work restriction, price and payment procedure, project management and coordination, construction progress and photographic documentations, submittal procedures, references, temporary facility and controls, environmental protection, product requirements, cutting and patching, selective demolition, and HVAC commissioning requirements. The site preparation includes: locate and remove existing utilities, temporary fencing, construction permits, and training.
1	09	03	05	02	RY - Sitework	This element will provide the Sitework materials and construction costs for: building demolition, site clearing, tree protection and trimming, dewatering, excavation support and protection, earthwork, erosion control, sanitary sewerage, subdrainage system, storm drainage, hotmix asphalt paving, portland concrete pavement, and pavement joint sealants. This element also includes the FFTB/BSY Vertical Wall, and FFTB Removal and Preservation.
1	09	03	05	05	RY - Metals	This element will provide the Metals materials and construction costs for: structural steel, steel joists, steel deck, cold-formed metal framing, metal fabrications, metal stairs, gratings, railings, and architectural joint systems.
1	09	03	05	20	RY - Project Close Out	This element will cover the receipt, inspection, assembly, commissioning, testing, punchlist, and furnishing of the project facilities and hardware, as well as any approved changes that are required during construction or assembly. Included in this final phase will be the receipt of operating and maintenance manuals, testing and on-site training for maintenance personnel, as-builts, and start-up of all equipment for validation of project (specification and drawing) compliance. At the end of the close out phase, the project will be ready for activation and operation by the operations staff.
1	09	03	06		Access Road Construction (AR)	The existing north access road will need to be modified to accommodate vehicular traffic over the portion of the new Undulator Hall that extends out into the Research Yard.
1	09	03	06	02	AR - Sitework	This element will provide the Sitework materials and construction costs for: building demolition, site clearing, tree protection and trimming, dewatering, excavation support and protection, earthwork, erosion control, sanitary sewerage, subdrainage system, storm drainage, hotmix asphalt paving, portland concrete pavement, and pavement joint sealants. This element also includes the FFTB/BSY Vertical Wall, and FFTB Removal and Preservation.
1	09	03	06	03	AR - Concrete	This element will provide the Concrete materials and installation costs for: castinplace concrete.

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1	09	03	08		Beam Transport Hall (BTH)	The new Beam Transport Hall commences from the end of the Linac to the beginning of the Undulator Hall and replaces the existing Final Focus Test Beam enclosure. The existing Linac finish floor is approximately one foot lower than the required elevation of the new facility which will be at 247.25'. The BTH will have roughly the same general footprint of the FFTB extending from the BSY wall in the direction of the beam at 227 meters (length) x 4.5 meters (width) x 3 meters (height). This element also includes the installation cost for a new BTH Switchboard which will provide power to the entire BTH area including the service buildings.
1	09	03	08	01	BTH - Site Preparation/General Requirements	This element will provide the site preparation and general requirements costs for: summarization of the project, work restriction, price and payment procedure, project management and coordination, construction progress and photographic documentations, submittal procedures, references, temporary facility and controls, environmental protection, product requirements, cutting and patching, selective demolition, and HVAC commissioning requirements. The site preparation includes: locate and remove existing utilities, temporary fencing, construction permits, and training.
1	09	03	08	02	BTH - Sitework	This element will provide the Sitework materials and construction costs for: earthwork, sanitary sewerage, subdrainage system, storm drainage, hotmix asphalt paving, portland concrete pavement, and pavement joint sealants.
1	09	03	08	03	BTH - Concrete	This element will provide the Concrete materials and installation costs for: castinplace concrete.
1	09	03	08	05	BTH - Metals	This element will provide the Metals materials and construction costs for: structural steel, steel joists, steel deck, cold-formed metal framing, metal fabrications, metal stairs, gratings, railings, and architectural joint systems.
1	09	03	08	15	BTH - Mechanical	This element will provide the Mechanical materials and construction costs for: air handlers, fans, ductwork, chilled and hot water piping, balancing/testing and temperature controls. Plumbing includes a compressed air header, a pumped waste system.
1	09	03	08	16	BTH - Electrical	This element provide the Electrical materials and construction costs for: basic power distribution from bldg 406/407 to an MCC in each Service building. The communication cable tray runs the length of the tunnel to each service building from a SLAC provided backbone conductor. This element also includes the installation costs for anew 1600 amp, 480 volts, 3 phase, BTH Switchboard which will provide power to the BTH area.
1	09	03	08	17	BTH - Others	This element provides the materials and construction costs for CSI divisions 4, 7, 8, 9 and 13. Div 4 - Masonry which covers unit masonry assemblies, Div 7 - Thermal and Moisture Protection which cover self-adhering, elastomeric, and thermoplastic sheet proofing, Bentonite waterproofing, traffic coatings, water repellents, building insulation, metal wall panels, thermoplastic membrane roofing, sheet metal roofing, sheet metal flashing and trim, roof expansion assemblies, roof accessories, horizontal lifeline fall protection system, sprayed fire-resistive materials, through-penetration firestop systems, fire-resistive joint systems, and joint sealants. Div 8 - Doors and Windows which covers standard steel doors & frames, flush wood doors, access doors, overhead coiling doors, and door hardware.
1	09	03	08	17	BTH - Others (continued)	Div 9 - Finishes which covers gypsum board assemblies, gypsum board shaft-wall assemblies, resilient floor covering, acoustical wall panel, exterior and interior painting, concrete floor stain, and high-performance coatings. Div 13 - Special Construction which covers radiation, metal building systems, security access, lighting controls, fire alarm, fire-suppression piping, electric-drive, centrifugal fire pumps, and clean-agent extinguishing systems.

