Statement of Work – Second Target Station (STS) Conventional Facilities AE Design
April 14, 2020, Rev 0

1. Introduction and Background

The Second Target Station (STS) is to be located at the Spallation Neutron Source (SNS), which is part of the Oak Ridge National Laboratory (ORNL), a Government owned facility, managed by UT-Battelle, LCC (Owner), for the Department of Energy (DOE), in Oak Ridge, TN. The First Target Station (FTS) at the SNS was completed in 2006. The Campus Master Plan included provision for the STS and was developed to accommodate growth and expansion of accelerator facilities, target facilities, instrument buildings, laboratories, offices, and secondary supporting facilities. The STS will be preceded by the Proton Power Upgrade (PPU) Project, which will provide the necessary proton beamline power to accommodate the STS (double the total output from 1.4 MW to 2.8 MW). The 15 Hz, 0.7 MW STS source will provide unparalleled intensity and resolution for long wavelength cold neutron applications. The STS is a DOE Major System Project as defined by DOE Order 413.3b which will include the capability to support 22 new beamlines for instruments, and the entire complex will include roughly 350k gross square feet (GSF) of new construction. The STS project will fulfill the original master plan through the construction of multiple new building structures which will comprise the STS facility.

The STS Conventional Facility (CF) goals and objectives are commensurate with the ORNL Annual Lab Plan and those of the project. These goals and objectives do not impose obligations, duties and responsibilities upon the AE in addition to, or independent of those set out in the other provisions of the solicitation and any impending contract. ORNL's Annual Lab Plan outlines the importance of operating and developing the SNS as a world-leading neutron scattering user facility and center of scientific excellence, attracting leading researchers to work with ORNL to solve challenging problems that are important to the mission of DOE. The STS project is a DOE Major System Project being developed at ORNL for the DOE Office of Basic Energy Sciences. The services of the AE are instrumental in planning, developing, and executing a design that will enable the project to exceed the Laboratory's Performance Evaluation and Measurement Plan (PEMP) objectives by delivering a project that addresses all stakeholder objectives and maximizes the talents of the team to deliver a project that promotes safe operations, and maximizes the scientific scope within project budget and schedule.

The DOE sets their expectations high and expects performance that is above routine. To measure ORNL's performance DOE assesses the ORNL STS project's ability to:

- Meet the intent of DOE Order 413.3B, *Program and Project Management for the Acquisition of Capital Assets* in the management processes of the STS [AE understanding and support in the 413 process is required for project success];
- Deliver accurate and timely information required to carry out the critical decision process through budget formulation that provides a high confidence level throughout the execution phase that the project will meet its cost/schedule performance baseline [AE is critical in developing timely cost and schedule information by working with the independent estimator and CM/GC to develop accurate estimates and schedules];
- Demonstrate high confidence throughout the execution phase that the project will be completed under budget and/or ahead of schedule while meeting or exceeding all performance baselines [this is the metric expected of ORNL, AE will be required to produce quality designs to support the project baseline];
- Effectively manage, communicate, and partner with the project team, DOE Oak Ridge Site Office (OSO) and HQ Acquisition Executive [timely, open, and clear communication with the Technical Project Officer (TPO) is required];
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- Perform design reviews that identify environment, safety and health practices that exceed expectations

and ensure safe conduct of all project personnel [AE excellence in design is required];
- Appropriately assess project risks and contingency needs [AE is to actively participate in risk development and mitigation process];
- Create innovative operational and programmatic design solutions for systems that ensure high availability, reliability, and efficiency of facilities [AE excellence and innovation in design is required];
- Deliver leading-edge specialty research and/or user facilities to ensure the required technical quality of conceptual, preliminary, and final designs and the credibility of the associated cost estimates [The AE design of facilities and support systems along with the interaction with technical components is most critical to the project's success];
- Leverage existing facilities in the design for proposed facilities [AE must provide innovative solutions that leverage existing infrastructure and facilities to optimize designs and reduce costs]; and
- Incorporate novelty and potential impact of new technologies embodied in proposed facilities and their development [cutting edge science requires cutting edge CF design techniques and expertise].
- The DOE ultimate objective is to deliver every project at the original Performance Measurement Baseline, on schedule, within budget, and fully capable of meeting mission performance, safeguards and security, quality assurance (QA), sustainability, and environmental, safety, and health requirements [non-negotiable objective].

