

# REQUEST FOR PROPOSAL

FRA RFP NO. LBNF-342297-BWQ

for the Construction of the

Long-Baseline Neutrino Facility (LBNF)  
Near Site Conventional Facilities (NSCF)  
Wetland Permit Construction

Package No. 3 of 4:  
RFP REFERENCE DOCUMENTS (SPECIFICATIONS)

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## Technical Specifications

ENCLOSED FOR REFERENCE/BASIS FOR PROPOSAL – DO NOT RETURN

**SECTION 010010 – GENERAL REQUIREMENTS****PART 1 GENERAL****1.1 PURPOSE**

- A. The Subcontractor is required to plan, control, and deliver the Work according to the project Drawings and Specifications. The project must possess complete, functional systems that conform to the specifications, industry standards, and regulatory requirements and must be assembled safely and in a quality fashion according to industry standards, regulatory requirements, and best practices.

**1.2 SUMMARY**

- A. The Subcontractor shall include all labor, materials, equipment, transportation, services, occupational exposure monitoring and supervision required to maintain project work sites that meet the ES&H requirements found in Section 01 31 00.
- B. The Subcontractor shall utilize its knowledge and experience to anticipate and include in the cost of the Work any work which may be required or reasonably inferred from the Specifications and Drawings, but are not specifically expressed herein, in order to provide a complete and fully functional facility and/or system.

**1.3 REFERENCES**

- A. Refer to Section 01 42 20 – References.

**1.4 SITE LOCATION**

- A. The Subcontractor shall confine all operations (including storage of materials) within the project area.
- B. The project is located on the Fermi National Accelerator Laboratory (Fermilab) Site, adjacent to the city of Batavia, Illinois, within Kane County. Within Fermilab, the project is situated on the north and west side of the Main Injector Ring. Access to the site is via the Kautz Rd construction gate on Rt 56 (Butterfield Rd), along Kautz Rd north to Indian Creek Rd.

**1.5 PROJECT INFORMATION**

- A. Project Identification: Wetland Permit Work at Fermilab, Project 6-15-15
- B. Architect/Engineer: AECOM Technical Services, Inc., 303 Wacker Drive, Suite 1400, Chicago, IL 60601
- C. FRA Commissioning Authority: Burns & McDonnell Engineering Company, Inc., 200 W. Adams St, Suite 2700, Chicago, IL 60606
- D. Construction Manager as Advisor (CMA).

**1.6 DESCRIPTION OF WORK**

- A. The Long-Baseline Neutrino Facilities (LBNF) Deep Underground Neutrino Experiment (DUNE) Project will provide facilities to enable a world-class program in neutrino physics that can measure fundamental physical parameters, explore physics beyond the Standard Model, and better elucidate the nature of matter and anti-matter. Specifically, the LBNF/DUNE-US Project will build a new high-intensity neutrino beam at Fermilab aimed at the LBNF Far Site, SURF, 1,300 km away; the associated DUNE Project will build neutrino detectors at Fermilab and SURF. The experiment will be optimized for precision measurement of neutrino oscillations with the goal of searching for charge parity-violation in the neutrino sector, as well as making other precision oscillation measurements. The Near Site Conventional Facilities (NSCF) provides the new service buildings, underground enclosures, utilities, roads, hardstands, and other conventional facilities features needed for operation of the LBNF Beamline and DUNE Near Detector.
- B. This Subcontract is for the Wetland Permit Work and is comprised of the following elements. The Subcontractor's scope of work is not limited to the general work outline described below. The Subcontractor shall perform all work required to complete the construction work in accordance with the drawings and specifications. The description and quantities listed below are general in nature and are only intended to describe the range and complexity of this scope of work. The description provided below is not to be used as the basis for establishing a cost proposal. Specific quantities and definitions of the scope of work for providing a proposal shall be based solely on estimates developed by the Offeror from the drawings, specifications, and the information obtained from examining of the project site.
1. Tree Clearing  
Tree Clearing includes clearing, grubbing, tree and shrub protection, debris removal, surveying and accessories necessary for Tree Clearing for the areas in accordance with the Contract Documents. Tree Clearing shall wholly occur between November 15 and March 15.
  2. Site Work  
Site Work includes excavation, grading and stockpiling of wetland materials in all Temporarily and Permanently Impacted Areas as indicated on the Contract Documents, lined channels with outlets, surveying, silt fencing, erosion control blankets, riprap and accessories necessary for a complete installation.

**1.7 MATERIALS & EQUIPMENT FURNISHED BY FRA**

- A. No material or equipment will be furnished for this project.

**1.8 SERVICES FURNISHED BY FRA**

- A. Fermilab will furnish the services as described below:
1. Drinking Water: Fermilab will not provide drinking water for this project.
  2. Toilet Facilities: Fermilab will not provide toilet facilities for this project.
  3. Utility Locates: FRA will provide locations of existing known utilities as defined in Section 01 31 00 Articles 1.12 and 3.1. The Subcontractor shall excavate electrical, fiber optics, and gas utilities, in accordance with Section 01 31 00 Article 1.12, paragraph A, 4.
- B. Subcontractor shall coordinate access to Fermilab existing utility and building services with the FRA Construction Coordinator:
1. FRA will de-energize and re-energize the existing Domestic Water System (DWS), Industrial Cooling Water (ICW), Low Conductivity Water (LCW), fire protection suppression system, electrical services entering facilities, and fire detection in the building(s). These activities shall be coordinated through the FRA Construction

Coordinator. The FRA Construction Coordinator shall be notified a minimum 48 hour prior to systems needing to be de-energized.

- C. Subcontractor shall coordinate requests for FRA permits or furnished services with the FRA Construction Coordinator.
  - 1. The FRA Construction Coordinator coordinates issuance of FRA permits; reference Section 01 31 00 for additional information.
  - 2. The FRA Construction Coordinator or designee processes requests for and provides disablement of existing systems. Availability and use of existing Fermilab utility services will comply with Section 01 31 00, Article 1.12, Paragraph B.
  
- D. Electrical Power:
  - 1. Electric power will be furnished free of charge by FRA for the Subcontractor's use.
  - 2. Installation of the Subcontractor's electrical power distribution shall include ground-fault circuit protection and shall be subject to FRA approval.
  - 3. Any additional power required but not specified herein shall be furnished and paid for by the Subcontractor.

## **1.9 ITEMS AFFECTING WORK PLANNING**

- A. Safety Representative: Subcontractor Safety Representative is required on the project. Reference Section 01 31 00, Article 1.15 for further information.
  
- B. Additional Training: Additional training provided by FRA other than the Subcontractor's orientation as specified in Section 01 31 00, Article 1.17 for further information:
  - 1. Project Site Specific Radiological Worker Training is required for workers working within 30 feet of the Main Injector standoff zone and Booster Neutrino Beamline
  
- C. Erosion Control: Subcontractor to refer to Section 31 25 13 – EROSION AND SEDIMENT CONTROL and Section 01 31 00 Article 1.13.
  
- D. Metal Recycling: Subcontractor to refer to Section 01 74 19 – CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL.
  - 1. Subcontractor must obtain decision if metal is or is not acceptable for recycling by ESH&Q Radiation Safety. If found to be not acceptable, FRA Construction Coordinator will arrange for a Fermilab-provided metal recycle dumpster for the Subcontractor to locate the metal in, reference Section 01 31 00, Article 1.18, Paragraph C for additional information: coordinated with SECTION 01 74 19.
  
- E. Waste Disposal: Subcontractor to refer to Section 01 74 19 – CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL.
  - 1. FRA will dispose of existing regulated waste or FRA-generated regulated waste. The Subcontractor is permitted to dispose of any regulated waste that is generated during the performance of this Subcontract. However, Subcontractor is required to notify the FRA Construction Coordinator prior to the commencement of any regulated waste generation and off-site shipments of any waste materials destined for disposal.
  - 2. No regulated waste is anticipated for this project.
  
- F. Work Restrictions associated with Accelerator Operations:
  - 1. Construction work is prohibited within 30 feet of existing accelerator beamlines, including the Main Injector Shielding Zone Area (defined on Contract Drawings as 30'-0") and the Booster Neutrino Beamline, during periods when the Accelerator is operational.

2. All work identified to occur within this zone must be executed during the Accelerator Shutdown Periods listed below.
  - a. Summer Shutdown Period, unless otherwise noted: typically July 1<sup>st</sup> through September 30<sup>th</sup>. Actual dates may vary and are scheduled each year by FRA Operations.
  - b. Long Shutdown Period, tentative dates: January 4, 2027 – December 31, 2027

### **1.10 ELECTRONIC PROJECT DRAWINGS**

- A. FRA may, at the Subcontractor's request and in accordance with specifications, release electronic project drawings for use in the preparation of shop drawings by the Subcontractor or Sub-tier subcontractors or vendors. By accepting these files, the Subcontractor understands and agrees that each electronic drawing is provided in connection with the above-identified project only. The drawings as incorporated into Subcontract are and will remain the record document for the Project. Use of electronic drawings does not relieve the Subcontractor from verifying or checking the information contained within the electronic drawings. The electronic drawings may not reflect all quantities, surface areas, and volumes, and may not completely describe all Architect/Engineer elements that may have an impact on the actual construction of the Project.
- B. These electronic drawings will be distributed to the Subcontractor utilizing FRA's current file and media format by an FRA authorized person.
- C. The project design drawings reflect the intent and scope of the project and general routing. The routing of utilities and building/facility services indicated on the design drawings is for providing proposal only. The Subcontractor and/or Sub-subcontractors are expected to make a site visit prior to submitting a proposal; make allowances for all necessary adjustments for the actual system installation; to examine physical conditions which may be material to the performance of its work; and coordinate the actual routing as necessary to accommodate the existing conditions and obstructions.

### **1.11 PARKING AND STAGING AREA**

- A. The Subcontractor's parking and staging area shall be coordinated with FRA's Construction Coordinator.
- B. Parking of the Subcontractor's and the Sub-tier subcontractors' vehicles shall be confined to the Subcontractor's designated construction and parking areas.
- C. The Subcontractor shall provide and maintain temporary barricades, fences, or other means to delineate the construction limits, as required for the protection of FRA employees. Provide signage at all entrances to the construction site with the Subcontractor's company's name and contact information. Signage shall include: Danger Construction Area, Do Not Enter. Visitors shall sign-in with the FRA Construction Coordinator and the Subcontractor's representative and must be made aware of the current hazards and conditions and be escorted either by the Subcontractor or the FRA Construction Coordinator.
- D. No material shall be stored beyond the construction limits unless prior written arrangements have been made through the FRA Construction Coordinator.

### **1.12 SITE ACCESS AND HAULING**

- A. The Subcontractor shall use only established roadways and use such temporary roadways constructed by the Subcontractor when and as may be authorized by FRA. Where materials are transported during the course of the work, vehicles shall not be loaded beyond the loading capacity

recommended by the manufacturer of the vehicles or prescribed by any Federal, State, or local law or regulation. When it is necessary to cross curbs or sidewalks, the Subcontractor shall protect them from damage. The Subcontractor shall repair or pay for the repair of any damaged curbs, sidewalks, or roads.

- B. Construction equipment and deliveries to the site are restricted to the Kautz Road construction entrance. Access to the site via other Fermilab gate entrances are restricted and must be arranged a minimum of 48 hours prior to the use of the access point through the FRA Construction Coordinator.
- C. Fermilab gate hours of operation
  - 1. Kautz Road construction entrance: 6am to 6pm
  - 2. Wilson Street entrance.
  - 3. Batavia Road entrance.
  - 4. Pine Street entrance.
- D. Fermilab site access and hauling shall be subject to the following conditions:
  - 1. Electronic communication devices, such as cell phones, texting devices, laptops, etc. must not be used while driving any motor vehicle on the Fermilab site.
  - 2. All roads shall remain open to emergency traffic at all times.
  - 3. All equipment and vehicles shall be confined to operating along defined construction roads and approved access routes.
  - 4. No overland hauling or off-road travel shall be permitted without prior approval of the FRA Construction Coordinator.
  - 5. Interruption of normal traffic patterns or temporary road closings necessitated by movement of equipment or delivery of materials or utility installations shall require 72 hours advance notice to the FRA Construction Coordinator and shall require proper barricades, signage, and flag persons to divert normal traffic safely.
  - 6. Traffic on paved roads shall be restricted to rubber-tired vehicles. Where crawler-mounted equipment is required to cross paved roads or areas, the pavement shall be suitably protected from damage to the satisfaction of the FRA Construction Coordinator.
  - 7. Dust, debris, mud, and litter on any Fermilab roads caused by the Subcontractor's operations shall be removed by the Subcontractor in a manner as directed by the FRA Construction Coordinator.
  - 8. Illinois Rules of the Road shall apply to the Subcontractor's use of all existing roads on the Fermilab site.
  - 9. The Subcontractor shall include a construction traffic access, routing, and maintenance plan.

### **1.13 TRANSPORTATION OF EQUIPMENT AND MATERIALS**

- A. Transportation of equipment and materials shall be subject to the following conditions:
  - 1. Transportation of equipment and materials used by the Subcontractor at the job site shall be furnished by the Subcontractor at his/her own expense.
  - 2. The Subcontractor shall be responsible for minimizing any interference with local traffic, other subcontractors and Fermilab operations.
  - 3. The Subcontractor shall coordinate the anticipated schedule for major material deliveries and site hauling of excavated materials with the FRA Construction Coordinator.

### **1.14 TEMPORARY SERVICES AND FACILITIES**

- A. Subcontractor to refer to Section 01 50 00 – TEMPORARY FACILITIES AND CONTROLS

**1.15 FERMILAB CLOSURE DATES**

- A. The Fermilab site is closed for major holidays and no construction activities shall occur, unless specifically approved by the FRA Construction Coordinator, on these days:
1. New Year's Day – January 1st
  2. Martin Luther King Jr. Day – 1st Monday after January 15th
  3. Memorial Day – Last Monday in May
  4. Independence Day – July 4th
  5. Labor Day – 1st Monday in September
  6. Thanksgiving Day – 4th Thursday in November
  7. Day After Thanksgiving – Friday after Thanksgiving
  8. Christmas Eve (1/2 Day) – December 24th
  9. Christmas Day – December 25th
  10. New Year's Eve (1/2 Day) – December 31st
- B. If any of these holidays occur on a weekend day, a weekday will be used for the holiday.

**1.16 MATERIAL SUBSTITUTIONS**

- A. Refer to Section 01 25 00 – SUBSTITUTION PROCEDURES. In the event of conflict, the Subcontractor shall comply with the more stringent requirement.

**1.17 DOCUMENTATION**

- A. For Quality Control documentation refer to Section 01 41 00 – QUALITY REQUIREMENTS, in particular sub-section 1.5.G.
- B. Refer Section 01 78 39 – PROJECT RECORD DOCUMENTS for record document requirements.
- C. Refer to Section 01 77 00 – CLOSEOUT PROCEDURES for Final Acceptance documentation.

**1.18 SUBCONTRACTOR'S REQUESTS FOR INFORMATION (RFI)**

- A. When the Subcontractor is unable to determine from the Contract Documents the exact material, process or system to be installed; or when the items of construction are required to occupy the same space (interference); or when an item of work is described differently at two places in the Contract Documents; or when other clarification is required; Subcontractor shall request a clarification through the RFI procedure set forth herein.
- B. Requests for Information (RFIs) shall be submitted through the web-based project management system (WBPMS) with the information found in Attachment A. Each RFI shall be given a discrete, consecutive number. Each page of the RFI and of attachments to the RFI shall bear the RFI number and Project number. Resubmitted RFIs with additional information shall be RFI number with a .01 prefix for the first resubmitted RFI, .02 for the second, and so on.
- C. RFIs from Sub-tier subcontractors shall be submitted through, reviewed by, given a number, and signed by the Subcontractor prior to submittal to FRA. The Subcontractor shall keep a log of the RFIs. RFIs submitted directly by Sub-tier subcontractors will be returned unanswered to the sender and the Subcontractor. Subcontractor shall be responsible for delays resulting from the necessity to resubmit an RFI.
- D. Subcontractor shall carefully study the Subcontract documents to assure that the requested information is not available therein.

- E. In all cases where RFIs are issued to request clarification of coordination issues (e.g., pipe and duct routing, clearances, specific locations of work shown diagrammatically, apparent interference and similar items), the Subcontractor shall furnish all information required to analyze and/or understand the circumstances causing the RFI in order to prepare a clarification or direction as to how Subcontractor shall proceed.
- F. RFIs shall not be used for the following purposes:
  - 1. To request approval of submittals.
  - 2. To request approval of substitutions.
  - 3. To request changes which entail additional cost or credit.
  - 4. To request different methods of performing work than those indicated on the drawings and/or specified.
- G. In the event the Subcontractor believes that a clarification by FRA results in additional cost, Subcontractor shall not proceed with the work indicated by the RFI until authorized by FRA Procurement Specialist to proceed by an approved Change Order, or FRA Procurement Specialist denies Subcontractor's request for a Change Order based on a belief that the work is within the established scope of the Subcontract. Subcontractor may pursue a claim for additional compensation or time to complete under the provisions of the Subcontract governing disputes, but the work, including the work that is the subject of a dispute, shall not be stopped or slowed in any way during the pendency of a dispute.
- H. FRA will return RFIs to the Subcontractor within 15 working days of receipt. RFIs received after 12:00 noon shall be considered received on the next regular workday for the purpose of establishing the start of the response period.