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1	09	03	08	20	BTH - Project Close Out	This element will cover the receipt, inspection, assembly, commissioning, testing, punchlist, and furnishing of the project facilities and hardware, as well as any approved changes that are required during construction or assembly. Included in this final phase will be the receipt of operating and maintenance manuals, testing and on-site training for maintenance personnel, as-builts, and start-up of all equipment for validation of project (specification and drawing) compliance. At the end of the close out phase, the project will be ready for activation and operation by the operations staff.
1	09	03	09		Front End Enclosure (FEE)	The Front End Enclosure (FEE) shall contain various diagnostic beam line components to separate the electron and x-ray-beams. The electron beam shall curve downward into the Beam Dump and the x-ray beam shall continue into the Near Experimental Hall and other facility components further downstream. A fire sprinkler system shall also be provided throughout the FEE. The floor elevation shall be maintained at 247.25' and will remain constant throughout the entire LCLS facilities.
1	09	03	09	01	FEE - Site Preparation/General Requirements	This element will provide the site preparation and general requirements costs for: summarization of the project, work restriction, price and payment procedure, project management and coordination, construction progress and photographic documentations, submittal procedures, references, temporary facility and controls, environmental protection, product requirements, cutting and patching, selective demolition, and HVAC commissioning requirements. The site preparation includes: locate and remove existing utilities, temporary fencing, construction permits, and training.
1	09	03	09	02	FEE - Sitework	This element will provide the Sitework materials and construction costs for: earthwork, geotechnical instrumentation and monitoring, soil and rock anchors, sanitary sewerage, subdrainage system, storm drainage, hotmix asphalt paving, portland concrete pavement, and pavement joint sealants..
1	09	03	09	03	FEE - Concrete	This element will provide the Concrete materials and installation costs for: castinplace concrete.
1	09	03	09	05	FEE - Metals	This element will provide the Metals materials and construction costs for: structural steel, cold-formed metal framing, metal fabrications, and gratings.
1	09	03	09	15	FEE - Mechanical	This element will provide the Mechanical materials and construction costs for: basic mechanical materials and methods, motors, hangers and supports, mechanical vibration and seismic controls, mechanical identification, mechanical insulation, valves, pipe expansion fittings, meters and gages, chilled water and heating water piping, piping specialties, drainage piping specialties, hydronic piping, general-sevice compressed-air piping, sump pumps, heat exchangers, breechings, and hydronic.
1	09	03	09	15	FEE - Mechanical (continued)	air-handling units, metal ducts, duct accessories, centrifugal fans, power ventilators, air terminal units, diffusers, registers, and grilles, ventilators, air filters, HVAC instrumentation and controls, sequence of operation, testing, adjusting, and balancing.
1	09	03	09	16	FEE - Electrical	This element provide the Electrical materials and construction costs for: basic electrical materials and methods, overcurrent protective device coordination, grounding and bonding, electrical supports and seismic restraints, electrical identification, conductors and cables, medium-voltage cables, raceways and boxes, cable trays, wiring devices, lighting control devices, variable frequency controllers, circuit breakers, enclosed controllers, switchboards, panel boards, motor control centers, dry-type transformers (600v and less), power distribution units, interior lighting, and exterior lighting.

LCLS WBS DICTIONARY

WBS NUMBER					TITLE	DESCRIPTION
1	2	3	4	5		
1	09	03	09	17	FEE - Others	This element provides the materials and construction costs for CSI divisions 4, 7, 8, 9 and 13. Div 4 - Masonry which covers unit masonry assemblies, Div 7 - Thermal and Moisture Protection which cover self-adhering, elastomeric, and thermoplastic sheet proofing, Bentonite waterproofing, traffic coatings, water repellents, building insulation, metal wall panels, thermoplastic membrane roofing, sheet metal roofing, sheet metal flashing and trim, roof expansion assemblies, roof accessories, horizontal lifeline fall protection system, sprayed fire-resistive materials, through-penetration firestop systems, fire-resistive joint systems, and joint sealants. Div 8 - Doors and Windows which covers standard steel doors & frames, flush wood doors, access doors, overhead coiling doors, and door hardware.
1	09	03	09	17	FEE - Others (continued)	Div 9 - Finishes which covers gypsum board assemblies, gypsum board shaft-wall assemblies, resilient floor covering, acoustical wall panel, exterior and interior painting, concrete floor stain, and high-performance coatings. Div 13 - Special Construction which covers radiation, metal building systems, security access, lighting controls, fire alarm, fire-suppression piping, electric-drive, centrifugal fire pumps, and clean-agent extinguishing systems.
1	09	03	09	20	FEE - Project Close Out	This element will cover the receipt, inspection, assembly, commissioning, testing, punchlist, and furnishing of the project facilities and hardware, as well as any approved changes that are required during construction or assembly. Included in this final phase will be the receipt of operating and maintenance manuals, testing and on-site training for maintenance personnel, as-builts, and start-up of all equipment for validation of project (specification and drawing) compliance. At the end of the close out phase, the project will be ready for activation and operation by the operations staff.
1	09	03	10		Electron Beam Dump (EBD)	The function of the Beam Dump (BD) is to act as a terminal point for the high-energy electron beam. The electron beam separated from the x-ray beam bends downward within the Front End Enclosure and terminates into the Beam Dump. The actual dump is located directly below the FEE and will have provisions for occasional access for maintenance. Within the BD will be shielding blocks which act as radiation shields. The BD will provide ventilation smoke system. The floor elevation will be maintain at 247.25' and will remain constant throughout the entire LCLS facilities.
1	09	03	10	01	EBD - Site Preparation/General Requirements	This element will provide the site preparation and general requirements costs for: summarization of the project, work restriction, price and payment procedure, project management and coordination, construction progress and photographic documentations, submittal procedures, references, temporary facility and controls, environmental protection, product requirements, cutting and patching, selective demolition, and HVAC commissioning requirements. The site preparation includes: locate and remove existing utilities, temporary fencing, construction permits, and training.
1	09	03	10	02	EBD - Sitework	This element will provide the Sitework materials and construction costs for: earthwork, geotechnical instrumentation and monitoring, soil and rock anchors, sanitary sewerage, subdrainage system, storm drainage, hotmix asphalt paving, portland concrete pavement, and pavement joint sealants..
1	09	03	10	03	EBD - Concrete	This element will provide the Concrete materials and installation costs for: castinplace concrete.
1	09	03	10	05	EBD - Metals	This element will provide the Metals materials and construction costs for: structural steel, cold-formed metal framing, metal fabrications, and gratings.
1	09	03	10	15	EBD - Mechanical	This element will provide the Mechanical materials and construction costs for: basic mechanical materials and methods, motors, hangers and supports, mechanical vibration and seismic controls, mechanical identification, mechanical insulation, valves, pipe expansion fittings, meters and gages, chilled water and heating water piping, piping specialties, drainage piping specialties, hydronic piping, general-sevice compressed-air piping, sump pumps, heat exchangers, breechings, and hydronic.