Specifically, the project CF goals are simple and provide the basis for meeting the ORNL measurement plan.
- Ensure that all work be conducted safely and efficiently and in a manner that ensures protection of workers, the public, and the environment.
- Ensure the safety of all project participants and develop a design solution that enables safe operations;
- Exceed the customers' expectations by ensuring the mission need is fulfilled;
- Execute the design in the most efficient manner, and in the best interest of the project team and DOE;
- Develop an integrated team culture with ownership, empowerment, and value added.

2. Purpose

The Architect-Engineer (AE) firm will provide the complete architectural/engineering of the STS CF, including Planning and Verification, Preliminary and Final design, and AE construction support. The AE will be required to provide all services including but not limited to planning, architectural, geotechnical, civil, mechanical, electrical, plumbing, structural, fire protection, and any other disciplines necessary for a complete the design.

The AE design process is anticipated to follow the standard process of conceptual planning confirmation and verification of the previously developed STS CF Conceptual Design Report [(2)] (CDR), design development processes, estimating support of an independent estimator (estimator contracted to owner), value engineering, and as-constructed design model and drawings. The design development process is expected to utilize BIM with transfer of the model to the Construction Manager/General Contractor (CM/GC) and lower tier subcontractors for use in multiple construction processes. The model will be used to validate construction conformance to the AE design. The AE will be required to collaborate and coordinate with the CM/GC, Estimator, and Commissioning Agent (Commissioning contracted to owner) throughout the design and construction process.

The STS project is a DOE Major System Project and will follow the requirements of DOE Order 413.3B *Program and Project Management for the Acquisition of Capital Assets* and all referenced or required DOE Orders, Guides, and implementing procedures. DOE guidelines implementing the DOE Orders will be utilized to manage and execute project requirements.

3. Scope

The STS will utilize a Construction Manager at Risk (CMAR) method of accomplishment. This approach is anticipated to deliver a design by an AE firm supported by a CM/GC and constructed by the CM/GC all led by the Management and Operations (M&O) acquisition team. Under this approach, the ORNL M&O Contractor, under the direction, guidance, and oversight of DOE-OSO, will accomplish this project utilizing a Basic Ordering Agreements (BOA) for an AE firm, CMAR contract, Estimating, and Commissioning subcontracts.

The AE will be tasked to perform planning and verification, preliminary and final design, and construction support services for the scope of work defined as CF activities. AE services will be contracted through individual Task Order scopes under the terms of the base BOA contract; future options exercised, and as directed in writing through the performance of approved change orders.

The STS project will have technically challenging design requirements, a segmented design schedule, and will have funding and milestone constraints. The STS CF preliminary hard construction estimate based on the CF CDR [(2)] can be found in Attachment 7.

3.1. Site Civil Work

The Site Civil Work will include all preconstruction services related to the proposed STS site. Site Civil work includes contractor laydown and support facilities, site utility infrastructure, and mass grading. The utility infrastructure includes stormwater conveyance systems, underground power and communications, and water (potable and chilled) conveyance infrastructure. The overall cut volume for the Construction Excavation Plan is estimated at approximately 430,000 cubic yards. This volume includes excavation required to develop 0.5 miles of roadway (for material transport and construction traffic) and approximately 190,000 cubic yards of existing stockpile around the proposed locations for the Ring to Second Target (RTST) Tunnel, Target Building II, and Instrument Buildings.