#### 1.19 SPECIFICATION AND DRAWING CONVENTIONS

- A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
  - 1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall", "shall be," or "shall comply with" depending on the context, are implied where a colon (:) is used within a sentence or phrase.
  - 2. Specification requirements are to be performed by Subcontractor unless specifically stated otherwise.
- B. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.
- C. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:
  - 1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
  - 2. Abbreviations: Materials and products are identified by abbreviations scheduled on Drawings.
  - 3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Specifications.
- D. Nomenclature:
  - 1. FRA is a prime contractor to the Department of Energy; therefore, contracts entered into by FRA with industry are subcontracts. The use of the "Contractor" and "Contract" are synonymous with "Subcontractor" and "Subcontract" throughout the Drawings and Specifications for this Work and are used to refer to the General Contractor selected by FRA to perform this Work.

**PART 2 PRODUCTS - Not Used****PART 3 EXECUTION****3.1 NOTICE TO PROCEED**

- A. The Notice to Proceed (NTP) represents the basis of the start of the project duration. The following describes the requirements for the Notice to Proceed:
1. The NTP is issued by the FRA Procurement Specialist.
  2. The issuance of the NTP establishes the start of work on the Fermilab Site.
  3. A project kickoff meeting may be required prior to the issuance of the NTP.

**3.2 PROJECT SCHEDULE**

- A. This Project Complete milestone marks the completion of the project including punch list items, clean-up, and acceptance of as-built drawings and if required, submittals.
- B. Refer to Section 01 30 00 – PROJECT MANAGEMENT AND COORDINATION for information pertaining to progress, coordination, and construction meeting requirements.

**3.3 QUALITY CONTROL AND CONTROL OF INSTALLATION**

- A. Refer to Section 01 41 00 – QUALITY REQUIREMENTS for information pertaining to Quality Control.
- B. The Subcontractor is responsible for all activities necessary to manage, control, and document that work complies with the Subcontract documents. The Subcontractor's responsibility includes ensuring adequate Quality Control services are provided for work accomplished on and off the site by its organization, suppliers, sub-tier contractors, technical laboratories, and consultants.
- C. The work activities include safety, submittal management, testing and inspection, and all other functions relating to the requirement for quality construction.

**3.4 ACCEPTANCE**

- A. Refer to Section 01 77 00 – CLOSEOUT PROCEDURES for general information on submittals, inspections, and closeout documents and procedures.

**END OF SECTION 01 00 10**

ATTACHMENT A



REQUEST FOR INFORMATION

Date:

Project Name:	RFI No.:
To:	Project No.:
Subject:	Submitted By:

Spec.. No.:	Article/Par.:	Drwg. No.:	Detail:
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Request: \_\_\_\_\_

Response: \_\_\_\_\_

**SECTION 01 23 00 - ALTERNATES****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section includes administrative and procedural requirements for alternates.

**1.2 DEFINITIONS**

- A. Alternate: An amount proposed by Proposers and stated on the Bid Form for certain work defined in the bidding requirements that may be added to or deducted from the base bid amount if FRA decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
  - 1. Alternates described in this Section are part of the Work only if enumerated in the Contract Documents.
  - 2. The cost or credit for each alternate is the net addition to or deduction from the Subcontract Price to incorporate alternates into the Work. No other adjustments are made to the Subcontract Price if an option is exercised.

**1.3 PROCEDURES**

- A. Coordination: Revise or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.
  - 1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.
- B. Execute accepted alternates under the same conditions as other work of the Subcontract.
- C. Schedule: A schedule of alternates is included at the end of this Section. Specification sections referenced in the schedule contain requirements for materials necessary to achieve the work described under each alternate.

**PART 2 - PRODUCTS (Not Used)****PART 3 - EXECUTION****3.1 SCHEDULE OF ALTERNATES**

- A. Alternate No. <Insert number>: <Insert title of alternate>.
  - 1. Base Bid: <Insert brief description of base-bid requirement> [as indicated on Drawing <Insert title of Drawing>] [and] [as specified in Section <Insert Section number> "<Insert Section title>."] ]

2. Alternate: <Insert brief description of alternate requirement> [as indicated on Drawing <Insert title of Drawing>] [and] [as specified in Section <Insert Section number> "<Insert Section title>."] ]

**END OF SECTION 01 23 00**

**SECTION 01 25 00 - SUBSTITUTION PROCEDURES****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section includes administrative and procedural requirements for substitutions.
- B. Related Requirements:
  - 1. Section 01 33 00: SUBMITTALS
  - 2. Section 01 60 00: PRODUCT REQUIREMENTS

**1.2 DEFINITIONS**

- A. Types of Substitution Requests:
  - 1. Substitutions for Cause: Changes proposed by Subcontractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
  - 2. Substitutions for Convenience: Changes proposed by Subcontractor that are not required in order to meet other Project requirements but may offer advantage to Subcontractor.
    - a. Substitutions for Convenience are not permitted.

**1.3 ACTION SUBMITTALS**

- A. Submit three copies of each request for consideration, if a physical submission is applicable. Identify product or fabrication or installation method to be replaced. Include the specification section number and title and drawing numbers and titles. The submittal shall contain the same information pertaining to the original specified product for purposes of comparison.
- B. The submittal shall explain fully the differences, if any, between the original specified product and proposed substitute product.
- C. Any change to the Drawings or Specifications for related work required for proper installation of the proposed substitute product shall be indicated in the submittal.
- D. If the proposed substitute product requires alterations of any kind to other equipment or construction or necessitates any engineering design changes for its proper installation, such alterations and engineering design changes shall be accomplished at no cost to FRA.
- E. The substitute submittal must contain a statement detailing the cost and schedule impact of the proposed substitution.
- F. FRA has sole discretion to accept or reject the proposed substitution.
- G. Substitution Requests shall:
  - 1. Show compliance with requirements for substitutions and the following, as applicable:
    - a. Statement indicating why specified product or fabrication or installation cannot be provided.
    - b. Coordination information, including a list of changes or revisions needed to other parts of the Work or existing Fermilab facility that will be necessary to accommodate proposed substitution.

- c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
  - d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
  - e. Samples, where applicable or requested.
  - f. Certificates and qualification data, where applicable or requested.
  - g. List of similar installations for completed projects with project names and addresses and names and addresses of Architect/Engineers construction contractors.
  - h. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
  - i. Research reports evidencing compliance with building code in effect for Project, from ICC-ES.
  - j. Detailed comparison of Subcontractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall time for performance. If specified product or method of construction cannot be provided within the specified period of performance, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
  - k. Cost information, including a proposal of change, if any, in the Subcontract Price.
  - l. Subcontractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.
  - m. Subcontractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
2. If necessary, FRA may request additional information or documentation.
- a. Forms of Acceptance: Change Order or through the submittal process.
  - b. Use product specified if no decision on use of a proposed substitution is received.

#### 1.4 QUALITY ASSURANCE

- A. Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

#### 1.5 PROCEDURES

- A. Revise or adjust affected work as necessary to integrate work of the approved substitutions.

### PART 2 - PRODUCTS

#### 2.1 SUBSTITUTIONS

- A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, and as stipulated above, but not later than 15 days prior to time required for preparation and review of related submittals.
  - 1. Conditions: Subcontractor's request for substitution will be considered when the following conditions are satisfied. If the following conditions are not satisfied, request shall be returned without action, except to record noncompliance with these requirements:
    - a. Requested substitution is consistent with the Subcontract Documents and will produce indicated results.
    - b. Substitution request is fully documented and properly submitted.
    - c. Requested substitution will not adversely affect Subcontractor's construction schedule.
    - d. Requested substitution has received necessary approvals of authorities having jurisdiction.
    - e. Requested substitution is compatible with other portions of the Work.

- f. Requested substitution has been coordinated with other portions of the Work.
  - g. Requested substitution provides specified warranty.
  - h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
- B. Substitutions for Convenience: Not allowed.
- C. FRA has the sole discretion to accept or reject the proposed substitution.

**PART 3 - EXECUTION (Not Used)****END OF SECTION 01 25 00**

**SECTION 01 26 00 – CONTRACT MODIFICATION PROCEDURES****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section includes administrative and procedural requirements for handling and processing Subcontract modifications. The requirements of this Section shall be in addition to and supplement change and/or modification requirements established in the Contract Documents. In the event of any conflict between this Section and any other change and/or modification requirements established in the Contract Documents, the provision granting greater rights or remedies to FRA, or imposing the greater duty, standard, responsibility or obligation on Subcontractor, as determined by FRA, shall govern.
- B. Related Requirements:
  - 1. Section 01 25 00: Substitution Procedures.

**1.2 MINOR FIELD CHANGES IN THE WORK**

- A. The FRA representatives that will have field change authority and the limits associated with minor changes will be relayed to the Subcontractor via the FRA Procurement Specialist.

**1.3 PROPOSAL REQUESTS**

- A. FRA-Initiated Proposal Requests: FRA will issue a detailed description of proposed changes in the Work that may require adjustment to the Subcontract price or the time for performance. If necessary, the description will include supplemental or revised Construction Drawings and Construction Specifications.
  - 1. Work Change Proposal Requests: issued by FRA are not instructions either to stop work in progress or to execute the proposed change.
  - 2. Within time specified in a Work Change Proposal Request or 20 days, when not otherwise specified, after receipt of a Work Change Proposal Request, submit a quotation estimating cost adjustments to the Subcontract Price and the period of performance necessary to execute the change.
    - a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
    - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
    - c. Include costs of labor and supervision directly attributable to the change.
    - d. Include an updated Subcontractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Minimize the impact of the change on the time for performance to the extent possible.
    - e. Quotation Form: Use form acceptable to FRA.
- B. Subcontractor-Initiated Proposals: If latent or changed conditions require modifications to the Subcontract, Subcontractor may initiate a request for equitable adjustment by submitting a request for equitable adjustment to FRA.
  - 1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Subcontract price and the period of performance.

2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
4. Include costs of labor and supervision directly attributable to the change.
5. Include an updated Subcontractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Minimize the impact of the change on the time for performance to the extent possible.
6. Comply with requirements in Section 01 25 00 "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.
7. Proposal Request Form: Use form acceptable to FRA.

#### **1.4 CHANGE ORDER PROCEDURES**

- A. On FRA's approval of a Work Changes Proposal Request or Change Order Request, FRA will issue a Change Order in accordance with the terms of the Subcontract. Any modification in Subcontract time or price will be addressed in accordance with the terms of the Subcontract.

#### **PART 2 - PRODUCTS (Not Used)**

#### **PART 3 - EXECUTION (Not Used)**

**END OF SECTION 01 26 00**

**SECTION 01 29 00 - INVOICING PROCEDURES****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment. The requirements of this Section shall be in addition to and supplement payment and/or invoicing requirements established in the Contract Documents. In the event of any conflict between this Section and any other payment and/or invoicing requirements established in the Contract Documents, the provision granting greater rights or remedies to FRA, or imposing the greater duty, standard, responsibility or obligation on Subcontractor, as determined by FRA, shall govern.
  
- B. Related Requirements:
  - 1. Section 01 00 10: General Requirements.
  - 2. Section 01 26 00: Contract Modification Procedures
  - 3. Section 01 32 00: Construction Progress Documentation

**1.2 DEFINITIONS**

- A. Schedule of Values: A statement furnished by Subcontractor allocating portions of the Subcontract Price to various portions of the Work and used as the basis for reviewing Subcontractor's Applications for Payment.

**1.3 SCHEDULE OF VALUES**

- A. Coordinate preparation of the Schedule of Values with preparation of Subcontractor's Construction Schedule. Cost-loaded critical path method schedule may serve to satisfy requirements for the Schedule of Values.
  - 1. Coordinate line items in the Schedule of Values with other required administrative forms and schedules, including the following:
    - a. Application for Payment forms with continuation sheets.
    - b. Submittal schedule.
    - c. Items required to be indicated as separate activities in Subcontractor's Construction Schedule.
  - 2. Submit a preliminary Schedule of Values to FRA with the Preliminary Construction Schedule. Submit a complete Schedule of Values with the Construction Schedule and update monthly to reflect Subcontract changes.
  - 3. Sub-schedules for Phased Work: Where the Work is separated into phases requiring separately phased payments, provide sub-schedules showing values coordinated with each phase of payment.
  - 4. Sub-schedules for Separate Elements of Work: Where the Subcontractor's Construction Schedule defines separate elements of the Work, provide sub-schedules showing values coordinated with each element.
  
- B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the Schedule of Values. Provide at least one-line item for each Definable Feature of Work.  
Identification: Include the following Project identification on the Schedule of Values:
  - 1. Project name and location.
    - a. FRA's Project number.
    - b. Subcontractor's name and address.
    - c. Date of submittal.

2. Arrange Schedule of Values consistent with format of AIA Document G703.
3. Arrange the Schedule of Values in tabular form with separate columns to indicate the following for each item listed:
  - a. Related Specification Section or Division.
  - b. Description of the Work.
  - c. Name of Sub-tier subcontractor.
  - d. Name of manufacturer or fabricator.
  - e. Name of supplier.
  - f. Change Orders (numbers) that affect value.
  - g. Dollar value of the following, as a percentage of the Subcontract price to nearest one-hundredth percent, adjusted to total 100 percent.
    - 1) Labor.
    - 2) Materials.
    - 3) Equipment.
4. Provide a breakdown of the Subcontract price in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Provide multiple line items for principal Subcontract amounts in excess of five percent of the Subcontract price.
  - a. Include separate line items under Subcontractor and principal Sub-tier subcontracts for Project closeout requirements in an amount totaling five percent of the Subcontract Price .
5. Round amounts to nearest whole dollar; total shall equal the Subcontract price.
6. Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed, to the extent allowed by the FRA General Terms and Conditions for Construction.
  - a. Differentiate between items stored on-site and items stored off-site. If required, include evidence of insurance.
7. Provide separate line items in the Schedule of Values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
8. Each item in the Schedule of Values and Applications for Payment shall be complete.
  - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the Schedule of Values or distributed as General Conditions at Subcontractor's option.
9. Schedule Updating: Update and resubmit the Schedule of Values before the next Application for Payment when Change Orders or Construction Change Directives result in a change in the Subcontract price.

#### 1.4 SUPPLEMENTAL INSTRUCTIONS FOR APPLICATION FOR PAYMENT

- A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications.
- B. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Subcontractor. FRA will return incomplete applications without action.
  1. Entries shall match data on the Schedule of Values and Subcontractor's Construction Schedule. Use updated schedules if revisions were made.
  2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
  3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
  4. Indicate separate amounts for work being carried out under FRA-requested Project acceleration.
  5. Subcontractor shall submit a pencil draw on or before the 20<sup>th</sup> day of the month forecasting the work to be completed before the last working day of the month.
  6. Submit Application for Payment on the second day of the month, or if the second day of the month is not a workday, the next workday.

- C. **Stored Materials:** Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed if allowed under the FRA General Terms and Conditions for Construction. Differentiate between items stored on-site and items stored off-site.
1. Provide documentation required by FRA General Terms and Conditions for Construction FRA and consent of surety to payment for stored materials.
  2. Provide supporting documentation that verifies amount requested, including documentation required by the FRA General Terms and Conditions for Construction, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
  3. Provide summary documentation for stored materials indicating the following:
    - a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
    - b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
    - c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.
- D. **Waivers of Mechanic's Lien:** With each Application for Payment, submit waivers of mechanic's lien as required by the Subcontract.
1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
  2. When an application shows completion of an item, submit final waivers no later than the next application submitted after showing completion.
  3. FRA reserves the right to designate which entities involved in the Work must submit waivers.
  4. Waiver Forms: Submit executed waivers of lien on forms acceptable to FRA.
- E. **FRA Initial Application for Payment:** Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
1. List of Sub-tier subcontractors.
  2. Schedule of Values.
  3. Subcontractor's Preliminary Construction Schedule (prior to approval of the Construction Schedule ).
  4. Construction Schedule (preliminary if not final) incorporating Work of multiple contracts, with indication of acceptance of schedule by each Sub-tier subcontractor.
  5. Products list (preliminary if not final).
  6. Submittal schedule (preliminary if not final).
  7. List of Subcontractor's staff assignments.
  8. List of Subcontractor's principal consultants.
  9. Initial progress report.
  10. Report of preconstruction conference.
  11. Certificates of insurance and insurance policies, if FRA requires policies.
  12. Performance and payment bonds.
- F. **Application for Payment at Substantial Completion:** After FRA notifies Subcontractor that the Work is Substantially Complete in accordance with the Subcontract, submit an Application for Payment showing the portion of the Work claimed as substantially complete.
1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Subcontract price.
  2. This application shall reflect Authorization to Use and Possession (AUP) issued previously for FRA occupancy of designated portions of the Work.