LCLS WBS DICTIONARY

WBS NUMBER					TITLE	DESCRIPTION
1	2	3	4	5		
1	09	03	10	15	EBD - Mechanical (continued)	air-handling units, metal ducts, duct accessories, centrifugal fans, power ventilators, air terminal units, diffusers, registers, and grilles, ventilators, air filters, HVAC instrumentation and controls, sequence of operation, testing, adjusting, and balancing.
1	09	03	10	16	EBD - Electrical	This element provide the Electrical materials and construction costs for: basic electrical materials and methods, overcurrent protective device coordination, grounding and bonding, electrical supports and seismic restraints, electrical identification, conductors and cables, medium-voltage cables, raceways and boxes, cable trays, wiring devices, lighting control devices, variable frequency controllers, circuit breakers, enclosed controllers, switchboards, panel boards, motor control centers, dry-type transformers (600v and less), power distribution units, interior lighting, and exterior lighting.
1	09	03	10	17	EBD - Others	This element provides the materials and construction costs for CSI divisions 4, 7, 8, 9 and 13. Div 4 - Masonry which covers unit masonry assemblies, Div 7 - Thermal and Moisture Protection which cover self-adhering, elastomeric, and thermoplastic sheet proofing, Bentonite waterproofing, traffic coatings, water repellents, building insulation, metal wall panels, thermoplastic membrane roofing, sheet metal roofing, sheet metal flashing and trim, roof expansion assemblies, roof accessories, horizontal lifeline fall protection system, sprayed fire-resistive materials, through-penetration firestop systems, fire-resistive joint systems, and joint sealants. Div 8 - Doors and Windows which covers standard steel doors & frames, flush wood doors, access doors, overhead coiling doors, and door hardware.
1	09	03	10	17	EBD - Others (continued)	Div 9 - Finishes which covers gypsum board assemblies, gypsum board shaft-wall assemblies, resilient floor covering, acoustical wall panel, exterior and interior painting, concrete floor stain, and high-performance coatings. Div 13 - Special Construction which covers radiation, metal building systems, security access, lighting controls, fire alarm, fire-suppression piping, electric-drive, centrifugal fire pumps, and clean-agent extinguishing systems.
1	09	03	10	20	EBD - Project Close Out	This element will cover the receipt, inspection, assembly, commissioning, testing, punchlist, and furnishing of the project facilities and hardware, as well as any approved changes that are required during construction or assembly. Included in this final phase will be the receipt of operating and maintenance manuals, testing and on-site training for maintenance personnel, as-builts, and start-up of all equipment for validation of project (specification and drawing) compliance. At the end of the close out phase, the project will be ready for activation and operation by the operations staff.
1	09	03	11		Near Experimental Hall (NEH)	The Near Experimental Hall (NEH) is a two-story structure (below grade) that will begin downstream of the FEE and will extend approximately 33 meters in the direction of the beam. The primary function of the NEH is to house three experimental hutches. Each hutch shall have its independent PPS entry (provided by others). Adjacent to the hutches shall be floor space to accommodate Prep and Control areas. Provisions shall be made for restroom facilities and 5-ton freight elevator. The second floor shall house a Laser Bay The NEH shall be provided with heating, cooling, ventilation and smoke purge systems. Provisions shall be made for the hutches to have process exhaust fans. A fire sprinkler system shall also be provided throughout the NEH. The floor elevation shall be maintained at 247.25' and remain constant throughout the entire LCLS facilities.
1	09	03	11	01	NEH - Site Preparation/General Requirements	This element will provide the site preparation and general requirements costs for: summarization of the project, work restriction, price and payment procedure, project management and coordination, construction progress and photographic documentations, submittal procedures, references, temporary facility and controls, environmental protection, product requirements, cutting and patching, selective demolition, and HVAC commissioning requirements. The site preparation includes: locate and remove existing utilities, temporary fencing, construction permits, and training.

LCLS WBS DICTIONARY

WBS NUMBER					TITLE	DESCRIPTION
1	2	3	4	5		
1	09	03	11	02	NEH - Sitework	This element will provide the Sitework materials and construction costs for: earthwork, geotechnical instrumentation and monitoring, soil and rock anchors, sanitary sewerage, subdrainage system, storm drainage, hotmix asphalt paving, portland concrete pavement, and pavement joint sealants.. This element includes installation costs for Fire Protection (Hazard Analysis).
1	09	03	11	03	NEH - Concrete	This element will provide the Concrete materials and installation costs for: castinplace concrete.
1	09	03	11	05	NEH - Metals	This element will provide the Metals materials and construction costs for: structural steel, cold-formed metal framing, metal fabrications, and gratings.
1	09	03	11	15	NEH - Mechanical	This element will provide the Mechanical materials and construction costs for: basic mechanical materials and methods, motors, hangers and supports, mechanical vibration and seismic controls, mechanical identification, mechanical insulation, valves, pipe expansion fittings, meters and gages, chilled water and heating water piping, piping specialties, drainage piping specialties, hydronic piping, general-sevice compressed-air piping, sump pumps, heat exchangers, breechings, and hydronic.
1	09	03	11	15	NEH - Mechanical (continued)	air-handling units, metal ducts, duct accessories, centrifugal fans, power ventilators, air terminal units, diffusers, registers, and grilles, ventilators, air filters, HVAC instrumentation and controls, sequence of operation, testing, adjusting, and balancing.
1	09	03	11	16	NEH - Electrical	This element provide the Electrical materials and construction costs for: basic electrical materials and methods, overcurrent protective device coordination, grounding and bonding, electrical supports and seismic restraints, electrical identification, conductors and cables, medium-voltage cables, raceways and boxes, cable trays, wiring devices, lighting control devices, variable frequency controllers, circuit breakers, enclosed controllers, switchboards, panel boards, motor control centers, dry-type transformers (600v and less), power distribution units, interior lighting, and exterior lighting.
1	09	03	11	17	NEH - Others	This element provides the materials and construction costs for CSI divisions 4, 7, 8, 9 and 13. Div 4 - Masonry which covers unit masonry assemblies, Div 7 - Thermal and Moisture Protection which cover self-adhering, elastomeric , and thermoplastic sheet proofing, Bentonite waterproofing, traffic coatings, water repellents, building insulation, metal wall panels, thermoplastic membrane roofing, sheet metal roofing, sheet metal flashing and trim, roof expansion assemblies, roof accessories, horizontal lifeline fall protection system, sprayed fire-resistive materials, through-penetration firestop systems, fire-resistive joint systems, and joint sealants. Div 8 - Doors and Windows which covers standard steel doors & frames, flush wood doors, access doors, overhead coiling doors, and door hardware.
1	09	03	11	17	NEH - Others (continued)	Div 9 - Finishes which covers gypsum board assemblies, gypsum board shaft-wall assemblies, resilient floor covering, acoustical wall panel, exterior and interior painting, concrete floor stain, and high-performance coatings. Div 13 - Special Construction which covers radiation, metal building systems, security access, lighting controls, fire alarm, fire-suppression piping, electric-drive, centrifugal fire pumps, and clean-agent extinguishing systems.
1	09	03	11	20	NEH - Project Close Out	This element will cover the receipt, inspection, assembly, commissioning, testing, punchlist, and furnishing of the project facilities and hardware, as well as any approved changes that are required during construction or assembly. Included in this final phase will be the receipt of operating and maintenance manuals, testing and on-site training for maintenance personnel, as-builts, and start-up of all equipment for validation of project (specification and drawing) compliance. At the end of the close out phase, the project will be ready for activation and operation by the operations staff.