3.2. RTST Tunnel and Service Building

The RTST Tunnel will house the proton beamline that extends from the existing Ring to Target Beam Transport (RTBT) Tunnel to Target Building II. The approximately 12,000 GSF tunnel will include a dedicated truck access and possibly an overhead crane for the movement of beamline components. Due to radiological levels, a total shielding dimension of approximately 18’-6” (measured from the interior tunnel surfaces to exterior grade) is required.

The RTST Service Building will house utility systems that support the RTST Tunnel and proton beamline, including magnet power supplies, power supply cooling systems, magnet cooling systems, controls, diagnostics and communication systems. It is anticipated to be a one-story facility of approximately 8,500 GSF structure.

3.3. Target and Instrument Buildings

The Target Building II, 40M, 50M, and 90M Instrument Buildings will be constructed as a single building. The Target Building II will house the second target monolith, which is where the STS proton beamline terminates, and 22 STS neutron beamlines originate. It will house all utility systems necessary to support the target, space supporting long-term maintenance of the target, and numerous other functions that are critical to operation of the target facility. The Target Building II is anticipated to be a four floor, approximately111,000 GSF structure. The second-floor high bay space will be served by a 50-ton overhead bridge crane. Interior tractor trailer truck bay with 30-ton cranes will serve the instrument floors. Significant shielding will be required for radiation protection with a weight and settlement criteria that will be challenging.

The structure will include 3 instrument “bays” referred to as buildings. The 40M Instrument Building will house 11 instruments within approximately 45,000 GSF. The 50M Instrument Building will house

9 instruments within approximately 42,000 GSF. The 90M Instrument Building will house 2 instruments within approximately 17,000 GSF. The 40M and 50M Buildings will be provided air handling and ventilation through the system that will also serve Target Building II. The 40M and 50M Buildings will include a perimeter mezzanine that provides upper level access to individual instruments and links the entire STS complex with the existing FTS facilities through a pedestrian bridge. The 40M and 50M Buildings will be served by 30-ton overhead cranes. The 90M Building will be served by a 10-ton overhead crane. Settlement and deflection criteria are stringent and will require significant design study and development to create a system that is both cost effective and predictable.

3.4. Central Utilities

The STS will be served by a new Central Utilities Building (CUB) II and Central Exhaust Facility (CEF) II. The CUB II will be a two story, approximately 9,000 GSF building located along Perimeter Ring Road north of the STS complex. It will house chiller, boiler, compressed air and pump systems and include an adjacent cooling tower. The CEF II is primarily an exterior facility including exhaust fans, stacks, and associated utilities to serve both the RTST and the Target building located within Perimeter Ring Road.

4. Task Definition

4.1. Program Management

The success of DOE funded projects requires excellence in project management practices, both functional requirements practices and business practices. The AE will be required to utilized sound, disciplined, and up-front project planning. Effective communication will be critical and must be established amongst the integrated project team. The integrated project team will include the AE, the CM/GC, specialty design consultants, and the ORNL and DOE team members.

4.1.1. Project & Business Management

The AE will need to provide the project management resources, tools, and people skills utilized to manage a diverse AE project team and partner with the broader team of CM, Owner, and specialty consultants. Accurate, complete, and timely progress data (a minimum of monthly status reports) will be required for the overall contract and for each task order. Likewise invoicing must be accurate, timely, reliable, and shall follow the terms and conditions established with UT-Battelle. Detailed project schedules will need to be developed and executed against to ensure deliverables are met and project milestone reviews can proceed on schedule. Due to the nature and scale of the project task order changes are inevitable. Detailed management of task order changes will be required to ensure accurate reporting and invoicing. Configuration management tools must be utilized to ensure requirements, specifications, and designs are controlled and retained throughout the project lifecycle. Record documents will be required to be retrievable, document professional development and approval of designs, and provide historical evidence of decisions and processes that produce the design product.

Multiple office locations and/or environments may be utilized requiring remote working environment guidelines, operating procedures, and personnel experienced in working as part of virtual teams. If the management and design structure will utilize multiple office locations the role of each location, and communication plan is required. The communication plan is to provide the processes and tools required to manage meetings, utilize and control AV equipment for virtual teams, and the processes for managing electronic data (files, drawings, word processing, etc.).