- G. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
1. Evidence of completion of Project closeout requirements.
  2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
  3. Updated final statement, accounting for final changes to the Subcontract price.
  4. "Contractor's Sworn Statement" in form acceptable to FRA.
  5. "Contractor's Final Mechanics Lien Waiver" in form acceptable to FRA.
  6. "Consent of Surety to Final Payment" in form acceptable to FRA.
  7. Evidence that claims have been settled.
  8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when FRA took possession of and assumed responsibility for corresponding elements of the Work.
  9. Final liquidated damages settlement statement, if applicable.

**PART 2 - PRODUCTS (Not Used)****PART 3 - EXECUTION (Not Used)****END OF SECTION 01 29 00**

**SECTION 01 30 00 - PROJECT MANAGEMENT AND COORDINATION**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
  - 1. General coordination procedures.
  - 2. Coordination drawings.
  - 3. Web Based Project Management System.
  - 4. Project meetings.
  
- B. Subcontractor, and Sub-tier subcontractors, shall participate in coordination requirements. Certain areas of responsibility are assigned to a specific subcontractor.
  
- C. Related Requirements:
  - 1. Section 01 00 10: General Requirements.
  - 2. Section 01 32 00: Construction Progress Documentation.
  - 3. Section 01 41 00: Quality Requirements.
  - 4. Section 01 73 00: Execution.
  - 5. Section 01 77 00: Closeout Procedures.

**1.2 DIVISION 01 DELIVERABLES**

- A. This section and the enclosed schedule are intended to assist the Subcontractor in identifying Division 01 deliverables but is not intended to be an all-inclusive list. The Subcontractor is ultimately responsible for reviewing all Division 01 sections and ensuring that all requested deliverables are identified and submitted on time.

Specification Section	Subsection	Deliverable (Refer to specification section for detail)	Submission Date
01 29 00	1.3	Schedule of Values	No later than 7-days before initial payment application
01 29 00	1.4	Application for Payment	By 2nd working day of each month
01 29 00	1.4	Draft Application for Payment	7-days prior to due date of Application for Payment
01 29 00	1.4	Final Payment Application	After completing project closeout requirements
01 30 00	1.2	Subcontract List	As agreed with FRA
01 30 00	1.5	Two-week Look-ahead	Prior to each weekly progress meeting
01 30 00	1.5	Schedule Variance Report	When any projected FRA specified milestones are behind by more than 5%
01 31 00	1.5	Construction Environmental, Safety and Health Certification	With Subcontractor's proposal
01 31 00	1.5	EMR Rates and OSHA 300 log for last 3 years	With Subcontractor's proposal
01 31 00	1.5	Subcontractor's ES&H Program	With Subcontractor's proposal
01 31 00	1.5	Resume of the Subcontractor's ES&H Manager	With Subcontractor's proposal
01 31 00	1.5	Completed Construction Environmental, Safety, & Health Certificate	Within 15 business days after Subcontract award

01 31 00	1.5	Initial Hazard Analysis	Within 15 business days after Subcontract award
01 31 00	1.5	Site Specific Safety Plan	Within 15 business days after Subcontract award
01 31 00	1.5	Individual Trade, Craft, or Task specific Hazard Analysis	After Notice to Proceed, as agreed with FRA
01 31 00	1.5	Global Harmonizing System, Safety Data Sheets	After Notice to Proceed, as agreed with FRA
01 31 00	1.5	Tabulation of On-site Work Hours on a weekly basis	After Notice to Proceed, as agreed with FRA
01 31 00	1.5	Incident Investigation Reports	After Notice to Proceed, as agreed with FRA
01 31 00	1.5	Lift Plans	After Notice to Proceed, as agreed with FRA
01 31 00	1.5	Welding Plans	After Notice to Proceed, as agreed with FRA
01 31 00	1.5	Environmental, Erosion Control Reports	After Notice to Proceed, as agreed with FRA
01 31 00	1.5	Excavation Plans	After Notice to Proceed, as agreed with FRA
01 31 00	3.1	Subcontractor's Confined Space Entry Program	As required
01 31 00	3.1	Training records of potential entrants, attendants, and entry supervisors	As required
01 31 00	3.1	Evidence that all air monitoring equipment is properly calibrated.	As required
01 31 00	3.2	Near Miss Investigation	Within 48 hours of any near miss
01 31 00	3.9	Construction Coordination documentation	Minimum of 5 business days in advance of Subcontractor's use of radiography sources.
01 32 00	1.4 B	Preliminary Construction Schedule	As agreed with FRA
01 32 00	1.4 C	Preliminary Network Diagram	As agreed with FRA
01 32 00	1.4 D	Subcontractor's Construction Schedule	As agreed with FRA
01 32 00	1.4 E	CPM Reports	As agreed with FRA
01 32 00	1.4 F	Construction Schedule Updating Reports: Submit with Applications for Payment.	As agreed with FRA
01 32 00	1.4 G	Daily Construction Reports	Daily or as agreed with FRA
01 32 00	1.4 H	Material Location Reports	Weekly
01 32 00	1.4 I	Site Conditions Report	submit at the time of discovering new condition
01 32 00	1.4 J	Special Reports	Submit at time of unusual event, within one day of occurrence
01 32 00	1.4 K	Qualification Data	As required
01 32 00	1.5 A	Scheduling Manager Qualifications:	Within 5 days of Notice of Award
01 32 00	2.1 H	Recovery Schedule	If work is 7 calendar days behind schedule
01 32 00	2.2 A	Preliminary Project Schedule	Within 15 calendar days after Notice of Award
01 32 00	2.3 A	Subcontractor's Construction Schedule	Within 45 days after Notice of Award
01 32 00	2.3 E	Material Location Reports	Weekly
01 32 00	2.3 F	Site Condition Reports	Immediately upon discovery
01 32 00	3.1 C	Subcontractor's Construction Schedule Updating	Within 3 working days of the end of the reporting month
01 32 33	1.2	Submit qualifications for photographer	No specific date listed
01 32 33	1.2	Key Plan for photographs	Issued with photographs
01 32 33	1.2	Construction photographs	Daily interval
01 32 50	1.1	Request for excavation permit	Before start of any excavation
01 32 50	1.3	Pre-construction Condition Survey Report	14 days before construction begins
01 32 50	1.3	Interim-Construction Condition Survey Reports	Within 7 calendar days of an established construction milestone and within 3 calendar days after a Response Value is reached

01 32 50	1.3	Post-Construction Condition Survey Report	Within 10 calendar days after Substantial Completion of the project.
01 32 50	1.3	Geotechnical and Structural Instrumentation Plan	At least 30 days before beginning any excavation
01 32 50	1.3	Response Value Report	14 calendar days before construction begins
01 32 50	1.3	Action Plans	Within 24 hours if Response Values are reached
01 32 50	1.4	Copy of factory calibration, manufacturer's test equipment certification, completed copy of quality assurance checklist and warranty	Within 5 working days of receipt of each instrument at the Work Site
01 32 50	1.4	Completed pre-installation and acceptance test record for that instrument	Within two weeks of receipt of each instrument at the Work Site.
01 32 50	1.4	Inspector's log of subsurface data in the first borehole drilled	Within 1 day of borehole completion
01 32 50	1.4	Acceptance and baseline readings for all instrumentation installed by Subcontractor	Before any effects from construction
01 32 50	1.4	Shop drawings summarizing installation of each instrument and monitoring point	After instrumentation installation and baseline readings are agreed on by FRA and Subcontractor
01 32 50	2.1	Determine physical monitoring locations	At least 7 calendar days before construction begins
01 32 50	3.15	Threshold Value Exceedances	Submit within 24 hours of the threshold values being reached.
01 32 50	3.15	Limiting Value Exceedances	Submit within 24 hours of the limiting values being reached.
01 41 00	1.4 A	Quality Control Plan	Prior to NTP
01 41 00	1.4 B 4	Submittals	As outlined
01 41 00	1.4 E	Quality Control Certifications	Upon completion
01 41 20	1.5 A-C	Submittals	As required
01 50 00	1.2 A	Temporary Facilities Site Plan	As agreed with FRA
01 50 00	1.2 B	Soil Erosion and Sedimentation Control Plan	As agreed with FRA
01 50 00	1.2 C	Traffic Control Plan	As agreed with FRA
01 50 00	1.2 D	Moisture Protection Plan	As agreed with FRA
01 50 00	1.2 E	Dust- and HVAC-Control Plan	As agreed with FRA
01 50 00	1.3 B	Certifications and permits for tests and inspections	As agreed with FRA
01 56 39	1.3 A	Product data for each product indicated	As agreed with FRA
01 56 39	1.3 B	Samples for verification	As agreed with FRA
01 56 39	1.3 C	Tree Pruning Schedule	As agreed with FRA
01 56 39	1.4 A-D	Informational submittals	As agreed with FRA
01 60 00	1.3 A	Comparable Product requests	If or as required
01 73 00	1.4 A	Qualification data for land surveyor	As agreed with FRA
01 73 00	1.4 B	Certificate signed by land surveyor	As agreed with FRA
01 73 00	1.4 C	Copy of receipts issued by a landfill facility	As agreed with FRA
01 73 00	1.4 D	Certified Surveys	As agreed with FRA
01 73 00	1.4 E	Final Property Survey	As agreed with FRA
01 73 00	1.4 F	Cutting and Patching Plan	Min 10 days prior o cutting and patching
01 77 00	1.5 A	Subcontractor's List of Incomplete Items	As agreed with FRA
01 77 00	1.5 B	Submittals Prior to Substantial Completion	Min.10 days prior to requesting inspection for determining date of Substantial Completion
01 77 00	1.5 C	Certificates of Release	As agreed with FRA

01 77 00	1.5 D	Procedures Prior to Substantial Completion	Min.10 days prior to requesting inspection for determining date of Substantial Completion
01 77 00	1.5 E	Written request for inspection	Min 10 days prior to date the work will be completed and ready for final inspection and tests
01 77 00	1.6	Authorization for use and possession (AUP) prior to completion	Subcontractor shall provide a 10-day notice to the FRA Construction Coordinator before this inspection is performed.
01 77 00	1.7 A	Submittals Prior to Final Acceptance	As agreed with FRA
01 77 00	1.7 B	Final Punchlist Inspection	Subcontractor shall provide a 10 day notice to the FRA Construction Coordinator in order to make arrangements for the final inspection of the construction Project with FRA personnel
01 77 00	1.7 C	Final Punchlist Reinspection and Acceptance	The Subcontractor shall provide a five (5) day notice prior to the Final Acceptance inspection;
01 77 00	1.9 B	Project Warranties: AUP	within 15 days of completion of designated portions of the Work
01 78 39	1.2 A.2	Initial Closeout Submittal: Submit record digital data files.	As agreed with FRA
01 78 39	1.2 A.3	Final Closeout Submittal: Submit PDF electronic files of scanned record prints.	As agreed with FRA
01 78 39	1.2 B	Record Specifications: Submit annotated PDF electronic files	As agreed with FRA
01 78 39	1.2 C	Record Product Data: Submit annotated PDF electronic files and directories of each submittal.	As agreed with FRA
	1.2 D	Miscellaneous Record Submittals: Submit annotated PDF electronic files and directories of each submittal	As agreed with FRA
01 78 39	1.2 E	Reports: Submit written report	Weekly
01 78 39	2.1 B	Record Product Data: Submit annotated PDF electronic files and directories of each submittal.	Immediately before inspection for Certificate of Substantial Completion
01 78 39	2.1 B	Full set of Contract Drawings	As agreed with FRA
01 78 39	2.2 A	Record Specifications as annotated PDF electronic file	As agreed with FRA
01 78 39	2.3 A	Record Product Data as annotated PDF electronic file	As agreed with FRA
01 78 39	2.4 A	Miscellaneous record submittals as PDF electronic file	As agreed with FRA
01 78 23	1.3 A.2	Operations and maintenance manuals	As agreed with FRA
01 78 23	1.3 B	Initial Manual Submittal: Submit draft copy of each manual	Min. 30 days before commencing demonstration and training
01 78 23	1.3 C	Final Manual Submittal	Prior to requesting inspection for Substantial Completion and at least 15 days before commencing demonstration and training. See spec for further instructions
01 78 23	2.1 A	Operation and Maintenance Directory. See section for further requirements	As agreed with FRA
01 78 23	2.2 E	Manuals in the form of a multiple file composite electronic PDF file	As agreed with FRA
01 79 00	1.2	Outline of instructional program for demonstration and training	As agreed with FRA

01 79 00	1.3	Closeout Submittals	Within 7 days of completion of each training module
01 79 00	1.3	Complete training manual(s) in PDF electronic file format on compact disc.	Within 7 days of completion of final training module
01 79 00	3.2 B	Schedule training	Provide FRA min. 7 days notice
01 91 13	1.5 A	Certified written report, in duplicate, of each inspection, test, or similar	As agreed with FRA
01 91 13	1.8 C	Construction and acceptance phase submittals	Varies
01 91 13	1.10	Commissioning Coordinator Letter of Authority	Within 10 days after approval of Commissioning Coordinator qualification.
01 91 13	1.10	Commissioning Coordinator Qualification Data	As agreed with FRA
01 91 13	1.10	List of test instrumentation, equipment, and monitoring devices	As agreed with FRA
01 91 13	1.10	Test Reports	At the end of each day
01 91 13	1.10	Completed Construction Checklists	As agreed with FRA
01 91 13	1.11	Commissioning Report	At closeout phase
01 91 13	1.11	Request for Certificate of Construction-Phase Commissioning Process Completion	At closeout phase
01 91 13	1.11	Operation and Maintenance Data	At closeout phase
01 91 13	3.13	Commissioning Compliance Issue Report	Within 24 hours of the test
01 91 13	3.16	Two-week Look-ahead Commissioning Schedule	Two weeks prior to the beginning of test
01 91 13	3.21	Draft Balancing Report	Prior to Test and Balance verification
01 91 13	3.25	Written training plan	As agreed with FRA

**1.3 SUBMITTALS**

- A. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:
  1. Name, address, and telephone number of entity performing subcontract or supplying products.
  2. Number and title of related Specification Section(s) covered by subcontract.
  3. Drawing number and detail references, as appropriate, covered by subcontract.

**1.4 GENERAL COORDINATION PROCEDURES**

- A. Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections, that depend on each other for proper installation, connection, and operation.
  1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
  2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
  3. Make adequate provisions to accommodate items scheduled for later installation.
  
- B. Subcontractor, and Sub-tier subcontractors, shall coordinate its construction operations to ensure efficient and orderly installation of each part of the Work. Subcontractor shall coordinate its operations with operations, included in different Sections, that depend on each other for proper installation, connection, and operation.
  1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.

2. Coordinate installation of different components with Sub-tier subcontractors to ensure maximum performance and accessibility for required maintenance, service, and repair.
  3. Make adequate provisions to accommodate items scheduled for later installation.
- C. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
- D. Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
1. Preparation of Subcontractor's Project Schedule.
  2. Preparation of the Schedule of Values.
  3. Installation and removal of temporary facilities and controls.
  4. Delivery and processing of submittals.
  5. Progress meetings.
  6. Preinstallation conferences.
  7. Project closeout activities.
  8. Startup and adjustment of systems.
- E. Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.
1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. See other Sections for disposition of salvaged materials that are designated as FRA's property.

## 1.5 COORDINATION DRAWINGS

- A. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual specification sections, and additionally where installation is not completely shown on Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.
1. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:
    - a. Use applicable Drawings as a basis for preparation of coordination drawings. Prepare sections, elevations, and details as needed to describe relationship of various systems and components.
    - b. Coordinate the addition of trade-specific information to the coordination drawings by multiple contractors in a sequence that best provides for coordination of the information and resolution of conflicts between installed components before submitting for review.
    - c. Indicate functional and spatial relationships of components of Architect/Engineer, structural, civil, mechanical, and electrical systems.
    - d. Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.
    - e. Indicate required installation sequences.
    - f. Indicate dimensions shown on the Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Subcontract.
  2. Electrical Work: Show the following:
    - a. Runs of vertical and horizontal conduit 1-1/4 inches in diameter and larger.
    - b. Panel board, switch board, switchgear, transformer, busway, generator, and motor control center locations.
    - c. Location of pull boxes and junction boxes, dimensioned from column center lines.