LCLS WBS DICTIONARY

WBS NUMBER					TITLE	DESCRIPTION
1	2	3	4	5		
1	09	03	12		Undulator Hall (UH)	The Undulator Hall (UH) shall be a tunnel commencing from the downstream end of the Beam Transport Hall thermal barrier. It shall extend 170 meters in the direction of the beam to the downstream end of the UH where it shall be enclosed by another physical thermal barrier separating the UH from the Beam Dump/Front End Enclosure. The UH will contain 33 undulator magnets and associated equipment as it continues the electron beam to the Front End Enclosure and Beam Dump. The interior dimensions are 4.5 meters (width) by approximately 4.0 meters (height). Access into the UH will be through an entry provided from the Beam Transport Hall. The UH shall be provided with heating, cooling, and ventilation system. The floor elevation shall be maintained at 247.25' and will remain constant throughout the entire LCLS facilities.
1	09	03	12	01	UH - Site Preparation/General Requirements	This element will provide the site preparation and general requirements costs for: summarization of the project, work restriction, price and payment procedure, project management and coordination, construction progress and photographic documentations, submittal procedures, references, temporary facility and controls, environmental protection, product requirements, cutting and patching, selective demolition, and HVAC commissioning requirements. The site preparation includes: locate and remove existing utilities, temporary fencing, construction permits, and training.
1	09	03	12	02	UH - Site Construction	This element will provide the Sitework materials and construction costs for: earthwork, secondary lining, drilled piers, geotechnical instrumentation and monitoring, soil and rock anchors, sanitary sewerage, subdrainage system, storm drainage, hotmix asphalt paving, portland concrete pavement, and pavement joint sealants.
1	09	03	12	03	UH - Concrete	This element will provide the Concrete materials and installation costs for: cast-in-place concrete.
1	09	03	12	15	UH - Mechanical	This element will provide the Mechanical materials and construction costs for: basic mechanical materials and methods, motors, hangers and supports, mechanical vibration and seismic controls, mechanical identification, mechanical insulation, valves, pipe expansion fittings, meters and gages, chilled water and heating water piping, piping specialties, drainage piping specialties, hydronic piping, general-service compressed-air piping, sump pumps, heat exchangers, breechings, and hydronic.
1	09	03	12	15	UH - Mechanical (continued)	air-handling units, metal ducts, duct accessories, centrifugal fans, power ventilators, air terminal units, diffusers, registers, and grilles, ventilators, air filters, HVAC instrumentation and controls, sequence of operation, testing, adjusting, and balancing.
1	09	03	12	16	UH - Electrical	This element provide the Electrical materials and construction costs for: basic electrical materials and methods, overcurrent protective device coordination, grounding and bonding, electrical supports and seismic restraints, electrical identification, conductors and cables, medium-voltage cables, raceways and boxes, cable trays, wiring devices, lighting control devices, variable frequency controllers, circuit breakers, enclosed controllers, switchboards, panel boards, motor control centers, dry-type transformers (600v and less), power distribution units, interior lighting, and exterior lighting.
1	09	03	12	17	UH - Others	This element provides the materials and construction costs for CSI divisions 4, 7, 8, 9 and 13. Div 4 - Masonry which covers unit masonry assemblies, Div 7 - Thermal and Moisture Protection which cover self-adhering, elastomeric, and thermoplastic sheet proofing, Bentonite waterproofing, traffic coatings, water repellents, building insulation, metal wall panels, thermoplastic membrane roofing, sheet metal roofing, sheet metal flashing and trim, roof expansion assemblies, roof accessories, horizontal lifeline fall protection system, sprayed fire-resistive materials, through-penetration firestop systems, fire-resistive joint systems, and joint sealants. Div 8 - Doors and Windows which covers standard steel doors & frames, flush wood doors, access doors, overhead coiling doors, and door hardware.

LCLS WBS DICTIONARY

WBS NUMBER					TITLE	DESCRIPTION
1	2	3	4	5		
1	09	03	12	17	UH - Others (continued)	Div 9 - Finishes which covers gypsum board assemblies, gypsum board shaft-wall assemblies, resilient floor covering, acoustical wall panel, exterior and interior painting, concrete floor stain, and high-performance coatings. Div 13 - Special Construction which covers radiation, metal building systems, security access, lighting controls, fire alarm, fire-suppression piping, electric-drive, centrifugal fire pumps, and clean-agent extinguishing systems.
1	09	03	12	19	UH - Tunnel Construction	This element will provide the Access Tunnel materials and construction costs for tunnelling.,
1	09	03	12	20	UH - Project Close Out	This element will cover the receipt, inspection, assembly, commissioning, testing, punchlist, and furnishing of the project facilities and hardware, as well as any changes that are required during construction or assembly. Included in this final phase will be the receipt of operating and maintenance manuals, testing and on-site training for maintenance personnel, as-builts, and start-up of all equipment for validation of project (specification and drawing) compliance. At the end of the close out phase, the project will be ready for activation and operation by the operations staff.
1	09	03	13		X-Ray Transport & Diagnostic Hall (XRTD)	The XRTD tunnel shall extend 250 meters downstream of the NEH and shall extend to the FEH. The tunnel width configuration shall accommodate the main beam (0 degree) and the splitting of the referenced beam with +/- ¼ degree beams. A 4' wide aisle shall be maintained throughout the tunnel. The XRTD tunnel shall be provided with ventilation and smoke purge systems. A fire sprinkler system shall be provided throughout the XRTD. The floor elevation shall be maintained at 247.25' and will remain constant throughout the entire LCLS facilities.
1	09	03	13	02	XRTD - Sitework	This element will provide the Sitework materials and construction costs for: earthwork, secondary lining, drilled piers, geotechnical instrumentation and monitoring, soil and rock anchors, sanitary sewerage, subdrainage system, storm drainage, hotmix asphalt paving, portland concrete pavement, pavement joint sealants, irrigation system, and planting and beautification of the site.
1	09	03	13	03	XRTD - Concrete	This element will provide the Concrete materials and installation costs for: castinplace concrete and shotcrete initial and final linings.
1	09	03	13	05	XRTD - Metals	This element will provide the Metals materials and construction costs for: structural steel, steel joists, steel deck, cold-formed metal framing, metal fabrications, metal stairs, gratings, ornamental metal, ornamental railings, and architectural joint systems.
1	09	03	13	15	XRTD - Mechanical	This element will provide the Mechanical materials and construction costs for: basic mechanical materials and methods, motors, hangers and supports, mechanical vibration and seismic controls, mechanical identification, mechanical insulation, valves, pipe expansion fittings, meters and gages, chilled water and heating water piping, piping specialties, drainage piping specialties, hydronic piping, general-sevice compressed-air piping, sump pumps, heat exchangers, breechings, and hydronic.
1	09	03	13	15	XRTD - Mechanical (continued)	air-handling units, metal ducts, duct accessories, centrifugal fans, power ventilators, air terminal units, diffusers, registers, and grilles, ventilators, air filters, HVAC instrumentation and controls, sequence of operation, testing, adjusting, and balancing.
1	09	03	13	16	XRTD - Electrical	This element provide the Electrical materials and construction costs for: basic electrical materials and methods, overcurrent protective device coordination, grounding and bonding, electrical supports and seismic restraints, electrical identification, conductors and cables, medium-voltage cables, raceways and boxes, cable trays, wiring devices, lighting control devices, variable frequency controllers, circuit breakers, enclosed controllers, switchboards, panel boards, motor control centers, dry-type transformers (600v and less), power distribution units, interior lighting, and exterior lighting.