4.1.2. ESH&Q

A STS AE specific ESH&Q plan will be required for the overall contract and a supplemental

plan for each subsequent task order. The plan must address how work will be conducted in a safe manner on and off-site, during travel, and on construction sites, and process for approving work activity hazards. A working quality assurance program and procedures must be developed that controls the project design to the highest (and/or most appropriate) level of standards. Quality metrics and check points must be identified. Safety through design is to be an active metric of the AE design quality program.

The ultimate safety goal is zero accidents, work-related injuries and illnesses, regulatory violations, and reportable environmental releases. For all activities and phases in the lifecycle of missions, inclusive of design and construction, appropriate mechanisms must be in place to ensure that exposures to workers, the public, and the environment to radiological and non-radiological hazards are maintained below regulatory limits. Furthermore, deliberate efforts must be taken to keep exposures to radiation as low as reasonably achievable.

4.1.3. Travel

Representatives of the AE will be required to travel in support of tasking such as design, cost, and schedule reviews, project meetings, to perform onsite construction assessments and quality assurance, and to perform punch-list and final acceptance tasks. Reimbursement for lodging, meals, and incidentals will be limited to the established GSA rates. Flights shall be booked in a manner to minimize cost to the owner, such as booking at least two weeks in advance of scheduled visits whenever possible. Travel should also be limited to representatives essential to the support of the scheduled event, and virtual support shall be utilized when appropriate.

Visits to ORNL require advance notice and badging, which will be supported by the owner. A week's notice, or a minimum of two business days for urgent matters, is required for US Citizens to be badged. Due to the Covid-19 conditions visits to and travel will be restricted to the terms established by ORNL and limited as low as reasonably practical. Visits by Foreign Nationals take additional time to process and may require three months of lead time or more for badging. Identification and any additional requirements will be provided by the owner in advance of scheduled visits.

4.1.4. Estimating Support

The DOE project reviews require full reviews of the design, independent cost estimate, and project schedule for each Critical Decision. In preparation for these CD reviews the design development process will include cost estimate reviews as the project progresses. The CF project team will utilize an independent estimator along with the CM/GC to development these cost estimates and project schedules. The AE must work with the independent estimator and CM/GC to coordinate the estimate with the design submissions and scope of work for each task order, and to review any assumptions made by either the estimator or CM/GC concerning exclusions and inclusions made that serve as the basis of estimate. The AE's input and subsequent review must encompass proposed types, quality, and quantities of building features, systems, equipment, and materials.

4.1.5. Earned Value Management System (EVMS)

DOE Order 413.3B requires Major System Projects to employ an EVMS that is compliant with ANSI/EIA-748-B to objectively measure a project's progress, and which is an essential element of program management and procurement within the DOE. The AE will be required to provide accurate, complete, and timely inputs to UT-Battelle's certified EVMS for the project. These inputs will cover the three basic elements of EVM, which are Planned Value, Actual Cost, and Earned Value. A performance management baseline will be established, and a budgeted cost loaded schedule will be required of the AE for each task order to assess the Planned Value.

Actual cost of the work performed will be tracked using progress data supplied by the AE at minimum intervals to be defined by the owner for each task order, along with complete and accurate invoices. Based on these inputs the project office will then calculate Earned Value and track the percentage completion of planned vs. actual work. Cost and schedule variances will also be tracked to ensure the project progresses on time and on budget.

4.2 Planning and Verification

The starting point for the AE will be the STS CF CDR [2]. The AE will be required to go through a verification process of previous design developments and conceptual designs. The AE planning services will be required to verify and modify previous design concepts and requirements based on interfaces and collaboration meetings with the science and engineering teams. The Planning and Verification resulting reports will be part of the basis for individual task orders. Outputs of this phase of the design shall incorporate the following key elements.