3. Review: FRA will review coordination drawings to confirm that the Work is being coordinated, but not for the details of the coordination, which are Subcontractor's responsibility. If FRA determines that coordination drawings are not being prepared in sufficient scope or detail, or are otherwise deficient, FRA will so inform Subcontractor, who shall make changes as directed and resubmit.
4. Coordination Drawing Prints: Prepare coordination drawing prints according to requirements in Section 01 33 00 "Submittals."

## **1.6 WEB\_BASED PROJECT MANAGEMENT SYSTEM (WPMS)**

- A. The Subcontractor shall use the provided WPMS for the purposes of transmitting, coordinating, and managing project communication and documentation through Final Completion. WPMS shall include the following functions:
  1. Project directory.
  2. Project correspondence.
  3. Meeting minutes.
  4. Contract modifications forms and logs.
  5. RFI forms and logs.
  6. Task and issue management.
  7. Photo documentation.
  8. Schedule and calendar management.
  9. Submittals forms and logs.
  10. Application for Payments forms.
  11. Drawing and specification document hosting, viewing, and updating.
  12. Online document collaboration.
  13. Reminder and tracking functions.
  14. Archiving functions.
- B. The Subcontractor shall identify the personnel requiring access to the WPMS within fifteen (15) working days after the Subcontract Award.
- C. On completion of Project, the Subcontractor will be provided one complete archive copy(ies) of the WPMS data within the Subcontractor access rights.
- D. Subcontractor, Sub-tier subcontractors, and other parties granted access by FRA to WPMS shall execute a data licensing agreement in the form of AIA Document C106 or Agreement acceptable to FRA.

## **1.7 PROJECT MEETINGS**

- A. Schedule and conduct meetings and conferences at Project site unless otherwise indicated.
  1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify FRA and FRA's consultants of scheduled meeting dates and times.
  2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
  3. Minutes: Record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including FRA and FRA's consultants, within three days of the meeting.
- B. The Subcontractor shall participate in a preconstruction conference no later than 15 days after Subcontract Award.
  1. The conference will be led by FRA.
  2. The conference will review responsibilities and personnel assignments.

3. Attendees: Authorized representatives of FRA, and their consultants; Subcontractor personnel, and other members of the Subcontractor team as needed; major Sub-tier subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
  4. Agenda: Discuss items of significance that could affect progress, including but not limited to the following:
    - a. Tentative Project Schedule.
    - b. Phasing.
    - c. Critical work sequencing and long-lead items.
    - d. Lines of communications.
    - e. Procedures for processing field decisions and Change Orders.
    - f. Procedures for RFIs.
    - g. Procedures for testing and inspecting.
    - h. Procedures for processing Applications for Payment.
    - i. Distribution of the Contract Documents.
    - j. Submittal procedures.
    - k. Preparation of record documents.
    - l. Work restrictions.
    - m. Working hours.
    - n. FRA's occupancy requirements.
    - o. Responsibility for temporary facilities and controls.
    - p. Procedures for disruptions and shutdowns.
    - q. Construction waste management.
    - r. Parking availability.
    - s. Office, work, and storage areas.
    - t. Equipment deliveries and priorities.
    - u. First aid.
    - v. Security.
    - w. Progress cleaning.
  5. Minutes: FRA will record and distribute meeting minutes.
- C. Conduct a preinstallation conference at Project site before each construction activity that requires coordination with other construction and as required by Section 01 41 00 "Quality Requirements."
1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise FRA of scheduled meeting dates.
  2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
    - a. Health and Safety, Protection of construction and personnel
    - b. Contract Documents.
    - c. Options.
    - d. Related RFIs.
    - e. Related Change Orders.
    - f. Purchases.
    - g. Deliveries.
    - h. Submittals.
    - i. Possible conflicts.
    - j. Compatibility requirements.
    - k. Time schedules.
    - l. Weather limitations.
    - m. Manufacturer's written instructions.
    - n. Warranty requirements.
    - o. Compatibility of materials.
    - p. Temporary facilities and controls.
    - q. Regulations of authorities having jurisdiction.
    - r. Testing and inspecting requirements.
    - s. Installation procedures.
    - t. Coordination with other work.

- u. Required performance results.
  - v. Protection of adjacent work.
  - 3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
  - 4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
  - 5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.
- D. Schedule and conduct a project closeout conference, at a time convenient to FRA and FRA's consultant(s), but no later than 90 days prior to the scheduled date of Substantial Completion.
- 1. Conduct the conference to review requirements and responsibilities related to Project closeout.
  - 2. Attendees: Authorized representatives of FRA and their consultants; Subcontractor and its superintendent; major Sub-tier subcontractors; suppliers; and other concerned parties shall attend the meeting. Participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
  - 3. Agenda: Discuss items of significance that could affect or delay Project closeout, including the following:
    - a. Preparation of record documents.
    - b. Procedures required prior to inspection for Substantial Completion and for final inspection for acceptance.
    - c. Submittal of written warranties.
    - d. Requirements for preparing operations and maintenance data.
    - e. Requirements for delivery of spare parts.
    - f. Requirements for demonstration and training.
    - g. Preparation of Subcontractor's punch list.
    - h. Submittal procedures.
    - i. Coordination of separate contracts.
    - j. FRA's partial occupancy requirements.
    - k. Installation of FRA's furniture, fixtures, and equipment.
    - l. Responsibility for removing temporary facilities and controls.
  - 4. Minutes: Record and distribute meeting minutes.
- E. Conduct progress meetings at weekly intervals, unless the FRA reduces or eliminates the progress meetings, to coordinate the work with Subcontractor, CMA, and FRA. The roles and responsibilities of the participants are as follows:
- 1. FRA Construction Coordinator or CMA:
    - a. Responsible for chairing the weekly progress meetings.
    - b. Identification of deficiencies in the quality of construction.
    - c. Submittal status
    - d. Status of responses to Requests for Information
  - 2. FRA ES&H Safety Coordinator:
    - a. Responsible for discussion on corrective action and preventative actions on ES&H items.
    - b. Can provide guidance on safe work practices and answer questions related to ES&H by the Subcontractor.
  - 3. FRA QA Representative:
    - a. Responsible for discussion on corrective action and preventative actions on QA/QC items
    - b. Can provide guidance on safe work practices and answer questions related to ES&H by the Subcontractor,
  - 4. Procurement Specialist:
    - a. Provide status of any sub contractual changes.
    - b. Any administration concerns related to the Subcontract.

5. Subcontractor's Project Manager:
  - a. Prior to the weekly progress meeting, the Subcontractor shall submit a "two week look ahead" schedule that will present the status of activities that are currently in progress or expected to begin within three (3) calendar weeks from the date of the weekly progress meeting.
  - b. Subcontractor's Environment, Safety and Health observations.
  - c. Submit Quality Control documents.
  - d. Status of deficiency list of those items of the work that do not conform to the Subcontract documents.
  - e. Providing a summary of the work hours worked during the previous week.
  - f. Identification of any impact to the Project cost or schedule due to the activities of FRA.
  - g. Identification of any work activities commenced or expected to commence that are outside the scope of the Subcontract.
6. Subcontractor's Project Management team including, but not limited to, the Deputy Project Manager or Project Engineer, Superintendent, ES&H Manager, Quality Control Coordinator, Cost Manager and Scheduler.
7. Additional Attendees: In addition to representatives listed above, Sub-tier subcontractors, suppliers, and other entities concerned with current progress or involved in planning, coordination, or performance of future activities are required to participate in the meeting at the request of FRA. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
8. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
  - a. Subcontractor's Project Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Subcontractor's Project Schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the time allotted for completion of the Project.
    - 1) Review schedule for next period.
  - b. Review present and future needs of each entity present, including the following:
    - 1) Health and Safety
    - 2) Interface requirements.
    - 3) Sequence of operations.
    - 4) Status of submittals.
    - 5) Deliveries.
    - 6) Off-site fabrication.
    - 7) Access.
    - 8) Site utilization.
    - 9) Temporary facilities and controls.
    - 10) Progress cleaning.
    - 11) Quality and work standards.
    - 12) Status of correction of deficient items.
    - 13) Field observations.
    - 14) Status of RFIs.
    - 15) Status of proposal requests.
    - 16) Pending changes.
    - 17) Status of Change Orders.
    - 18) Pending claims and disputes.
    - 19) Documentation of information for payment requests.
9. Minutes: FRA Construction Coordinator or CMA will record and distribute the meeting minutes to each party present and to parties requiring information.
  - a. Revise Subcontractor's Project Schedule after each progress meeting where revisions to the Project Schedule have been approved by FRA. Issue revised Project Schedule concurrently with the report of each meeting.

- F. Conduct monthly Project Schedule Update Meetings: The Project Schedule shall accurately reflect the execution of the Project. The Project Schedule update shall include the following:
1. Actual start and completion dates for activities that finished during the update period.
  2. Percent complete and predicted completion date for those activities that are in progress.
  3. Any necessary changes to the Project Schedule required to accurately reflect the actual sequence of work.
  4. Clear identification of the critical path work activities and logic ties.
  5. The FRA Construction Coordinator and the Subcontractor shall jointly review all Project Schedule updates prior to formal submittal.
  6. The date of the update will be selected by FRA to coincide with accepted FRA financial accounting periods.
  7. The Project Schedule shall reflect all Subcontract changes that have been issued via Supplemental Agreement.
  8. A revision summary of the changes shall be maintained on the schedule.

**1.8 DIVISION 01 MEETINGS**

- A. This section and the enclosed schedule are intended to assist the Subcontractor in identifying Division 01 meetings but is not intended to be an all-inclusive list. The Subcontractor is ultimately responsible for reviewing all Division 01 sections and ensuring that all requested meetings are identified and held in a timely manner.

Specification Section	Subsection	Meeting (Refer to specification section for detail)	Cadence
01 30 00	1.5	Preconstruction Conference	No later than 15 days after Subcontract Award
01 30 00	1.5	Preinstallation Conference	Before each construction activity that requires coordination with other construction.
01 30 00	1.5	Project Closeout Conference	At a time convenient to FRA, but no later than 90 days prior to the scheduled date of Substantial Completion.
01 30 00	1.5	Progress Meeting	Weekly interval
01 30 00	1.5	Project Schedule Update Meeting	Monthly interval
01 31 00	1.15	Toolbox Meetings	Weekly interval
01 31 00	3.1	Preparatory Meeting	Prior to entering permit-required confined space
01 31 00	3.1	Hot Work Meeting	Prior to work commencing and issuance of Burn Permit
01 31 00	3.4	Daily Work Planning Meetings	Daily interval
01 32 00	1.5 B	Pre-scheduling Conference	Within 10 days of Notice of Award
01 32 00	3.1 A	Weekly Schedule Progress meetings	Weekly
01 32 00	3.1 B	Monthly Schedule Update meetings:	Monthly
01 41 00	1.4 C	Quality Control Meetings	Regularly (e. weekly) and as outlined in 01 41 00
01 56 39	1.5 C	Preinstallation Conference	As agreed with FRA
01 73 00	1.3	Preinstallation Meeting	As agreed with FRA
01 79 00	1.4 C	Pre-instruction Conference	As agreed with FRA
01 91 13	3.2 A	Commissioning Kickoff Meeting	As agreed with FRA
01 91 13	3.2 B	Miscellaneous Commissioning Meetings	As agreed with FRA

01 91 19	1.3 A	Preconstruction meetings between the trades	As agreed with FRA
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**PART 2 - PRODUCTS (Not Used)**

**PART 3 - EXECUTION (Not Used)**

**END OF SECTION 01 30 00**

**SECTION 01 31 00 - ES&H REQUIREMENTS****PART 1 GENERAL****1.1 LABORATORY'S ES&H POLICY**

- A. At Fermilab, safety and environmental protection are of the highest importance. The Laboratory's policy is to protect the environment and the safety and health of all persons, may they be laboratory employees, subcontractor employees, scientific visitors, or visiting members of the public, from accident or injury while they are present on the Fermilab Site or other locations managed by Fermi Research Alliance, LLC (FRA).
- B. Nothing shall have a higher priority.

**1.2 SUMMARY**

- A. This section describes the requirements, responsibilities, and expectations for the environment, safety, and health (ES&H) aspects of the Project.
- B. Safety, as used in this document, encompasses environment, safety, and health, including pollution prevention and waste minimization.
- C. The Subcontractor shall provide all labor, materials, equipment, services, occupational exposure monitoring, and supervision required to maintain work sites that meet the ES&H requirements of all applicable federal, state, local and FRA regulations. In addition, the Subcontractor shall protect the environment and the safety and health of its employees, the employees of its Sub-tier subcontractors, sub-tier vendors, FRA's employees and the general public.

**1.3 REFERENCES**

- A. The Subcontractor and Sub-tier subcontractors shall comply with the following referenced documents. The publications referenced herein, form a part of this Section and Contract Documents.
  - 1. 10 Code of Federal Regulations (CFR) 851, Department of Energy (DOE) Worker Safety and Health Program
  - 2. 10 CFR 820, Procedural Rules for DOE Nuclear Activities
  - 3. 10 CFR 835, Occupational Radiation Protection
  - 4. 10 CFR 860, Trespass to Land Owned & Leased by the US Government
  - 5. 10 CFR 708, DOE Contractor Employee Protection Program
  - 6. 29 CFR 1904, Record Keeping Guidelines for Occupational Injuries, and Illnesses
  - 7. 29 CFR, 1910, Occupational Safety and Health General Industry Standards
  - 8. 29 CFR 1926, Occupational Safety and Health Standards for Construction
  - 9. 40 CFR Protection of the Environment (USA EPA)
  - 10. 49 CFR Transportation
  - 11. 35 IAC Illinois Environmental Protection (Illinois EPA)
  - 12. Illinois State, "Rules of the Road" and the Illinois Vehicle Code
  - 13. DOE Order 442.1A, Department of Energy Employee Concerns Program
  - 14. National Fire Protection Association (NFPA) codes and standards
  - 15. NFPA 70E, Standard for Electrical Safety in the Workplace
  - 16. American Conference of Governmental Industrial Hygienists (ACGIH), "Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices" (2016)

17. American Society of Mechanical Engineers (ASME) Codes and Standards:
    - a. ASME B30 Series, Crane Safety
    - b. ASME B31 Standards of Pressure Piping
  18. American National Standards Institute (ANSI) Standards:
    - a. ANSI A10, Construction Package
    - b. ANSI Z136.1 Safe Use of Lasers
- B. Subcontractor(s) working on the Fermilab site are subject to United States of America - Department of Energy (DOE) civil penalties or Subcontract fee reductions for noncompliance, in accordance with 10 CFR 851 "Worker Safety and Health Program" and 10 CFR 835 "Occupational Radiation Protection". Subcontractor(s) shall also comply with 10 CFR 851 "Worker Safety and Health Program" which defines worker safety and health requirements for the Department of Energy contractors and their subcontractors. The Worker Safety and Health Program acknowledgment is part of the Construction ES&H Certification. Additional information can be found at: <http://eshq.fnal.gov/worker-safety-health-for-subcontractors/>.
- C. Subcontractor shall comply with 10 CFR 835 "Occupational Radiation Protection". This Regulation defines the requirements pertinent to work where potential exposure to ionizing radiation hazards occur. The protective measures to be taken where this hazard is present shall be communicated to the Subcontractor through the FRA Construction Coordinator. FRA has an extensive level of expertise in the management of ionizing radiation hazards that will be utilized to identify the work locations where such hazards are present and establish these protective measures.

#### 1.4 DEFINITIONS

- A. Competent Person: One who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate the identified hazardous. Duties related to ES&H shall take precedence over other duties.
- B. Construction: The combination of erection, installation, assembly, demolition, or fabrication activities involved to create a new facility or to alter, add to, rehabilitate, dismantle, or remove an existing facility. It also includes the alteration and repair (including dredging, excavating, and painting) of buildings, structures, or other real property, as well as any construction, demolition, and excavation activities conducted as part of environmental restoration or remediation efforts.
- C. FRA Construction Coordinator: An FRA person responsible for ensuring the work being performed is in conformance to the Subcontract technical requirements. The FRA Construction Coordinator is the primary point of contact with the Subcontractor.
- D. Construction Environmental Safety & Health Certification: An official, binding document prepared by the Subcontractor, bearing the signature of a responsible manager of the subcontracting company that defines the safety and health practices and responsibilities necessary to conduct operations on Fermilab property in a safe manner.
- E. Construction Manager as Advisor (CMA): An individual or firm responsible to Fermi Research Alliance, LLC, for the supervision and administration of the Project to ensure the construction Subcontractor's compliance with construction Project requirements.
- F. Construction Worksite: The area within the limits necessary to perform the work described in this Subcontract. Reference Sections 01 00 10 Site Location Article 1.4, Parking and Staging Article 1.11, and Site Access and Hauling Article 1.12.