LCLS WBS DICTIONARY

WBS NUMBER					TITLE	DESCRIPTION
1	2	3	4	5		
1	09	03	13	17	XRTD - Others	This element provides the materials and construction costs for CSI divisions 4, 7, 8, 9 and 13. Div 4 - Masonry which covers unit masonry assemblies, Div 7 - Thermal and Moisture Protection which cover self-adhering, elastomeric, and thermoplastic sheet proofing, Bentonite waterproofing, traffic coatings, water repellents, building insulation, metal wall panels, thermoplastic membrane roofing, sheet metal roofing, sheet metal flashing and trim, roof expansion assemblies, roof accessories, horizontal lifeline fall protection system, sprayed fire-resistive materials, through-penetration firestop systems, fire-resistive joint systems, and joint sealants. Div 8 - Doors and Windows which covers standard steel doors & frames, flush wood doors, access doors, overhead coiling doors, and door hardware.
1	09	03	13	17	XRTD - Others (continued)	Div 9 - Finishes which covers gypsum board assemblies, gypsum board shaft-wall assemblies, resilient floor covering, acoustical wall panel, exterior and interior painting, concrete floor stain, and high-performance coatings. Div 13 - Special Construction which covers radiation, metal building systems, security access, lighting controls, fire alarm, fire-suppression piping, electric-drive, centrifugal fire pumps, and clean-agent extinguishing systems.
1	09	03	13	19	XRTD - Tunnel Construction	This element will provide the Access Tunnel materials and construction costs for Access Tunnelling
1	09	03	13	20	XRTD - Project Close Out	This element will cover the receipt, inspection, assembly, commissioning, testing, punchlist, and furnishing of the project facilities and hardware, as well as any changes that are required during construction or assembly. Included in this final phase will be the receipt of operating and maintenance manuals, testing and on-site training for maintenance personnel, as-builts, and start-up of all equipment for validation of project (specification and drawing) compliance. At the end of the close out phase, the project will be ready for activation and operation by the operations staff.
1	09	03	14		Far Experimental Hall (FEH)	The Far Experimental Hall (FEH) shall be located 250 meters downstream of the NEH. It shall be located approximately 30 meters below grade and shall be constructed using conventional tunneling applications. The primary function of the FEH is to house experimental hutches. Each hutch shall have its independent PPS entry. Adjacent to the hutches shall be floor space to accommodate Prep and Control areas. The FEH shall be provided with heating, cooling, ventilation and smoke purge systems. Provisions shall be made for the hutches to have process exhaust fans. A fire sprinkler system shall be provided throughout the FEH. The floor elevation shall be maintained at 247.25' and will remain constant throughout the entire LCLS facilities.
1	09	03	14	01	FEH - Site Preparation/General Requirements	This element will provide the site preparation and general requirements costs for: summarization of the project, work restriction, price and payment procedure, project management and coordination, construction progress and photographic documentations, submittal procedures, references, temporary facility and controls, environmental protection, product requirements, cutting and patching, selective demolition, and HVAC commissioning requirements. The site preparation includes: locate and remove existing utilities, temporary fencing, construction permits, and training.
1	09	03	14	02	FEH - Sitework	This element will provide the Sitework materials and construction costs for: earthwork, secondary lining, drilled piers, geotechnical instrumentation and monitoring, soil and rock anchors, sanitary sewerage, subdrainage system, storm drainage, hotmix asphalt paving, portland concrete pavement, pavement joint sealants, irrigation system, and planting and beautification of the site.
1	09	03	14	05	FEH - Metals	This element will provide the Metals materials and construction costs for: structural steel, steel joists, steel deck, cold-formed metal framing, metal fabrications, metal stairs, gratings, ornamental metal, ornamental railings, and architectural joint systems.