4.2.1. Systems Requirements Documents

The owner including the CF engineering team; science and engineering systems teams; environment, safety, health, and quality team; and end users shall develop Systems Requirements Documents (SRDs) in conjunction with the AE for each WBS level 3 element during the planning and verification phase of the design development. These SRDs shall establish the CF design basis, key system functions and configuration, design requirements by discipline or function, installation requirements, testing and commissioning requirements, and occupational and equipment safety requirements. These documents will also address operational, maintenance, and reliability needs to ensure the designs will meet the long-term needs of the project mission. The SRDs shall also establish the applicable codes and standards that will be used to govern the design and construction of each element.

4.2.2. Interface Control Documents

To ensure the CF designs will meet the needs of all project stakeholders the AE shall work with the owner to produce Interface Control Documents (ICDs) for critical systems. Due to the shared responsibilities and scope for these systems, input and concurrence will be required of the science and engineering teams, CF engineering team, and the AE. ICDs shall incorporate a system identification and overview, detailed interface requirements, and establish a method of configuration control. These documents will then serve as a record of the inputs and outputs to each system or subsystem by both the AE and the STS science and engineering teams throughout the design phases of the project.

4.2.3. Room Data Sheets

To further develop space utilization, equipment, and operational needs the AE shall develop Room Data Sheets for each facility. These data sheets will be a refinement and progression of the Space Program presented in Appendix B of the CF CDR [2] and will be used by the owner to ensure rooms will meet functional, operational, and safety requirements. The content of these data sheets shall include space allocations for equipment and furnishings, workspaces, safety zones, and shall also incorporate access requirements, an estimate of occupancy, and note key design considerations.

4.2.4. Task Definition

The output of the planning and verification phase shall be a set of well-defined and documented task-based requirements which will provide the task definition for subsequent design activities. These task definitions shall be clear and definitive to ensure the mission need will be accomplished.

4.2.5 BIM Plan

The BIM model is expected to be leveraged and capitalized to more efficiently design the project, transfer design development between integrated team members, improve cost estimating techniques, leverage design information in construction scheduling and planning, speed development of means and methods drawings (i.e. shop drawings and equipment details) reduce/eliminate construction conflicts and interferences, serve as the basis for procurement and construction of conventional facilities, and for long term configuration control. The model is to be updated throughout the construction and installation process to document the as-built condition of the facility. The BIM is to create consolidated models for each facility integrating key technical aspects of the project.

The BIM Plan is to be developed and approved by all associated parties. The plan must address legal requirements and methodology for removing barriers for transfer and utilization of the model for the good of the project. The plan must address model integration across all software platforms including Creo and SolidWorks, design teams, model set-up for utilization across all phases of the project (design, estimating, scheduling, procurement, construction), configuration management of model, and model utilization for future infrastructure development. The plan must define the level of development (LOD) and incorporate how, and if necessary, the 4th and 5th dimensions of schedule and cost LOD will be implemented into the design process. And, provide the normal plan elements of roles and responsibilities, meetings, model transfers, and standard execution processes.

4.3 Preliminary Design

Each facility design will go through a rigorous process of development and review to meet the minimum required Preliminary and Final design reviews as defined in DOE Order 413-3B. The DOE stages of design (Preliminary and Final) will be utilized for defining target milestones. In the development of the Preliminary and Final Designs, reviews of each design stage (preliminary and final) will be completed by the integrated project team with a minimum of two detailed progress reviews and a final review at Preliminary and Final design stage completion.

The Preliminary Design stage initiates the process of converting concepts and requirements established during the planning and verification phase into a more detailed design whereby more detailed and reliable cost and schedule estimates are developed. This stage of the design is complete when it provides sufficient information to support development of the performance baseline. In this phase the CF project anticipates that it will utilize design reviews at 50%, 90%, and at completion of the final preliminary design.