- G. ES&H Coordinator: An FRA person responsible for ES&H guidance, periodic construction site visits, support for the FRA Construction Coordinator, and providing oversight of the Subcontractor's safety program. The ES&H Coordinator will review Hazard Analysis and training documentation for on-going work activities. Any deficiencies noted shall be brought to the attention of the FRA Construction Coordinator for follow up with the Subcontractor. The ES&H Coordinator has authority to stop work activities for imminent danger, fatality, or major environmental release, but does not have authority to direct changes in the work scope of the Project or the Subcontractor's means and methods of construction.
- H. Fermi Research Alliance, LLC (FRA) – The entity that manages Fermi National Accelerator Laboratory (Fermilab) for the U.S. Department of Energy's Office of Science.
- I. Field Superintendent: One who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate the identified hazardous. The superintendent's role is to run the day-to-day operations and control the short-term schedule. In addition, the superintendent includes important quality control and coordination responsibilities with Sub-tier subcontractor/vendors. FRA also requires the Subcontractor Field Superintendent to have completed an OSHA 30-hour construction safety course. Duties related to ES&H shall take precedence over other duties.
- J. Imminent Danger: A hazard which, if allowed to persist, is likely to cause an accident that will result in death, injury, property damage, or environmental impairment.
- K. Integrated Safety and Environment Management (ISEM): ISEM is defined as a system for performing work safely and in an environmentally responsible manner. The term "integrated" is used to indicate that the Environment, Safety and Health (ES&H) management systems are normal and natural elements of accomplishing work. The intent is to integrate the management of ES&H with the management of the other primary elements of construction: quality, scope, cost, and schedule. FRA subscribes to the philosophy of Integrated Safety and Environment Management (ISEM) by following the program outlined in this section. The ISEM core functions are implemented by robust daily work planning of construction activities. The ISEM core functions include 1) defining the scope of work, 2) identifying and analyzing the hazards, 3) developing and implementing hazard controls, 4) performing work with controls, and 5) providing feedback for continuous improvement. FRA also requires this of subcontractors and sub-tier subcontractors.
- L. Procurement Specialist: FRA person responsible for and specifically assigned to the Project, who is responsible for negotiating and administering the Subcontract terms and conditions. All modifications to the Subcontract shall come from the Procurement Specialist or designee, in writing. The Procurement Specialist or designee is the sole entity that can modify the Subcontract or initiate change orders.
- M. Qualified Person: One who, by possession of a recognized degree, certification, or professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated his or her ability to solve or resolve problems relating to the subject matter, the work, or the Project.
- N. Subcontractor's Safety Representative/ES&H Manager: The Subcontractor's ES&H Manager shall have completed the OSHA 30-hour construction safety course and have a minimum of 15 years (preferred) of construction safety experience consistent with the type of activities included in the scope of work.
- O. Subcontractor's Environmental, Safety, &Health (ESH) Program: Subcontractor's (corporate) company policies and procedures to ensure operations comply with applicable safety and occupational health laws and regulations and protect the safety and health of employees and members of the public.

- P. Stop-Work Order: A definitive statement made openly to another individual that an imminent danger situation exists and therefore, all related work must stop immediately. If unsafe behavior or potential environmental release is observed, any FRA or Subcontractor employees shall stop the task activity, inform the FRA Construction Coordinator and Subcontractor's Field Superintendent.
- Q. Time and Material (T&M) Office: An FRA person or office assigned to oversee the overall Subcontract compliance effort and operating procedures for Subcontract Time and Material Releases. This individual serves as the focal point for T&M administration of their assigned Subcontract Releases.

## **1.5 SUBMITTALS**

- A. Submittals with Subcontractor's proposal:
  - 1. Construction Environmental Safety and Health Certification, which includes acknowledgement regarding Worker Safety 10 CFR 851; (See Article 1.8)
  - 2. Experience Modification Rating (EMR) Rates and Occupational Safety Health Administration (OSHA) 300 log for last three years. Reference the Fermilab Subcontractor Safety Information Questionnaire
  - 3. Subcontractor's ES&H Program
  - 4. Resume of the Subcontractor's Environmental, Health, and Safety (ES&H) Manager
- B. ES&H Submittals Required Prior to Notice to Proceed: Within fifteen (15) business days after Subcontract award, the Subcontractor shall submit the following to FRA for acceptance. These items must be submitted and accepted by FRA prior issuance of Notice-To-Proceed (NTP):
  - 1. The completed Construction Environmental Safety & Health Certification
  - 2. Initial Hazard Analysis: The initial hazard analysis, at a minimum, should be for visitor's access to the work site and mobilization.
  - 3. Site Specific Environmental, Safety, and Health (ESH) Plan.
- C. Submittals after Notice to Proceed include, if applicable:
  - 1. Individual Trade, Craft, or Task Specific Hazard Analysis
  - 2. Global Harmonizing System, Safety Data Sheets (SDS)
  - 3. Tabulation of On-site Work Hours on a Weekly basis as part of Weekly Progress Meetings
  - 4. Incident Investigation Reports
  - 5. Lift Plans
  - 6. Welding Plans
  - 7. Environmental, Erosion Control Reports; and
  - 8. Excavation Plans, etc.

## **1.6 ENFORCEMENT**

- A. The US Department of Energy has the authority to exercise enforcement actions on any subcontractor who violates any requirement set forth in 10 CFR 851 and 10 CFR 835. The subcontractor may be subject to civil penalties up to \$80,000 for each such violation, in accordance with 10 CFR 851 and civil penalties up to \$110,000 for each such violation, in accordance with 10 CFR 835.
- B. If any violation is a continuous violation, each day of the violation shall constitute a separate violation for the purpose of computing the civil penalty.

## **1.7 CONSTRUCTION ES&H CERTIFICATION**

- A. To ensure acceptance to 10 CFR 851, the Subcontractor shall complete and submit the attached Construction ES&H Certification.

- B. The Construction ES&H (CESH) Certification shall be submitted with the Subcontractor's proposal and reviewed by FRA prior to the award of the Subcontract.
- C. The CESH Certification shall encompass the work of any and all Sub-tier subcontractors involved in activities under this Subcontract, and it shall include the Subcontractor's methods to enforce the elements of the safety program for all personnel on the construction worksite.
  - 1. The Subcontractor's CESH Certification shall include the following, at a minimum:
    - a. A statement of the Subcontractor's commitment to provide a safe and healthful construction worksite for all employees including Subcontractors' employees and FRA personnel.
    - b. A signature of a responsible manager of the subcontracting company.
    - c. Name, title, and qualifications of the designated site ES&H Manager and designated alternates.
    - d. Occupational Medicine Program, including identifying the qualified occupational medicine services provider.
  - 2. Procedures for coordinating safety and health with Sub-tier subcontractors and with FRA personnel on the construction worksite.
- D. The Subcontractor's incident reporting and occupational medical program and the specifics for the construction worksite shall include:
  - 1. Identification of the activities on the construction worksite that will require employees to be under an occupational medical or exposure-monitoring program. Upon FRA's request, the Subcontractor shall submit documentation of compliance.
  - 2. Discussion of how medical personnel will be made available for advice and consultation on matters of occupational health.
  - 3. An emergency response plan that sets forth the procedures to be followed upon the occurrence of serious injuries, illnesses, fatalities, fires, structural failures, or other emergencies, including procedures for the administration of first aid and/or other necessary medical treatment including:
    - a. Identified of provision for prompt medical treatment.
    - b. Process for reporting and investigating recordable injuries for possible cause and corrective action in accordance with 10 CFR 1904.
    - c. Specific designation of management persons responsible for reviewing injury and illness reports.
  - 4. Procedures for recording and reporting safety incidents and maintaining safety and health records in accordance with Occupational Safety and Health Administration (OSHA) requirements and in accordance with Article 3.3.
    - a. Procedures for the investigation of job-related incidents to determine possible cause and corrective action.
    - b. Specific designation of management persons responsible for review of injury and illness reports

## **1.8 SUBCONTRACTOR'S ENVIRONMENT, SAFETY, AND HEALTH PROGRAM**

- A. The Subcontractor shall have an ES&H Program that is commensurate with the complexity and nature of the work. This ES&H Program will describe the Subcontractor's overall commitment to safety and measures that will be taken specific to this Project work scope and site. The following describes the ES&H Program requirements.
  - 1. The Subcontractor shall submit to FRA one (1) electronic copy in Adobe portable document format (PDF) in the web-based project management system (WBPMs).

2. The ES&H Program will address the Subcontractor's commitment to each of the following Integrated Safety and Environmental Management (ISEM) principles. A brief explanation and key elements to be addressed follows each:
- a. Line Management Responsibility for Safety: Line management shall be responsible and accountable for the protection of the employees, the public, and the environment. Examples of expected items to support this statement are:
    - 1) Statement of ES&H policy and goals.
    - 2) Workforce accountability for strict compliance with Subcontractor's ES&H program.
    - 3) Policy statement concerning substance abuse on the construction worksite.
    - 4) Process for progressive discipline.
    - 5) Means of holding Sub-tier subcontractors accountable for compliance with ES&H requirements.
    - 6) Evidence of worker participation.
    - 7) Participation of management in safety meetings, inspection, and documentation.
    - 8) Process for employees to identify and help resolve ES&H issues quickly, including stop work authority; and
    - 9) Management support without hint of retribution or harassment.
    - 10) On-going status and compliance verification reporting to FRA.
  - b. Clear Roles and Responsibilities: The roles and responsibilities, and authority at all levels of the organization, including potential Sub-tier subcontractors are clearly identified. Examples of expected items to support this statement are:
    - 1) ES&H and Quality Control (QC) responsibilities for principals, field superintendent, foremen, competent person, ES&H officer, and workforce are documented; and
    - 2) Stop work authority.
  - c. Competence Commensurate with Responsibility: Personnel possess the experience, knowledge, skills, and abilities that are necessary to discharge their responsibilities. Examples of expected items to support this statement are:
    - 1) Identification of required training and experience of field superintendent, foremen, competent person, ES&H personnel, and workforce.
    - 2) Identification of process for documenting completion of training.
    - 3) Process for assuring Sub-tier subcontractors are adequately skilled to perform their work activities; and
    - 4) Training for employees and sub-tiers employees on Integrated Safety Management and hazard analysis.
  - d. Balanced Priorities: Resources are effectively allocated to address safety, programmatic, and operational considerations. Protecting the public, the workers, and the environment shall be a priority whenever activities are planned and performed. Examples of expected items to support this statement are:
    - 1) Management commitment of resources to adequately implement their ES&H program.
    - 2) Selection process for Sub-tier subcontractors that include cost, quality, schedule adherence, and safety performance; and
    - 3) Process for the Subcontractor to authorize start of work by Sub-tier subcontractors.
  - e. Identification of Safety Standards and Requirements: Before work commences, the associated hazards are evaluated and an agreed upon set of safety standards and requirements are established which will provide adequate assurance that the public, the workers, and the environment are protected from adverse consequences. Examples of expected items to support this statement are:
    - 1) Subcontractor ES&H Program, by reference.

- 2) Subcontractor QC Program, by reference; and
  - 3) Hazard analysis process which includes defining scope of work, analysis of hazards, identification of hazard controls, requirement to perform work within these controls, and means to provide feedback and improvement.
- f. Hazard Controls Tailored to Work Being Performed: Administrative and engineering controls, tailored to the work being performed, are present to prevent and mitigate hazards. Examples of expected items to support this statement are:
- 1) Hazard analysis process.
  - 2) Subcontractor ES&H Program, by reference.
  - 3) Planning and selection of appropriate and effective protective measures.
  - 4) Active regimen of workplace inspections and prompt abatement of identified hazards; and
  - 5) Occupational exposure (industrial hygiene) monitoring to verify adequacy of controls and compliance with occupational exposure limits.
  - 6) Inspections, assessment, and audits of Sub-tier subcontractor's adherence to ES&H and QC program.
  - 7) Daily work planning and hazard reviews at the worker level documented in form found in Attachment B.
- g. Operations Authorization: The conditions and requirements to be satisfied for operations to be initiated and conducted are clearly established and understood by all. Examples of expected items to support this statement are:
- 1) Process to assure workers are informed of hazards and required protective measures before work is allowed to begin.
  - 2) Process to assure workers, including Sub-tier subcontractors are appropriately trained to do their job safely.
  - 3) Process to assure that when an incident occurs, the scene is secured until the incident investigation is complete; and
  - 4) Investigation process includes analysis, examination of trends and lessons learned, and a means to report to FRA in a timely manner.
  - 5) Process to assure that applicable FRA permits are in place prior to allowing work to commence.
- B. The ES&H Program should describe the following:
- 1. Basic Safety and Health Provisions including Emergency Action/Response Plan, Accident Investigation Program, Recording and Reporting of Injuries, Housekeeping, Hazard Communication Plan, Personal Protective Equipment and Fire Protection and Prevention.
  - 2. Hazard Analysis Process including how hazards are identified and analyzed, preventive controls and the periodic inspection program. How workers are informed of hazards and protective actions. How objective evidence, i.e., monitoring results, is to be used for establishing controls measure, including exposures assessments to verify adequacy of control, e.g., verifying adequacy of hearing protection while monitoring equipment noise that is expected to be greater than 85dba exposure.
  - 3. Waste Handling and Disposal including characterization of waste, packaging and labeling requirements and assurance that appropriate transportation and handling facilities will be used.
  - 4. Erosion Control and Environmental Protection including Storm Water Pollution Prevention Plan (SWPPP) when required and Erosion/Sediment Control Plan(s).
  - 5. Other Program components (as dictated by the scope of this work) including the following:
    - a. Control of Hazardous Energy (Lockout/Tagout).
    - b. Confined Space.
    - c. Concrete Cutting.
    - d. Hearing Conservation.
    - e. Ionizing Radiation.
    - f. Nonionizing Radiation.
    - g. Lead, Beryllium, or Other Metals.

- h. Electrical (including Power Transmission and Distribution).
  - i. Welding and Cutting.
  - j. Scaffolds.
  - k. Fall Protection.
  - l. Excavations.
  - m. Signs, Signals, And, Barricades.
  - n. Tools - Hand and Power.
  - o. Ladders & Stairways.
  - p. Commercial Diving Operations.
  - q. Motor Vehicles, Mechanized Equipment, and Marine Operations.
  - r. Cranes, Derricks, Hoists, Elevators, and Conveyors.
  - s. Concrete and Masonry Construction.
  - t. Steel Erection.
  - u. Underground Construction, Caissons, Cofferdams, & Compressed Air
  - v. Demolition; and
  - w. Blasting and the Use of Explosives
- C. Changes and Updates: The ES&H Program is a living program. Updates that reflect changes to processes and program shall be submitted as changes are made. FRA may require changes for the program acceptance prior to Subcontract award. Once accepted by FRA, the Subcontractor shall be required to comply with the requirements set forth in its program.
- D. All Sub-tier subcontractors employed by the Subcontractor must agree in writing to follow the Subcontractor's ES&H Program. If not, the Sub-tier subcontractor's will submit for acceptance one (1) electronic version in Adobe portable document format (pdf) of their ES&H Program and provide their own CESHG to ensure acceptance of 10 CFR 851, reference paragraphs 1.3, B and Article 1.8.

## 1.9 JOB SITE ORIENTATION

- A. The Subcontractor shall ensure and demonstrate; through a documented job site orientation program that Sub-tier subcontractor personnel are aware of the ES&H requirements of the job.
- B. The Sub-tier subcontractors working for the Subcontractor shall follow and perform all required ES&H programs defined by the Subcontractor's approved and accepted ES&H program for the job site.

## 1.10 HAZARD ANALYSIS (HA)

- A. The hazard analysis document details the specific hazards associated with the work activities and mitigating actions (including personal protective equipment) that the Subcontractor and Sub-tier subcontractors will take to reduce or eliminate the risk of injury.
- B. The initial hazard analysis shall be submitted as part of the CESHG and accepted by FRA prior to notice to proceed (NTP).
- C. As the Project progresses, task specific hazard analysis shall be prepared and submitted. The Subcontractor shall prepare a hazard analysis for all trade work. A link to the hazard analysis can be found at <http://eshq.fnal.gov/worker-safety-health-for-subcontractors/>. The FRA format shall be used unless otherwise approved, see attachment D.
- D. The following criteria shall be addressed, if applicable, when developing the hazard analysis:
  - 1. An FRA-accepted hazard analysis shall be required for all work activities.
  - 2. All Subcontractor and Sub-tier subcontractor employees are required to sign the analyses affecting their work thereby acknowledging understanding of the hazards and the mitigation

- activities. The signature list shall be available for review by FRA. As the HA is updated, the Subcontractor and Sub-tier subcontractor employees shall be advised of the new information and re-sign the document.
3. Prior to the start of subsequent new work activities, the Subcontractor shall review and revise the hazard analysis, or develop a new hazard analysis, as necessary to incorporate new hazards. Each revision must be submitted and accepted by FRA before the associated element of work is begun.
  4. Safety Data Sheet (SDS) of products that may significantly impact the safety or environment of Fermilab or Subcontractor personnel are to be submitted as part of the hazard analysis process.
  5. The name of Competent Persons shall be included on the hazard analysis and communicated to all affected workforces.
  6. Specific procedures in the areas of fall protection, excavation, confined space, hoisting and rigging, and Lockout/Tagout may be required as job conditions dictate.
  7. Identifying silica exposure such as cutting masonry products, installing, cutting, or removing concrete, installation of or removal of sheet rock compound or dealing with other silica constraining products. Reference Attachment A for recommended mitigations.
- E. FRA will provide informal hazard analysis training for Subcontractor and Sub-tier subcontractor personnel upon request.