LCLS WBS DICTIONARY

WBS NUMBER					TITLE	DESCRIPTION
1	2	3	4	5		
1	09	03	14	15	FEH - Mechanical	This element will provide the Mechanical materials and construction costs for: basic mechanical materials and methods, motors, hangers and supports, mechanical vibration and seismic controls, mechanical identification, mechanical insulation, valves, pipe expansion fittings, meters and gages, chilled water and heating water piping, piping specialties, drainage piping specialties, hydronic piping, general-sevice compressed-air piping, sump pumps, heat exchangers, breechings, and hydronic.
1	09	03	14	15	FEH - Mechanical (continued)	air-handling units, metal ducts, duct accessories, centrifugal fans, power ventilators, air terminal units, diffusers, registers, and grilles, ventilators, air filters, HVAC instrumentation and controls, sequence of operation, testing, adjusting, and balancing.
1	09	03	14	16	FEH - Electrical	This element provide the Electrical materials and construction costs for: basic electrical materials and methods, overcurrent protective device coordination, grounding and bonding, electrical supports and seismic restraints, electrical identification, conductors and cables, medium-voltage cables, raceways and boxes, cable trays, wiring devices, lighting control devices, variable frequency controllers, circuit breakers, enclosed controllers, switchboards, panel boards, motor control centers, dry-type transformers (600v and less), power distribution units, interior lighting, and exterior lighting.
1	09	03	14	17	FEH - Others	This element provides the materials and construction costs for CSI divisions 4, 7, 8, 9 and 13. Div 4 - Masonry which covers unit masonry assemblies, Div 7 - Thermal and Moisture Protection which cover self-adhering, elastomeric , and thermoplastic sheet proofing, Bentonite waterproofing, traffic coatings, water repellents, building insulation, metal wall panels, thermoplastic membrane roofing, sheet metal roofing, sheet metal flashing and trim, roof expansion assemblies, roof accessories, horizontal lifeline fall protection system, sprayed fire-resistive materials, through-penetration firestop systems, fire-resistive joint systems, and joint sealants. Div 8 - Doors and Windows which covers standard steel doors & frames, flush wood doors, access doors, overhead coiling doors, and door hardware.
1	09	03	14	17	FEH - Others (continued)	Div 9 - Finishes which covers gypsum board assemblies, gypsum board shaft-wall assemblies, resilient floor covering, acoustical wall panel, exterior and interior painting, concrete floor stain, and high-performance coatings. Div 13 - Special Construction which covers radiation, metal building systems, security access, lighting controls, fire alarm, fire-suppression piping, electric-drive, centrifugal fire pumps, and clean-agent extinguishing systems.
1	09	03	14	18	FEH - Access Tunnel	This element will provide the Access Tunnel materials and construction costs for Access Tunnelling
1	09	03	14	19	FEH - Tunnel Construction	This element will provide the Access Tunnel materials and construction costs for tunnelling.,
1	09	03	14	20	FEH - Project Close Out	This element will cover the receipt, inspection, assembly, commissioning, testing, punchlist, and furnishing of the project facilities and hardware, as well as any changes that are required during construction or assembly. Included in this final phase will be the receipt of operating and maintenance manuals, testing and on-site training for maintenance personnel, as-builts, and start-up of all equipment for validation of project (specification and drawing) compliance. At the end of the close out phase, the project will be ready for activation and operation by the operations staff.
1	09	03	15		Service Buildings 2.1, 2.2, and 2.3 (SB BTH)	Service Buildings 2.1, 2.2, and 2.3 are included as a pre-engineered buildings and are part of the Beam Transport Hall. The building components include the slab, metal frame, exterior cladding, HVAC and electrical.
1	09	03	15	03	SB BTH - Concrete	This element will provide the Concrete materials and installation costs for: castinplace concrete and shotcrete initial and final linings.
1	09	03	15	05	SB BTH - Metals	This element will provide the Metals materials and construction costs for: structural steel, steel joists, steel deck, cold-formed metal framing, metal fabrications, metal stairs, gratings, ornamental metal, ornamental railings, and architectural joint systems.

LCLS WBS DICTIONARY

WBS NUMBER					TITLE	DESCRIPTION
1	2	3	4	5		
1	09	03	15	15	SB BTH - Mechanical	This element will provide the Mechanical materials and construction costs for: basic mechanical materials and methods, motors, hangers and supports, mechanical vibration and seismic controls, mechanical identification, mechanical insulation, valves, pipe expansion fittings, meters and gages, chilled water and heating water piping, piping specialties, drainage piping specialties, hydronic piping, general-sevice compressed-air piping, sump pumps, heat exchangers, breechings, and hydronic.
1	09	03	15	15	SB BTH - Mechanical (continued)	air-handling units, metal ducts, duct accessories, centrifugal fans, power ventilators, air terminal units, diffusers, registers, and grilles, ventilators, air filters, HVAC instrumentation and controls, sequence of operation, testing, adjusting, and balancing.
1	09	03	15	16	SB BTH - Electrical	This element provide the Electrical materials and construction costs for: basic electrical materials and methods, overcurrent protective device coordination, grounding and bonding, electrical supports and seismic restraints, electrical identification, conductors and cables, medium-voltage cables, raceways and boxes, cable trays, wiring devices, lighting control devices, variable frequency controllers, circuit breakers, enclosed controllers, switchboards, panel boards, motor control centers, dry-type transformers (600v and less), power distribution units, interior lighting, and exterior lighting.
1	09	03	15	17	SB BTH - Others	This element provides the materials and construction costs for CSI divisions 4, 7, 8, 9 and 13. Div 4 - Masonry which covers unit masonry assemblies, Div 7 - Thermal and Moisture Protection which cover self-adhering, elastomeric , and thermoplastic sheet proofing, Bentonite waterproofing, traffic coatings, water repellents, building insulation, metal wall panels, thermoplastic membrane roofing, sheet metal roofing, sheet metal flashing and trim, roof expansion assemblies, roof accessories, horizontal lifeline fall protection system, sprayed fire-resistive materials, through-penetration firestop systems, fire-resistive joint systems, and joint sealants. Div 8 - Doors and Windows which covers standard steel doors & frames, flush wood doors, access doors, overhead coiling doors, and door hardware.
1	09	03	15	17	SB BTH - Others (continued)	Div 9 - Finishes which covers gypsum board assemblies, gypsum board shaft-wall assemblies, resilient floor covering, acoustical wall panel, exterior and interior painting, concrete floor stain, and high-performance coatings. Div 13 - Special Construction which covers radiation, metal building systems, security access, lighting controls, fire alarm, fire-suppression piping, electric-drive, centrifugal fire pumps, and clean-agent extinguishing systems.
1	09	03	15	20	SB BTH - Project Close Out	This element will cover the receipt, inspection, assembly, commissioning, testing, punchlist, and furnishing of the project facilities and hardware, as well as any changes that are required during construction or assembly. Included in this final phase will be the receipt of operating and maintenance manuals, testing and on-site training for maintenance personnel, as-builts, and start-up of all equipment for validation of project (specification and drawing) compliance. At the end of the close out phase, the project will be ready for activation and operation by the operations staff.
1	09	03	16		Service Buildings 3.1, 3.2, and 3.3 (SB UH)	Service Buildings 3.1 included as a pre-engineered building and is part of the Undulator Hall. The building components include the slab, metal frame, exterior cladding, HVAC and Electrical.
1	09	03	16	01	SB UH - Site Preparation/General Requirements	This element will provide the site preparation and general requirements costs for: summarization of the project, work restriction, price and payment procedure, project management and coordination, construction progress and photographic documentations, submittal procedures, references, temporary facility and controls, environmental protection, product requirements, cutting and patching, selective demolition, and HVAC commissioning requirements. The site preparation includes: locate and remove existing utilities, temporary fencing, construction permits, and training.
1	09	03	16	03	SB UH - Concrete	This element will provide the Concrete materials and installation costs for: castinplace concrete and shotcrete initial and final linings.