4.3.1. 50% Preliminary Design

At this stage of the design concepts developed during the planning and verification phase should be further developed to include revised site plans and drawings showing basic structural and architectural elements. Mechanical, Electrical, and Plumbing (MEP) system designs should include diagrams and schematics for fundamental technical systems, and preliminary load calculations should be completed.

4.3.2. 90% Preliminary Design

At this stage of the design structural and architectural plans should be further developed to include plans and sections with supporting calculations. These designs should address the fundamental space requirements documented in the SRDs. Civil designs shall include grading plans, site utilities routing, and stormwater and wastewater elements. Calculations should also be developed to support the basis of design for foundations, retaining walls, and other load bearing structures, and a method of accomplishment for these systems shall be vetted. Electrical designs shall incorporate a single line diagram, a basic power and lighting plan, and a general layout of primary equipment. Mechanical and process system designs shall incorporate

equipment layouts, flow diagrams, and schematics incorporating primary components. Critical safety and fire protection systems shall be identified and included.

4.3.3. Final Preliminary Design

Outputs of final preliminary design shall include an integrated preliminary design and model. Elements of the design shall be present to support an updated cost estimate, and critical features to satisfy the requirements established in the SRDs shall be evident. Interfaces to owner provided STS scientific equipment and technical systems defined in the ICDs shall be captured in the design. A Basis of Design report shall also be produced.

4.4 Final Design

Final Design is the last stage of development prior to implementation. Per DOE Order 413.3B the purpose of the Final Design stage is to prepare final drawings, technical specifications and contract documents required to obtain bids and quotes for procurement and construction. The Final Design must include clear statements of testing requirements and acceptance criteria for the safety and functionality of all subsystems. The project scope will also be finalized and changes (coordinated through a documented and approved change control process) will be permitted only for compelling reasons.

4.4.1. 40% Final Design

At this stage major facility attributes should be established including building foundations, facility envelopes, essential architectural features, and calculations and requirements for primary MEP equipment established. The design should be developed enough to support Value Engineering efforts to ensure a cost-effective final design output. The project specifications book shall be available for preliminary review by the owner and CM/GC. Applicable construction standards and requirements shall also be developed and communicated. Critical interfaces to owner provided STS scientific equipment and technical systems shall be incorporated and ready for preliminary review.

4.4.2. 60% Final Design

At this stage all designs, reports, and documents required for permitting shall be complete. Detailed requirements shall be established for each task order, but may include stormwater pollution prevention plans, applicable environmental impact reports, and site sewer and water systems. Applicable life and equipment safety systems should be developed and ready for review. Detailed architectural and MEP designs should be developed that incorporate Value Engineering efforts. Critical interfaces to owner provided STS scientific equipment and technical systems shall be developed and ready for thorough review. Specifications shall be mature and inputs from the CM/GC regarding constructability should be addressed and incorporated.

4.4.3. 100% Final Design

With the exception of Site Civil Works and Target/Instrument Building foundation task orders which will target a CD-3A approval, completion of Final Design shall produce the necessary designs, models, and documents needed to support the CD-2 milestone review requirements. This includes establishment of the performance baseline for which the CF design must be implementable, minimum key performance parameters for each task order, and shall include all applicable final safety reports, testing requirements and acceptance criteria, and shall address any outstanding comments or issues from prior design reviews.

4.4.4. Signed Construction Documents

Upon completion of the final design review the AE will be responsible for providing signed and stamped construction documents for use by the owner and CM/GC for construction. These documents will establish the basis for final construction bids and establish the Design Record for subsequent construction task orders. A full and complete BIM is to be complete and transferred to the applicable parties.

4.5 Construction Administration

The CM/GC is anticipated to be a part of the integrated project team during the Final Design phase. The AE will be expected to work with the CM/GC in the development of bid packages and early contractor engagement. In addition, the AE will provide the following construction phase services.