### 1.11 EXISTING UTILITIES, EQUIPMENT, AND STRUCTURES

- A. Utility Identification and Location:
1. Structures and utilities shown on the Construction Drawings represent the best information available. Their number and exact locations are not guaranteed. Excavation during construction may reveal the presence of underground drainage tiles, culverts, utilities, and other obstructions. The Subcontractor shall request from FRA direction for rerouting, sealing or otherwise modifying underground obstructions not shown on the Construction Drawings.
  2. The Subcontractor shall preserve and protect all structures, equipment, and vegetation (such as trees, shrubs, and grass) on or adjacent to the work site, which are not to be removed and which do not unreasonably interfere with the work required under this Subcontract. The Subcontractor shall only remove trees when specifically authorized to do so and shall avoid damaging vegetation that will remain in place. If any limbs or branches of trees are broken during Subcontract performance, or by the careless operation of equipment, or by workmen, the Subcontractor shall trim those limbs or branches with a clean cut and paint the cut with a tree-pruning compound as directed by FRA.
  3. The Subcontractor shall protect from damage all existing infrastructure (1) at or near the work site and (2) on adjacent property of a third party, the locations of which are made known to or should be known by the Subcontractor. The Subcontractor shall repair any damage to those facilities, including those that are the property of a third party, resulting from failure to comply with the requirements of this Subcontract or failure to exercise reasonable care in performing the work. If the Subcontractor fails or refuses to repair the damage promptly, FRA may have the necessary work performed and charge the cost to the Subcontractor.
  4. Electrical cables, duct banks, fiber optic cables, and gas service in the area of the excavation, that is, 18 inches either side or crossing, must be de-energized/de-pressured and lock-out/tagged-out. If the services cannot be de-energized/de-pressured, then vacuum excavation methods, consisting of air or water to break up the soil and a vacuum device to collect the spoil, shall be used to locate fiber optic cables, electrical cables, duct banks, and gas lines prior to the excavation activity.

- B. Work on Existing Utilities:
1. FRA will identify through Construction Drawings, notations and field locates, the approximate location of known utilities and underground structures.
  2. No work shall be performed on existing in-service utility systems without prior approval and coordination of the system outage by the FRA Construction Coordinator.
  3. Pressure shall be relieved on all piping systems before opening system and starting the work.
  4. Lockout/Tagout shall be used by the Subcontractor for all valves, blank-offs, and relief lines.
  5. "Hot Tap" connections on utility services shall not be permitted unless specified by the Contract Documents and specific procedures have been submitted to and accepted by FRA.
  6. Existing fire and life safety systems shall be re-activated at the end of each business work day. If systems are unable to be re-activated at the end of the business work day, notification must be made to the FRA Construction Coordinator.
- C. Fermilab Access for Information Gathering:
1. FRA utilizes a GPS system for on-site mapping and documentation of underground utilities.
  2. The Subcontractor shall provide access for data gathering.
  3. The Subcontractor shall notify the FRA Construction Coordinator two (2) working days prior to backfilling.

## 1.12 ENVIRONMENTAL ISSUES AFFECTING THE WORK

- A. Environmental issues affecting the work planning specific to this Project can be found in Section 01 00 10, Article 1.9.
- B. Soil Erosion and Sediment Control shall be employed on all projects involving excavations. The following requirements apply:
1. Subcontractor shall have all required erosion control devices required by the Soil Erosion Sediment Control Plan (SESCP) and Surface Water Pollution Prevention Plan (SWPPP) and as shown on the Construction Drawings, in place prior to commencing any work for which they are required.
    - a. As the work evolves, additional interim control structures may be required in order to protect waterways and/or comply with permit terms and conditions.
    - b. Costs for installation and maintenance of these structures shall be considered incidental to the Project and included in the original proposal.
    - c. The Subcontractor shall install all such structures within 24 hours of notification by FRA.
  2. Maintenance of Erosion Control Structures:
    - a. Subcontractor shall be required to perform inspections of all control structures as specified in the Construction Drawings and SWPPP, and to maintain all control devices until final stabilization of all disturbed areas.
    - b. Subcontractor shall perform at a minimum, weekly erosion control inspections and after ½-inch or more precipitation events.
  3. Temporary and Permanent Seeding and Stabilization
    - a. The Subcontractor shall be required to follow seeding dates and requirements as specified and in accordance to the Illinois Urban Manual.
    - b. The Subcontractor shall be responsible for providing appropriately vegetated surfaces as outlined in the Construction Specifications or specified on the Construction Drawings.
    - c. The Subcontractor shall be responsible for establishing sufficient final vegetation required for stabilization as accepted by FRA to removing the erosion control structures. Any permanent seeding operations completed at the end of the growing season shall be carried out per dormant seeding requirements (Illinois Urban

Manual Standard 880C). Subcontractor shall be responsible for establishing final vegetation over all disturbed areas.

### **1.13 ADVANCE NOTICE OF WORK ACTIVITIES**

- A. The following activities require the Subcontractor to provide written notification to the FRA Construction Coordinator a minimum of five (5) business days prior to the commencement of work:
1. Interruption of road traffic.
  2. Closure of any roads.
  3. Connection to or interruption of any existing underground utility.
  4. Intended use of ICW from any hydrant.
  5. Connection to temporary electric power sources.
  6. Request for disablement of fire alarms or related safety devices.
  7. Request for disablement of fire protection systems.
  8. Intended activity beyond the specified construction limits.
  9. Intended access to or work within a confined space.
  10. Connection to or interruption of any existing 13.8kV power system.
  11. Saw cutting or core drilling at manholes, foundations and paved areas.
  12. Excavation activities.
  13. Backfilling of underground utilities.
  14. Delivery of a radioactive source on the Fermilab site.
- B. Subcontractor must receive FRA's approval prior to proceeding on the above-listed work activities.

### **1.14 SUBCONTRACTOR'S PROJECT TEAM & PERSONNEL**

- A. Field Superintendent - The Subcontractor shall, at all times during the progress of the work, provide a competent superintendent. In addition, the following requirements for the Field Superintendent are described below:
1. The Subcontractor shall provide a competent Field Superintendent, who is the Subcontractor's representative designated for the duration of the Project to the running of the day-to-day operations of the work including safety, quality control and Sub-tier subcontractor coordination responsibilities.
  2. The Field Superintendent shall have knowledge and experience of Occupational Safety and Health Administration (OSHA) and other related safety standards and has the authority to enforce such standards in the field.
  3. The Field Superintendent must be present on the Project Site whenever work activities are ongoing.
  4. In the absence of the designated Field Superintendent, the Subcontractor shall identify an alternate individual with similar qualifications acceptable to FRA.
  5. Should more than one work shift be required on this Project, the Subcontractor shall identify and assign a designated individual meeting the above requirements for each work shift.
  6. In the event excavations are part of the Project scope, the Subcontractor shall provide a competent person for excavation activities who meets the requirements of OSHA 29 CFR 1926.650 (b).
  7. In the event scaffolding is to be utilized during the execution of the Project, the Subcontractor shall provide a competent person for scaffolding who meets the requirements of OSHA 29 CFR 1926.450 (b).
- B. Subcontractor's ES&H Manager - The Subcontractor shall employ a ES&H Manager who acts as the authorized agent of the Subcontractor, responsible for ESH activities of all work sites under this Subcontract. Reference Section 01 00 10.

- C. The Subcontractor's ES&H Manager as identified in the CESHG shall interface with the FRA Construction Coordinator and FRA ESH Coordinator on all safety matters, and assure the Subcontractor does the following:
1. Act as the Competent Person
  2. Provide Input to Daily Task/Work Planning Meeting
  3. Interface with FRA Construction Coordinator on all safety matters.
  4. Prepare and submit Hazard Analyses including revisions and updates.
  5. Review and accept sub-tier safety plans and hazard analyses.
  6. Assure that all Sub-tier subcontractors have accepted the ES&H Plan.
  7. Update the ES&H Plan as required.
  8. Maintain a list of Competent and Qualified Persons.
  9. Assure that Hazard Analyses are understood and signed by all workers.
  10. Inspect work in progress.
  11. Identify and reports and corrects deficiencies.
  12. Assure that personal protective equipment is available.
  13. Conducts toolbox meetings.
  14. Maintain all safety records including minutes, training records, inspections, etc.
  15. Maintain safety related signage.
  16. Assure that equipment inspections are performed.
  17. Attend weekly construction meetings.
  18. Coordinate permit applications with FRA Construction Coordinator.
  19. Investigates all incidents.
- D. The Subcontractor's ES&H Manager or the alternate shall be present at all meetings between the Subcontractor and FRA at which changes in construction methodology are discussed. The Subcontractor's ES&H Manager shall approve these changes.
- E. Drug and Alcohol-Free Workplace - All personnel of the Subcontractor and Sub-tier subcontractors are prohibited from engaging in the unlawful manufacture, distribution, dispensing, possession, or use of controlled and restricted substances. Subcontractor's and Sub-tier subcontractor's personnel shall adhere to the Federal Controlled Substances Act (12 USC 8120 and further defined in Federal Regulations 29 CFR 1308.11-3808.15) and stated in the Contract Documents.
- F. After damage to property or environment release by the Subcontractor or Sub-tier subcontractor associated personnel are subject to drug testing and results shall be submitted to the FRA Construction Coordinator.

### **1.15 IDENTIFICATION BADGING**

- A. The Subcontractor employees and Sub-tier subcontractors working on site will be required to obtain identification badging for access onto the Fermilab site.
1. The FRA Construction Coordinator will assist in the process of identification badging.
  2. Once identification badges are obtained, they shall be available at all times while on and entering the Fermilab site; and
  3. Deliveries, incidentals, and escorted work activities under eight (8) hours are exempted from the badging requirement.
  4. Starting October 1, 2021 FRA will only accept REAL ID.

### **1.16 FERMILAB TRAINING**

- A. Subcontractor and all Sub-tier subcontractors working at Fermilab shall attend Subcontractor Orientation which is a half-hour presentation conducted weekdays at 7:30 a.m. All Subcontractor employees will receive a card documenting attendance. This training must be repeated every two (2) years. The orientation and badging efforts require approximately one (2) hour.

- B. FRA may require that Subcontractor and Sub-tier subcontractor employees receive Radiological Worker training, an approximately eight (8) hour class. Refer to Section 01 00 10 to determine if this class is required.
- C. FRA may require that Subcontractor and Sub-tier subcontractor employees receive Oxygen Deficiency Hazard (ODH) training, an approximately eight (8) hour class. This include a medical evaluation by Fermilab Occupational medical department. Refer to Section 01 00 10 to determine if this class is required.
- D. FRA may require that Subcontractor and Sub-tier subcontractor employees receive Fermilab LOTO II, a 4-hour class. Refer to Section 01 00 10 to determine if this class is required.

## **PART 2 PRODUCTS - Not Used**

## **PART 3 EXECUTION**

### **3.1 PERMITS**

- A. Fermilab acts as its own Authority Having Jurisdiction. No municipality permits are required. However, Fermilab conducts work through the use of on-site permits. All Fermilab required permits will be identified to the Subcontractor by the FRA Construction Coordinator, who will arrange for all necessary permits at no cost to the Subcontractor.
- B. No work activity shall be performed without the required permits.
- C. Activities requiring permits include, but are not limited to:
  - 1. Work notification.
  - 2. Excavation (see below).
  - 3. Electrical work.
  - 4. Existing Structure/Concrete Cutting & Coring
  - 5. Hot Work, Burning/Welding & Spark Producing.
  - 6. Modification to drinking water, sanitary sewer systems or Industrial Cooling Water.
  - 7. Radioactive sources on site.
  - 8. Working with/on radioactive material, working in radiological areas.
  - 9. Moving government or Fermilab property off site.
- D. The Subcontractor shall comply with all restrictions or provisions listed on permits.
- E. All requests for permits shall be made a minimum of two (2) working days prior to the need for the permit, except excavation permit.
- F. Excavation Permit: An Excavation Permit issued by Fermilab via the FRA Construction Coordinator is required before any excavation/digging can begin at the construction site. The following requirements are associated with the Excavation Permit:
  - 1. Subcontractor shall coordinate the preparation of the excavation permit application with the FRA Construction Coordinator.
  - 2. Excavation permits require a minimum of ten (10) working days for areas less than one acre (208-ft x 208-ft) unless near accelerator operations. All other excavation permits including near accelerator operations, that is, 100-ft from the center of the beamline, require a minimum of eighteen (18) working days.
  - 3. No excavation shall proceed without an approved Excavation Permit, signed by the Subcontractor Competent Person and the FRA Construction Coordinator.

- G. Confined Space Permit: The minimum acceptable requirements for confined space work at Fermilab include:
1. The FRA Construction Coordinator shall identify all existing confined work spaces to the Subcontractor.
  2. If a Subcontractor is required to enter a permit-required confined space as part of their subcontract with FRA, the Subcontractor shall submit the following information in the timeframe identified in the Submittal specification for FRA review prior to the Preparatory meeting or prior to entry, if there is no Preparatory meeting:
    - a. Submit Subcontractor's confined space entry program to the WBPMS.
    - b. Training records for potential entrants, attendants, and entry supervisors.
    - c. Evidence that all air monitoring equipment is properly calibrated within the calibration period specified by the Subcontractor's program or manufacturer's instructions. This may be in the form of a calibration log, certification indicator on the instrument, or other means. (It is imperative that the equipment used by the Subcontractor be capable of monitoring for the contaminants associated with the confined space to be entered.
  3. It will be the Subcontractor's responsibility to provide all of its own personal protective equipment (PPE), such as lifelines, harnesses, respirators, tripods, ventilators, etc., as specified by the entry permit.
  4. In addition to complying with the permit space requirements listed above, each Subcontractor retained to perform permit-required confined space entry operations shall:
    - a. Obtain any available information regarding permit space hazards and entry operations from the FRA Construction Coordinator.
    - b. Coordinate entry operations with FRA, when both FRA personnel and Subcontractor personnel will be working in or near permit spaces.
    - c. Prior to entry, inform the FRA Construction Coordinator of the specific permit space procedures the Subcontractor will follow.
    - d. Inform the FRA Construction Coordinator who will inform the Fermilab Fire Department prior to entering the space.
    - e. Inform the FRA Construction Coordinator of any unanticipated hazards encountered during confined space entry.
    - f. Provide the FRA Construction Coordinator with a copy of the Subcontractor's confined space permit, reclassification form or written certification once the work has been completed.
- H. Hot Work, Burning, Welding, including Spark Producing around Burn Permit:
1. Information concerning the burning/welding permit is listed below:
    - a. The FRA Construction Coordinator will contact the Fermilab Fire Department (FFD) and secure the Burn Permit.
    - b. Members of the FFD will meet with the FRA Construction Coordinator and the Subcontractor's Field Superintendent and examine the proposed operation, prescribe precautions, assure appropriate instructions are understood, and then issue a written Burn Permit.
    - c. The Subcontractor must arrange for fire watches during burning, welding, or other fire or spark generating work. This fire watch must continue for a minimum of thirty minutes after work is complete.
    - d. It is the Subcontractor's responsibility to furnish the proper number and type of fire extinguishers for any welding, cutting, or brazing activities as specified in the Burn Permit.
    - e. The extinguishers must be located in clear sight and no farther than 50 feet from the work areas.
    - f. All welding shall be in accordance with the requirements of the American Welding Society (AWS) Standard: Safety in Welding, Cutting, and Allied Process (ANSI/ASC Z49.1-94).

- g. UL or FM listed check valves shall be installed on oxygen-fuel torch cutting equipment.