LCLS WBS DICTIONARY

WBS NUMBER					TITLE	DESCRIPTION
1	2	3	4	5		
1	09	03	16	05	SB UH - Metals	This element will provide the Metals materials and construction costs for: structural steel, steel joists, steel deck, cold-formed metal framing, metal fabrications, metal stairs, gratings, ornamental metal, ornamental railings, and architectural joint systems.
1	09	03	16	15	SB UH - Mechanical	This element will provide the Mechanical materials and construction costs for: basic mechanical materials and methods, motors, hangers and supports, mechanical vibration and seismic controls, mechanical identification, mechanical insulation, valves, pipe expansion fittings, meters and gages, chilled water and heating water piping, piping specialties, drainage piping specialties, hydronic piping, general-sevice compressed-air piping, sump pumps, heat exchangers, breechings, and hydronic.
1	09	03	16	15	SB UH - Mechanical (continued)	air-handling units, metal ducts, duct accessories, centrifugal fans, power ventilators, air terminal units, diffusers, registers, and grilles, ventilators, air filters, HVAC instrumentation and controls, sequence of operation, testing, adjusting, and balancing.
1	09	03	16	16	SB UH - Electrical	This element provide the Electrical materials and construction costs for: basic electrical materials and methods, overcurrent protective device coordination, grounding and bonding, electrical supports and seismic restraints, electrical identification, conductors and cables, medium-voltage cables, raceways and boxes, cable trays, wiring devices, lighting control devices, variable frequency controllers, circuit breakers, enclosed controllers, switchboards, panel boards, motor control centers, dry-type transformers (600v and less), power distribution units, interior lighting, and exterior lighting.
1	09	03	16	17	SB UH - Others	This element provides the materials and construction costs for CSI divisions 4, 7, 8, 9 and 13. Div 4 - Masonry which covers unit masonry assemblies, Div 7 - Thermal and Moisture Protection which cover self-adhering, elastomeric , and thermoplastic sheet proofing, Bentonite waterproofing, traffic coatings, water repellents, building insulation, metal wall panels, thermoplastic membrane roofing, sheet metal roofing, sheet metal flashing and trim, roof expansion assemblies, roof accessories, horizontal lifeline fall protection system, sprayed fire-resistive materials, through-penetration firestop systems, fire-resistive joint systems, and joint sealants. Div 8 - Doors and Windows which covers standard steel doors & frames, flush wood doors, access doors, overhead coiling doors, and door hardware.
1	09	03	16	17	SB UH - Others (continued)	Div 9 - Finishes which covers gypsum board assemblies, gypsum board shaft-wall assemblies, resilient floor covering, acoustical wall panel, exterior and interior painting, concrete floor stain, and high-performance coatings. Div 13 - Special Construction which covers radiation, metal building systems, security access, lighting controls, fire alarm, fire-suppression piping, electric-drive, centrifugal fire pumps, and clean-agent extinguishing systems.
1	09	03	16	20	SB UH - Project Close Out	This element will cover the receipt, inspection, assembly, commissioning, testing, punchlist, and furnishing of the project facilities and hardware, as well as any changes that are required during construction or assembly. Included in this final phase will be the receipt of operating and maintenance manuals, testing and on-site training for maintenance personnel, as-builts, and start-up of all equipment for validation of project (specification and drawing) compliance. At the end of the close out phase, the project will be ready for activation and operation by the operations staff.
1	09	03	17		Service Building 8.1 (SB FEH)	Service Building 8.1 is included as a pre-engineered building and is part of the Far Experimental Hall. The building components include the slab, metal frame, exterior cladding, HVAC and electrical.
1	09	03	17	01	SB FEH - Site Preparation/General Requirements	This element will provide the site preparation and general requirements costs for: summarization of the project, work restriction, price and payment procedure, project management and coordination, construction progress and photographic documentations, submittal procedures, references, temporary facility and controls, environmental protection, product requirements, cutting and patching, selective demolition, and HVAC commissioning requirements. The site preparation includes: locate and remove existing utilities, temporary fencing, construction permits, and training.

LCLS WBS DICTIONARY

WBS NUMBER					TITLE	DESCRIPTION
1	2	3	4	5		
1	09	03	17	03	SB FEH - Concrete	This element will provide the Concrete materials and installation costs for: castinplace concrete and shotcrete initial and final linings.
1	09	03	17	05	SB FEH - Metals	This element will provide the Metals materials and construction costs for: structural steel, steel joists, steel deck, cold-formed metal framing, metal fabrications, metal stairs, gratings, ornamental metal, ornamental railings, and architectural joint systems.
1	09	03	17	15	SB FEH - Mechanical	This element will provide the Mechanical materials and construction costs for: basic mechanical materials and methods, motors, hangers and supports, mechanical vibration and seismic controls, mechanical identification, mechanical insulation, valves, pipe expansion fittings, meters and gages, chilled water and heating water piping, piping specialties, drainage piping specialties, hydronic piping, general-sevice compressed-air piping, sump pumps, heat exchangers, breechings, and hydronic.
1	09	03	17	15	SB FEH - Mechanical (continued)	air-handling units, metal ducts, duct accessories, centrifugal fans, power ventilators, air terminal units, diffusers, registers, and grilles, ventilators, air filters, HVAC instrumentation and controls, sequence of operation, testing, adjusting, and balancing.
1	09	03	17	16	SB FEH - Electrical	This element provide the Electrical materials and construction costs for: basic electrical materials and methods, overcurrent protective device coordination, grounding and bonding, electrical supports and seismic restraints, electrical identification, conductors and cables, medium-voltage cables, raceways and boxes, cable trays, wiring devices, lighting control devices, variable frequency controllers, circuit breakers, enclosed controllers, switchboards, panel boards, motor control centers, dry-type transformers (600v and less), power distribution units, interior lighting, and exterior lighting.
1	09	03	17	17	SB FEH - Others	This element provides the materials and construction costs for CSI divisions 4, 7, 8, 9 and 13. Div 4 - Masonry which covers unit masonry assemblies, Div 7 - Thermal and Moisture Protection which cover self-adhering, elastomeric , and thermoplastic sheet proofing, Bentonite waterproofing, traffic coatings, water repellents, building insulation, metal wall panels, thermoplastic membrane roofing, sheet metal roofing, sheet metal flashing and trim, roof expansion assemblies, roof accessories, horizontal lifeline fall protection system, sprayed fire-resistive materials, through-penetration firestop systems, fire-resistive joint systems, and joint sealants. Div 8 - Doors and Windows which covers standard steel doors & frames, flush wood doors, access doors, overhead coiling doors, and door hardware.
1	09	03	17	17	SB FEH - Others (continued)	Div 9 - Finishes which covers gypsum board assemblies, gypsum board shaft-wall assemblies, resilient floor covering, acoustical wall panel, exterior and interior painting, concrete floor stain, and high-performance coatings. Div 13 - Special Construction which covers radiation, metal building systems, security access, lighting controls, fire alarm, fire-suppression piping, electric-drive, centrifugal fire pumps, and clean-agent extinguishing systems.
1	09	03	17	20	SB FEH - Project Close Out	This element will cover the receipt, inspection, assembly, commissioning, testing, punchlist, and furnishing of the project facilities and hardware, as well as any changes that are required during construction or assembly. Included in this final phase will be the receipt of operating and maintenance manuals, testing and on-site training for maintenance personnel, as-builts, and start-up of all equipment for validation of project (specification and drawing) compliance. At the end of the close out phase, the project will be ready for activation and operation by the operations staff.
1	09	03	18		Central Utility Plant (CUP)	The Central Utility Plant Support (CUP) includes a single level steel structure with metal panel cladding and metal standing seam roof assembly. Interiors include light gauge metal studs and painted drywall.