4.5.1. Construction Support Services

The AE will be required to provide services throughout the construction phase of the project. These services will include construction procurement support, home office support, commissioning support, punch and final acceptance, and the creation and delivery of as-built drawings and BIM models. During the construction procurement phase the AE will aid in the bid process by providing pre-bid presentations of the design, providing bid addenda, and responding to bid questions. Home office support during construction will include review and approval of submittals, response to requests for information, review of change orders, and field reviews. The AE will provide final inspection and punch list development and closure for each facility to ensure the design has been executed per the intent and quality established at the completion of final design. Final as-built drawings and models will be required to detail the constructed condition of the facilities. The AE will be tasked with ensuring the as built/constructed models and drawings reflect the field conditions and the model is useful for future design and configuration control of the facilities.

4.5.2. Quality and Inspection

During construction the AE is anticipated to provide construction review for quality assurance purposes to ensure the correct designs are being utilized, and the intent of the design is being constructed. Onsite inspections shall be coordinated with CM/GC and owner to coincide with critical junctions in the facility construction and shall be conducted by members of the AE team with appropriate knowledge and expertise. The intent is to not duplicate services of other members of the integrated team but to bring value to the construction process.

4.5.3. Commissioning Support

The integrated project team is anticipated to include an independent commissioning agent that will be responsible for ensuring critical systems meet key performance parameters and will support both the design development and construction process. The AE will provide support to this agent in the form of design documents, technical specifications, facility and system requirements, and may oversee field commissioning or review commissioning reports.

5. Schedule by WBS Element

A notional schedule has been developed for the major CF project activities by WBS Element and can be found in Appendix A. The schedule is contingent upon project approvals and DOE funding allocation. This schedule will be further developed by the owner with input from the AE, CM/GC, and commissioning agent as the project matures but will serve as the basis for discussion at this stage of the project. Critical Decision 1 approval for the project is projected for Q4 of 2020. Following DOE approval and completion of the BOA, AE task orders are expected to begin to be issued in Q2 of 2021. Designs supporting a CD-3A review for site work including construction access and laydown, mass grading, and site utilities along with the long lead foundation and superstructure designs for the target and instrument buildings are anticipated for Q3 of 2022. Remaining design tasks are scheduled to support a CD-2 review targeted for Q3 of 2023. Start of construction will follow the CD-3A approval, which is anticipated to be in Q1 of 2023. Construction and commissioning activities are expected to occur through the fiscal year 2027. Services for as-builts and project wrap-up may continue beyond final facility construction acceptance.

6. Deliverables

The AE shall be responsible for providing deliverables to the owner as a product of the design and development process including design documents and model files, along with the data management services necessary to support the STS CF design project. These deliverables shall be provided as follows.

6.1. Design Documents

The AE will be required to create record documents that are retrievable, document professional development and approval of designs, and provide historical evidence of decisions and processes that produce the design product. These documents and files shall include the previously discussed SRDs, ICDs, data sheets, and all technical specifications and drawings developed to encompass the comprehensive design output.

6.2. BIM Electrotonic Files

BIM files will serve as both a primary design element and as a review mechanism. Models shall be developed and maintained in Revit with supporting two- and three-dimensional CAD files in DWG format. The required BIM level of development and CAD file outputs will be established as appropriate with each task order.

6.3. Data Management

The AE shall provide data management services that incorporates the collection and storage of all CF design data and files in a secure, efficient, and cost-effective manner. Data management shall incorporate the necessary attributes to provide high availability to all necessary team members, incorporate an effective backup and archival process, and ensure data integrity.

6.3.1. Virtual Networking

Given the nature of the project and the many parties involved that will make up the integrated project team the AE must establish and maintain a virtual network to support the efficient and dynamic sharing of data and files remotely. Solutions may include cloud-based software tools with the appropriate administrative controls and features. This network and associated applications must be maintained throughout the project lifecycle.

6.3.2. File Management

Design documents, CAD models, and supporting project files are to be stored and maintained by the AE in a structured and organized manner to ensure the integrated project can access these files systematically and efficiently. File management practices must also support effective configuration control to ensure all parties are working with the appropriate document revisions.