### **3.2 REPORTING REQUIREMENTS**

- A. The following requirements concern Subcontractor reporting requirements:
  - 1. Emergencies: All emergencies occurring at the Fermilab site must be reported immediately by dialing extension 3131 from a Fermilab phone or (630) 840-3131. The types of emergencies to be reported include: injury or illness requiring emergency care, fire, explosion, security incident, vehicle accident, radiation incident, utility failure, tornado sighting, and hazardous material spill or release. After emergency is stabilized, contact the FRA Construction Coordinator.
  - 2. Non-Emergencies (or All Other Incidents): All incidents, including any injury/illness, any non-emergency incident and near misses must be reported immediately to the FRA Construction Coordinator. FRA shall determine if the incident scene shall be preserved and secured by the Subcontractor to enable FRA and DOE to conduct any necessary investigations. After any necessary emergency response is made, the scene shall be left unchanged and protected until the FRA Construction Coordinator is notified and releases the incident site for work to continue; and
  - 3. Investigation and Reporting: The Subcontractor must investigate all incidents (including near misses). The Subcontractor shall submit to the FRA Construction Coordinator within 48 hours of an incident, a written report of an investigation. The investigation must include root causes, corrective actions, and preventive measures.

### **3.3 SUBCONTRACTOR TRAINING**

- A. The following requirements concern Subcontractor training:
  - 1. The Subcontractor shall be responsible for assuring that its employees and Sub-tier subcontractor employees, who do not speak English, understand all ES&H requirements. The Subcontractor must be able to communicate any necessary instructions to those employees.
  - 2. All Subcontractors performing work at Fermilab shall provide to their employees any necessary ES&H training as may be required by federal/state regulations and as appropriate for their Subcontract activities at Fermilab. Exceptions involve hazards, which are unusual for the trade of the Subcontractor's employees. In particular, FRA normally provides appropriate training for Subcontractors working in radiation areas or oxygen deficient hazard areas and expected emergency response.
- B. ES&H training that was provided by the Subcontractor or others and received by Subcontractor employees performing Subcontractor activities at Fermilab shall be maintained on-site and available for review by FRA.
- C. Subcontractors shall maintain on-site, and provide to FRA upon request, any and all occupational safety and environmental records. Such records include, but are not limited to, the records required to be maintained by federal/state regulation. Such records include OSHA injury/illness logs, training records, inspection records, safety meetings, and incident investigations. Additional records appropriate for the Subcontractor's activities shall also be maintained and provided to FRA upon request. Examples include but not limited to:
  - 1. Excavation
  - 2. Scaffolding
  - 3. Fall Protection
  - 4. Confined Space
  - 5. Welding
  - 6. Crane Inspections
  - 7. NFPA 70E

8. Monitoring IH Hazards, e.g., silica exposure
  9. Written exposure monitoring program
- D. If the Subcontractor intends to administer first aid or Cardio Pulmonary Resuscitation (CPR), the Subcontractor must comply with 29 CFR 1926 and have available the list of names of any employee who will administer first aid or CPR, along with current certifications.

### **3.4 JOB SITE ES&H INSPECTIONS/MEETINGS**

- A. After the start of work and throughout the entire work period, the Subcontractor shall monitor and inspect the work area and operations for compliance with the Subcontractor's accepted ES&H Program, Hazard Analysis, and/or CESH Certification on a daily basis. The Subcontractor's Project Team is expected to conduct these inspections and correct any deficiencies found.
- B. These inspections shall be documented by the Subcontractor and maintained on-site for the duration of the Project. Records shall be available for review upon request by FRA.
- C. The following requirements concern Job Site ES&H meetings:
1. Daily Work Planning Meetings in the form of daily briefings shall be conducted by the Subcontractor Field Superintendent and attended by all Sub-tier subcontractors on the Project Site that day. The daily planning meeting will discuss the planned work activities, review the applicable hazard analysis, and allow for employee questions and feedback regarding the work activity documented on form found on Attachment B.
  2. Weekly Toolbox Meetings of approximately five (5) minutes duration shall be conducted at the job site by the various area/job foreman or superintendents for their specific crafts. These meetings shall emphasize the current construction operations and provide an opportunity for inspection of tools and personal protective equipment.
- D. The Subcontractor will document the daily and weekly toolbox meetings (date, topic, attendance, etc.) and provide a copy to FRA.
- E. The FRA Construction Coordinator will be notified of all job site ES&H meetings and may attend.

### **3.5 PERSONAL PROTECTIVE EQUIPMENT**

- A. 100% eye, head, hand, and foot protection – All construction workers and other personnel on the construction worksite shall wear at all times eye, head, hand, and foot protection that complies with the applicable ANSI Standards. The type of protective eyewear shall be selected as appropriate for the hazard.
- B. The Subcontractor shall furnish personal protective equipment (PPE) as required to reduce employee exposure to hazards when engineering and administrative controls are not feasible or effective in reducing hazard exposures. The minimum acceptable PPE for work on the Fermilab site are:
1. Hard hats shall be furnished by the Subcontractor and shall be worn in the construction work areas. Personnel working on construction activities or in the field shall also wear hard hats, brim facing forward or full brim style hard hat. Hard hats shall meet the ANSI Z89.1 standard as required by 29 CFR 1926.100 and bear the "Z89.1" designation. High voltage exposure work requires hard hats that meet the ANSI Z89.2 standard and bear the "Z89.2a" designation.
  2. Safety glasses with side shields shall be furnished by the Subcontractor and shall be worn in the construction work areas. Eye protection must meet the requirements of 29 CFR 1926.102. Safety glasses shall be ANSI approved and shall be marked with the ANSI "Z87.1" designation.
  3. Gloves that are impact-resistant and cut-resistant.

4. Clothing suitable for the work and weather conditions is required. In construction areas, the minimum shall be short (1/4 length) sleeve shirt, long trousers, and hard sole steel-toed leather work boots providing ankle protection. Canvas, tennis, or deck shoes are not permitted within the construction work area.
5. All personnel working on construction activities shall wear a ANSI Class II reflective, high visibility outer garment.
6. For underground excavation work activities, all personnel shall a carry cap lamp and emergency self-rescuer unit, as required per OSHA 1926.800.

### **3.6 FALL PROTECTION**

- A. All fall hazards equal to or greater than six (6) feet will have 100% fall protection for all Subcontractor and Sub-tier subcontractor employees.
- B. Exception: When climbing reinforcing steel walls. Fall protection is not required when climbing vertically; however, when traversing horizontally or performing work on reinforced steel walls, then 100% fall protection is required.

### **3.7 ELECTRICAL WORK**

- A. FRA will determine the Work that requires electrical work permits.
- B. The following sets forth the minimum acceptable requirements for work on electrical systems at Fermilab.
  1. All electrical work shall be performed in accordance with NFPA 70E, Standard for Electrical Safety in the Workplace.
  2. The Subcontractor personnel must be trained in Lockout/Tagout (LOTO) prior to participating in LOTO of hazardous energy sources and working on LOTO systems or equipment.
  3. The Subcontractor shall provide ground fault circuit interrupter protection for electric hand-held tools, portable generators, temporary electrical extension cords and other wiring, etc. The assured equipment-grounding program is not an acceptable alternative at Fermilab.
- C. All electrical tools and equipment brought onto the Fermilab site shall be Nationally Recognized Testing Laboratory (NRTL) and shall be used in accordance with their listings.

### **3.8 OXYGEN DEFICIENT HAZARDS (ODH)**

- A. Fermilab has policies and procedures governing work in ODH areas. The FRA Construction Coordinator will communicate specific requirements and work practices to the Subcontractor.
- B. All Subcontractor and Sub-tier subcontractor personnel who must enter designated ODH areas must have and display a level of medical fitness acceptable to FRA prior to entering those areas.
- C. FRA will assess the need for ODH training for Subcontractor personnel. If ODH training is necessary FRA will provide the trainer, free of charge.
- D. Oxygen monitoring equipment will be supplied to the Subcontractor personnel, as necessary. The Subcontractor is responsible for returning this equipment upon request or upon completion of the work.
- E. FRA will furnish emergency evacuation breathing equipment. Care, use, and the return of such equipment will be the responsibility of the Subcontractor.

**3.9 RADIATION PROTECTION**

- A. Fermilab has policies and procedures governing radiological work. The FRA Construction Coordinator will advise the Subcontractor of the requirements and work practices, if potential for radiation affects the work scope.
- B. FRA will assess the need for radiological training for Subcontractor personnel. If radiological training is necessary, FRA will provide the trainer, free of charge.
- C. Radiation dosimeters will be supplied to the Subcontractor personnel, as necessary. The Subcontractor is responsible for returning this equipment upon request or upon completion of the work.
- D. FRA will furnish protective clothing. Disposal of such clothing will be the responsibility of FRA.
- E. Prescribed procedures for material handling and segregation shall be followed explicitly. Potentially radioactive material must be surveyed prior to removal from site. The FRA Construction Coordinator shall coordinate this survey.
- F. The use of industrial radioactive testing sources is subject to monitoring and oversight by FRA based on the following:
  - 1. Nuclear density meters will be inspected at the construction site by Fermilab ES&H personnel. Review for Department of Transportation compliance with survey and inspection requirements will be completed at that time.
  - 2. When required by specification, Subcontractor use of radiography sources will require five (5) business days' advance notice to the FRA Construction Coordinator. During this time, the Subcontractor shall submit to the FRA Construction Coordinator documentation showing the Subcontractor's Nuclear Regulatory Commission or Agreement State license for the material.
  - 3. When the source is brought to the Fermilab site, FRA ES&H staff will meet the Subcontractor, escort him/her to the construction site, and monitor the use of the source during the testing activity.
  - 4. Any work with radiography will occur outside normal business hours.

**3.10 ENVIRONMENTAL PROTECTION**

- A. All work on the Fermilab site shall comply with all applicable environmental executive orders, laws, regulations, and permits. All Subcontractors and Sub-tier subcontractors shall conduct their activities in an environmentally sound manner that limits the risks to the environment and protects the public health. The following sets forth the minimum acceptable requirements for environmental protection at Fermilab:
  - 1. Refer to Section 1.12 of this document for the Soil Erosion and Sedimentation Control (SESC) requirements for this Project.
  - 2. The Subcontractor shall install all erosion control in accordance with SESC plan prior to the start of excavation activities.
  - 3. Excavation at or adjacent to streams' tributaries, wetlands, or other surface waters shall be done only after notification to the FRA Construction Coordinator.
  - 4. The FRA Construction Coordinator will inform the Subcontractor if any wetlands are present in the work area and what protective measures are necessary.
  - 5. Unexpected environmental impacts shall be immediately reported to the FRA Construction Coordinator and mitigated by the Subcontractor.
  - 6. Flammable and/or combustible liquids, fuels, and oils shall be provided with containment and shall not be stockpiled beyond one day's usage. Storage of these materials, plus maintenance and fueling areas used by the Subcontractor, shall be properly graded, and

- maintained and shall be located a minimum of 100 feet away from a wetland or water body boundary so that adverse effects on the environment are eliminated.
7. The Subcontractor shall make routine inspections to assure that all motorized equipment is free of leaks of petroleum and other toxic or hazardous materials. The Subcontractor shall keep sufficient cleanup supplies on hand (e.g. oil dry, absorbent booms, etc.) to contain/absorb any spill or leak of fuels, oils, etc. that could potentially leak from their equipment. If a spill or leak should occur, the Subcontractor should immediately take appropriate steps to contain spills, move equipment out of sensitive areas (near wetland or water body) and immediately notify the FRA Construction Coordinator.
  8. At the close of each workday, the Subcontractor's Field Superintendent shall inspect the complete construction site to ensure that all erosion controls, drainage patterns, excavations and staging areas are in environmentally sound condition for the weather conditions anticipated.

### **3.11 TEMPORARY HEATING DEVICES**

- A. Open burning, fire barrels, coal or kerosene type salamanders, or open flame heating devices that have exposed fuel below the flame are not allowed on the Fermilab site.
- B. Temporary heating devices shall be coordinated through the FRA Construction Coordinator

### **3.12 SMOKING**

- A. Smoking including tobacco products and electronic smoking devices are prohibited in locations where flammable and/or combustible materials are stored. "No smoking" signs shall be posted in these areas.
- B. Smoking including electronic smoking devices are prohibited in all Fermilab buildings except in designated areas.

### **3.13 FUEL STORAGE TANKS**

- A. Above ground fuel storage tanks for equipment or vehicles shall not be permitted on the Fermilab site.
- B. Fuel tanks mounted on pick-up trucks shall conform to the requirements of the Illinois State Fire Marshall's Office.
- C. Fuel tanks mounted on pick-up trucks shall be removed from the Fermilab site at the end of each workday.
- D. Refueling of equipment while the motor is running is prohibited.
- E. During refueling from truck-mounted fuel tanks or with portable fuel cans, etc., a 10-pound (minimum) A-B-C dry chemical fire extinguisher must be present.
- F. Maintenance and fueling areas used by the Subcontractor shall be properly graded and maintained and shall be located a minimum of 100 feet away from a wetland or water body boundary to avoid adverse effect on the environment.

### **3.14 EXPLOSIVES**

- A. The use of explosives is not permitted without prior written approval of Fermilab.

### 3.15 VEHICLES AND EQUIPMENT

- A. The following sets forth the minimum acceptable requirements for vehicles and equipment at Fermilab:
1. Operators must have an appropriate, valid driver's license when operating vehicles on site. Seat belts are required to be provided and worn for the operators and passengers of all vehicles.
  2. All vehicles and mobile powered equipment, except automobiles and pickup trucks, shall have reverse signal alarms (a.k.a. backup alarms) audible above the surrounding noise level. If backup alarms are not present on the equipment, a spotter (other than the driver of the vehicle) must be present to warn pedestrians and the drivers of other moving equipment.
  3. If required by the equipment manufacturer, roll over protection structures shall be provided.
  4. Personnel lifts must be equipped with audible motion alarms. These alarms must be in operation and audible over the surrounding ambient noise when the lift is in use. Additionally, all lifts require two distinct actions in order to make the lift move in a forward or backward direction or in an upward or downwards direction. A foot pedal is considered one of the actions if independent of the other controls.
  5. The equipment manufacturer must approve any modifications to lifting and hoisting equipment.
  6. All hand and power tools must be checked prior to use on each shift to assure that they are maintained in a safe condition. Any deficiencies shall be repaired, or defective parts replaced, before continued use.
- B. Equipment inspection and modification (The Subcontractor shall comply with 29 CFR 1926.600, Subpart O):
1. The Subcontractor must inspect all heavy equipment before use on site, prior to use on each shift, and during use to make sure it is in safe operating condition. Defective equipment shall be removed from service.
  2. The Subcontractor is to assure that regulatory inspection records are complete and up-to-date and that operating manuals are available.
  3. In no case shall the original safety factor of the equipment be reduced.
  4. All tools and equipment brought on site by the Subcontractor are subject to inspection by FRA. Items found to be damaged or out of compliance shall be repaired or immediately removed from service and tagged out of service.

### 3.16 CONCERN REPORTING PROCESS

- A. Whistleblower Protection for Subcontractor Employees
1. The Subcontractor shall comply with the requirements of the "DOE Contractor Employee Protection Program" at 10 CFR Part 708.
  2. The Subcontractor shall insert or have inserted the substance of this clause, including this paragraph (b), in Sub-tier subcontracts, at all tiers, with respect to work performed on any construction worksite at a DOE-owned or leased facility, as provided for at 10 CFR part 708.
  3. Concern Reporting Processes - Subcontractor employees on the worksite are entitled to use any of the means available to communicate concerns about ES&H conditions and practices. Information about concern reporting is available on ES&H bulletin boards throughout Fermilab and shall be included with FRA provided materials for the worksite postings for this Project. The options for reporting concerns include:
    - a. DOE Concern Reporting:
      - 1) Telephone: (630) 840-3281
      - 2) Email: [EmployeeConcerns@science.doe.gov](mailto:EmployeeConcerns@science.doe.gov)

**3.17 PROJECT BULLETIN BOARD**

- A. Subcontractor is responsible for installing and maintaining a safety bulletin board at the location where the majority of the Subcontractor's employees, Sub-tier subcontractors, report to work. Information shall include:
  - 1. DOE Worker Safety and Health Poster DOE-F 5480.2 (Worker Rights), furnished by FRA. Spanish versions of the DOE Safety and Health Poster are also available from FRA upon request.
  - 2. DOE Occupational Safety and Health Complain Form 5480.4, available on-line.

**3.18 JOBSITE SAFEGUARDS**

- A. Housekeeping shall be maintained on a daily basis. The Subcontractor shall plan, organize, layout, and maintain the worksite area in a manner to insure an environmentally healthful working area.
- B. All areas of the worksite area shall be kept clear of debris, rubbish, and other materials that could cause tripping or falling conditions. The use of caution construction tape, barricades, and signage shall comply with ANSI Z535 series.
- C. The Subcontractor shall be responsible for providing and implementing the necessary precautions to safeguard material and equipment at the Project site.
- D. Food waste shall be removed daily from all construction sites to avoid attracting wildlife.
- E. In the event of theft or damage to Subcontractor property, Fermilab property, and/or Government property, the Subcontractor shall immediately notify Security Dispatch by telephone (630) 840-3414 and FRA Construction Coordinator.