LCLS WBS DICTIONARY

WBS NUMBER					TITLE	DESCRIPTION
1	2	3	4	5		
1	09	03	18	01	CUP - Site Preparation/General Requirements	This element will provide the site preparation and general requirements costs for: summarization of the project, work restriction, price and payment procedure, project management and coordination, construction progress and photographic documentations, submittal procedures, references, temporary facility and controls, environmental protection, product requirements, cutting and patching, selective demolition, and HVAC commissioning requirements. The site preparation includes: locate and remove existing utilities, temporary fencing, construction permits, and training.
1	09	03	18	02	CUP - Sitework	This element will provide the Sitework materials and construction costs for: earthwork, secondary lining, drilled piers, geotechnical instrumentation and monitoring, soil and rock anchors, sanitary sewerage, subdrainage system, storm drainage, hotmix asphalt paving, portland concrete pavement, pavement joint sealants, irrigation system, and planting and beautification of the site.
1	09	03	18	03	CUP - Concrete	This element will provide the Concrete materials and installation costs for: castinplace concrete and shotcrete initial and final linings.
1	09	03	18	05	CUP - Metals	This element will provide the Metals materials and construction costs for: structural steel, steel joists, steel deck, cold-formed metal framing, metal fabrications, metal stairs, gratings, ornamental metal, ornamental railings, and architectural joint systems.
1	09	03	18	15	CUP - Mechanical	This element will provide the Mechanical materials and construction costs for: basic mechanical materials and methods, motors, hangers and supports, mechanical vibration and seismic controls, mechanical identification, mechanical insulation, valves, pipe expansion fittings, meters and gages, chilled water and heating water piping, piping specialties, drainage piping specialties, hydronic piping, general-sevice compressed-air piping, sump pumps, heat exchangers, breechings, and hydronic.
1	09	03	18	15	CUP - Mechanical (continued)	air-handling units, metal ducts, duct accessories, centrifugal fans, power ventilators, air terminal units, diffusers, registers, and grilles, ventilators, air filters, HVAC instrumentation and controls, sequence of operation, testing, adjusting, and balancing.
1	09	03	18	16	CUP - Electrical	This element provide the Electrical materials and construction costs for: basic electrical materials and methods, overcurrent protective device coordination, grounding and bonding, electrical supports and seismic restraints, electrical identification, conductors and cables, medium-voltage cables, raceways and boxes, cable trays, wiring devices, lighting control devices, variable frequency controllers, circuit breakers, enclosed controllers, switchboards, panel boards, motor control centers, dry-type transformers (600v and less), power distribution units, interior lighting, and exterior lighting.
1	09	03	18	17	CUP - Others	This element provides the materials and construction costs for CSI divisions 4, 7, 8, 9 and 13. Div 4 - Masonry which covers unit masonry assemblies, Div 7 - Thermal and Moisture Protection which cover self-adhering, elastomeric , and thermoplastic sheet proofing, Bentonite waterproofing, traffic coatings, water repellents, building insulation, metal wall panels, thermoplastic membrane roofing, sheet metal roofing, sheet metal flashing and trim, roof expansion assemblies, roof accessories, horizontal lifeline fall protection system, sprayed fire-resistive materials, through-penetration firestop systems, fire-resistive joint systems, and joint sealants. Div 8 - Doors and Windows which covers standard steel doors & frames, flush wood doors, access doors, overhead coiling doors, and door hardware.
1	09	03	18	17	CUP - Others (continued)	Div 9 - Finishes which covers gypsum board assemblies, gypsum board shaft-wall assemblies, resilient floor covering, acoustical wall panel, exterior and interior painting, concrete floor stain, and high-performance coatings. Div 13 - Special Construction which covers radiation, metal building systems, security access, lighting controls, fire alarm, fire-suppression piping, electric-drive, centrifugal fire pumps, and clean-agent extinguishing systems.

LCLS WBS DICTIONARY

WBS NUMBER					TITLE	DESCRIPTION
1	2	3	4	5		
1	09	03	18	20	CUP - Project Close Out	This element will cover the receipt, inspection, assembly, commissioning, testing, punchlist, and furnishing of the project facilities and hardware, as well as any changes that are required during construction or assembly. Included in this final phase will be the receipt of operating and maintenance manuals, testing and on-site training for maintenance personnel, as-builts, and start-up of all equipment for validation of project (specification and drawing) compliance. At the end of the close out phase, the project will be ready for activation and operation by the operations staff.
1	09	03	19		Central Laboratory Office Complex (CLOC)	This scope has been deleted from LCLS Conventional Facilities System. Only Sitework from Bid Group 1 remain in this WBS
1	09	03	19	20	CLOC - Sitework (Bid Group 1 ONLY)	This element will provide the Sitework materials and construction costs for: earthwork, prep slab (mud slab) sanitary sewerage, subdrainage system, storm drainage, lighting, curb and gutter. This element is for work associated with Bid Group 1 ONLY.
2	09	03			Conventional Facility Pre-Operation	This element covers the commissioning plan, Dispute Resolution, and OPC Labor Support to Beam Path
2	09	03	20		Beam Path Project Commissioning	This element covers the commissioning plan, Dispute Resolution, and OPC Labor Support to Beam Path