**3.19 EMERGENCY EGRESS AND SEVERE WEATHER**

- A. The following sets forth the minimum acceptable requirements for emergency egress and severe weather protection at Fermilab:
  - 1. All emergency egress routes shall be kept clear at all times.
  - 2. Severe weather shelter locations and specific evacuation procedures will be provided by the FRA Construction Coordinator.
  - 3. The Subcontractor shall communicate egress routes and severe weather shelter to their employees and all Sub-tier subcontractors.

**3.20 WORK COMPLETION AND CLEAN UP**

- A. All work and clean-up operations shall be in compliance with the Subcontractor's ES&H Plan.
- B. Requested documentation for all aspects of the ES&H program shall be complete and submitted prior to Subcontract close-out.

**END OF SECTION 01 31 00**

**ATTACHMENT A  
SILICA GUIDANCE**

- 1 Purpose: To protect employees, subcontractors, sub-tier subcontractors, the public, environment, and property from the detrimental effects of dust and respirable crystalline silica generated by construction, restoration, and maintenance activities.
- A. As required by 29 CFR 1926.1153, subcontractors must have a written silica exposure control plan. The plan shall be submitted to Fermi Research Alliance, LLC (FRA) and include:
    - i. Tasks performed that involve exposure to respirable crystalline silica.
    - ii. Engineering controls, work practices and respiratory protection used to limit employee exposure to respirable crystalline silica.
    - iii. Housekeeping measures used to limit employee exposure to respirable crystalline silica.
    - iv. Procedures used to restrict access to work areas to minimize the number of employees exposed to respirable crystalline silica.
  - B. FRA and its subcontractors are required by law, 10 CFR 851, to comply with the American Conference of Governmental Industrial Hygienists (ACGIH) threshold limit value (TLV) of 0.025 mg/m<sup>3</sup> for an 8-hour time-weighted average (TWA).
  - C. Subcontractors must comply with the requirements outlined in the Guidance for Silica Work table at the end of this Appendix unless the subcontractor has air monitoring data or other objective data sufficient to accurately characterize employee exposures to respirable crystalline silica.
- II. Controls: In all cases, engineering controls that reduce dust at the source where it is being generated shall be the control of choice. The Subcontractor must document how that determined that controls are valid.
- A. Safety and Effectiveness of Dust Control Systems
    - i. Procedures shall be implemented to ensure that dust control systems maintain their effectiveness for dust reduction throughout the work activity.
    - ii. Dust control system shall be installed, operated, and maintained in accordance with manufacturer recommendations when there are such.
    - iii. When electrical tools are used with water as dust control system, it shall be done in accordance with applicable requirements of electrical safety.
    - iv. Respirators shall be worn until effectiveness of dust control system are proven through industrial hygiene monitoring.
  - B. Dust Collection/Management
    - i. Dust shall be contained and disposed of in bags that can effectively hold dust without breaking.
    - ii. Work surfaces and clothing shall be cleaned with vacuums and not by dry sweeping or the use of compressed air.
    - iii. Respirators shall be worn when changing out bags or handling dust.
- III. Evaluating the Effectiveness of Controls
- A. As soon as possible after the beginning of cutting or grinding tasks, the Subcontractor shall conduct personal air monitoring or workers performing the cutting/grinding work activities. An industrial hygienist shall perform the monitoring and must be consulted prior to the execution of work.

- B. Once initial monitoring is performed to assure the effectiveness of controls, then work activities can continue without additional monitoring.
  - C. The Subcontractor shall conduct daily visual inspections of the site for the presence of visible dust that appears during grinding and cutting work activities. The presence of such dust is a sign that the controls are not performing as intended.
  - D. A copy of the monitoring results/report shall be submitted to FRA.
- IV. Training: Operations include using powered tools or equipment to cut, grind, core, or drill concrete or masonry materials, and the following training is required:
- A. Proper use and maintenance of dust reduction systems, including the safe handling and disposal of waste materials collected with their use.
  - B. The importance of good personal hygiene and housekeeping practices when working in proximity to dust from concrete and masonry materials including: not smoking tobacco products including e-cigarettes, appropriate methods of cleaning up before eating, and appropriate methods of cleaning clothes.
  - C. Have training, medical evaluation, and fit-test documentation/records on site for workers that are using respirators.

GUIDANCE FOR SILICA WORK -				
Type of Work	8-hour Duration/Scope	Location (general)	Required Controls*	Notes
Grout/mortar mixing	≤ 7 bags	Inside or Outside	D	Keep employees upwind of dust when outdoors.
Grout/mortar mixing	> 7 bags	Inside or Outside	A, C, D	
Shoveling sand	Any	Outside	B	Keep employee upwind of dust when outdoors
Hole drilling ≤ 1/4 in diameter	< 4 holes	Inside or outside	None	Use HEPA vacuum for housekeeping (no sweeping)
Hole drilling ≤ 1/4 in diameter	> 4 holes	Inside or outside	A or B	Use HEPA vacuum for housekeeping (no sweeping)
Hole drilling > 1/4 in diameter	Any	Inside or outside	A or B	B is for horizontal surfaces only
Coring	Any	Inside or Outside	B	Respirator required if using HEPA vacuum
Saw cutting - chop saw	Any	Inside or Outside	B, C, D	
Saw cutting - hand held saw	< 1 linear ft.	Outside	B, C, D	
Saw cutting - hand held saw	> 1 linear ft.	Outside	B, C, D	
Saw cutting - walk behind saw type equipment	Any	Outside	B, C, D	
Surface finish	Any	Inside or outside	A, C or B, C, & D	
Joint compound sanding	> 1 linear ft.	Inside or outside	A, C, D	Some new joint compounds are silica free

Tuck Pointing/Grout repair - Hand tools	Any	Inside or outside	B, D	
Tuck Pointing/Grout repair - Power tools	Any	Inside or outside	A, C, D	
Jack Hammering	Any	Outside	B, C, D	
Concrete Demolition using Heavy Equipment (enclosed cab)	< 4 continuous hours	Outside	B, C	Sprayer must wear respirator or contact IH through Construction Coordinator
Concrete Demolition using Heavy Equipment (enclosed cab)	> 4 continuous hours	Outside	B, C	Sprayer and operator must wear respirator or contact IH through Construction Coordinator
*Controls - NOTE: OTHER PPE WILL BE REQUIRED FOR ADDITIONAL HAZARDS				
A = Manufacturer's local exhaust ventilation on tool or HEPA Vacuum at Point of Operation				
B = Water to eliminate visible dust				
C = Respirator with P100 HEPA and face piece scaled for anticipated exposure				
D = First aid flush of eye contamination				

## ATTACHMENT B

### Daily Work Planning

Project: \_\_\_\_\_  
Subcontractor \_\_\_\_\_

Work Location: \_\_\_\_\_  
Date: \_\_\_\_\_

#### Permits Required

- None
- Penetration Permit
- Excavation Permit
- Confined Space Entry Permit
- Hot Work Permit-Fire (flame or sparks)
- Radiological Work Permit
- Traffic Control Plan
- Hoisting and Rigging Plan
- Electrical Work Plan
- Energy Isolation Plan
- Elevated Surface Work Plan
- Pressure Test Plan
- Other

\_\_\_\_\_  
 Other

#### Required Inspections

- Excavation / shoring inspection
- Heavy equipment inspection
- Fall protection
- Scaffolding
- Rigging
- Other

\_\_\_\_\_  
 Other

#### Discussion & Review Checklist

- What activities will be performed today?
- Are there any modified or different activities or equipment being used today?
- Do all workers have adequate PPE for working on the site and during their individual activities?
- Have high-hazard activities been identified and evaluated and have controls been established?
- Has relevant information from the HA(s) been included in today's work plan and discussion?
- Do all workers understand Fermilab's safety expectations, including stop work?
- Is the construction area organized and free of trip hazards and debris?
- Have all work activities been identified and coordinated between all Sub-subcontractors?
- Will weather conditions impact safety or any work being performed today?
- Are there any hazardous waste containers or bins needed for today's work?
- Are all required permits and plans submitted and approved for today's work?
- Is access by non-construction personnel to all construction areas controlled?
- Are all workers qualified for the tasks that they will perform today?
- Have first aid and emergency resources / procedures been identified?
- Do all workers understand the entire scope of work that will be performed on site today?
- Other: \_\_\_\_\_
- Other

#### Notes:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



ATTACHMENT C



## Construction Environmental, Safety & Health Certification (CESHC)

### INSTRUCTIONS

This Construction Environmental, Safety & Health Certification (CESHC) is required for each construction project at DOE's Fermi National Accelerator Laboratory site (Fermilab). See Technical Specification 013100 for further information.

This document is a template for the CESHC designed to assist construction subcontractors in describing project conditions and developing project-specific hazards and controls information. The CESHC template is available in electronic format to facilitate editing.

The prime subcontractor may *either* flow down this requirement to each of its subcontractors; or serve as a control and coordination point, requiring all subcontractors' activities to be conducted under the prime subcontractor's solitary CESHC.

Subcontractors must submit the completed CESHC to the FRA Procurement Office, which will distribute the document for review and concurrence by the FRA ES&H and Project Management teams prior to work commencing. The CESHC is intended to be a living document, which may be updated as necessary throughout a project as information changes or as the project progresses (e.g. – as additional Task/trade Hazard Analyses are developed, subcontractors added, etc.).

All of the sections in are required to be completed for each construction project, regardless of the size or complexity. Enter information in all of the fill-in blocks that are applicable. For those that are not applicable, enter "N/A" or other suitable explanation.

### PROJECT GOVERNANCE / EMERGENCY INFORMATION

#### Section 1 – Project Description and Emergency Contacts

Fill in the names and telephone numbers of the contact personnel for this particular project. In accordance with Title 10 of the *Code of Federal Regulations*, Part 851 (10 *CFR* 851), the Subcontractor must have a designated on-site safety representative who is knowledgeable of the project's hazards and has the authority to correct unsafe conditions or behavior. This is either the Field Superintendent or a designated Subcontractor's Safety Representative as delineated in Technical Specification 010010. Attach the qualifications of your safety representative's resume' for this project. If you have subcontractors performing work on this project, list their contact information. Update as necessary throughout the project.

#### Section 2 – Subcontractor Policy Statement

Enter your Company's health and safety policy statement. At minimum, your policy should include:

- Specify if Subcontractor's ES&H Program is required and if a dedicated Subcontractor Safety Representative is required.
- Specify if a Quality Control Plan (Reference Technical Specification 010010 if a dedicated Quality Control Representative is required.
- A statement if occupational exposure monitoring is required and if so, that it complies with 10 CFR 851.
- Specify what occupational (industrial hygiene sampling) monitoring may be required.

#### Section 3 – 10 CFR 851 Acknowledgement

Because Fermilab is a Department of Energy site, your company must meet the Department of Energy requirements of Title 10, *Code of Federal Regulations*, Part 851, "Worker Safety and Health Program" ([Link to 10 CFR 851](#)). It is your responsibility to ensure you have read and understand the actual regulatory requirements. Specify medical surveillance and qualifications. This may include Occupational exposure monitoring.



(Project Name)  
(Subcontractor's Name)

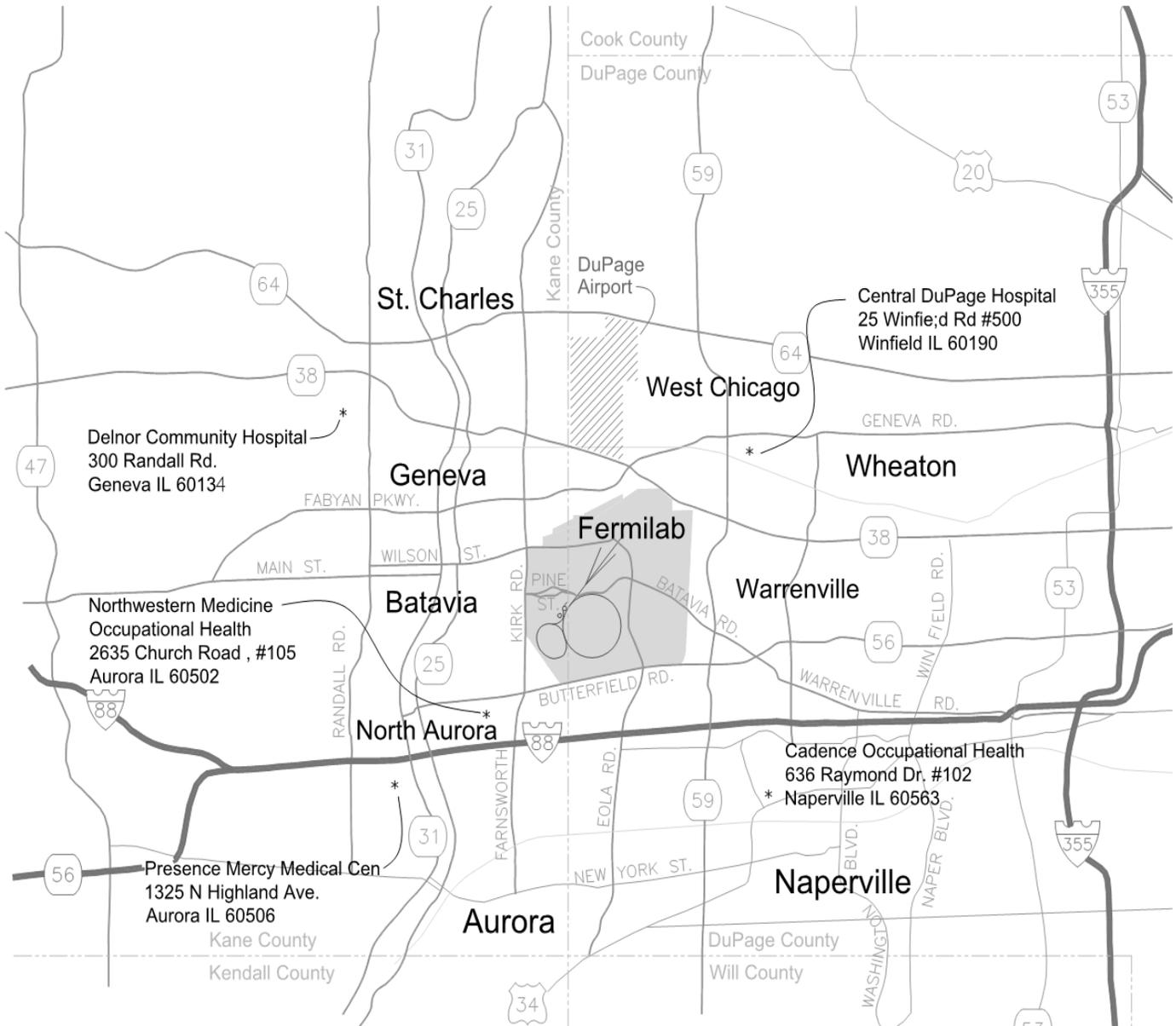
Construction Environmental, Health & Safety Certification

SECTION 1 - PROJECT DESCRIPTION & EMERGENCY CONTACTS			
Subcontract / Project Number	Enter subcontract and/or task order number		
Project Start / End Dates	Start:	Complete:	
Project Location	Enter the work location(s) at Fermilab		
Scope of Work	Enter breakdown and description of work activities		
FOR ALL EMERGENCIES CALL:			
Fermilab Emergency Contact number: x3131 - or - (630) 840-3131 from a cell phone.			
For all incidents, injuries, property damage, near-misses, work-induced illness or chemical over-exposures, the following personnel MUST be immediately contacted upon scene stabilization, but in all cases within one hour:			
PROJECT TEAM & PERSONNEL CONTACT INFORMATION			
Subcontractor Project Manager	Enter the name of subcontractor Project Manager	Enter number: xxx-xxx-xxxx	Enter: user@domain
Subcontractor Site Superintendent	Enter the name of subcontractor's Site Superintendent	Enter number: xxx-xxx-xxxx	Enter: user@domain
Subcontractor Health & Safety Representative **	Enter the name of subcontractor health & safety representative	Enter number: xxx-xxx-xxxx	Enter: user@domain
Subcontractors - Company Name	Name of Designated Safety Representative **	Phone Number	
Enter Subcontractor company name	Enter name of individual**	Enter number: xxx-xxx-xxxx	
Enter Subtier company name	Enter name of individual**	Enter number: xxx-xxx-xxxx	
Enter Subtier company name	Enter name of individual**	Enter number: xxx-xxx-xxxx	
<i>** If required, attach a description of qualifications, or resume', for each Safety Representative per Technical Specification 010010.</i>			

CESHC REVIEWS		
Reviewed & Approved by: (Subcontractor)	CESHC Reviewed & Accepted by: (FRA)	CESHC Reviewed & Accepted by: (FRA)
Enter Subcontractor - Company Officer	Enter Fermilab Name	Enter Fermilab Project ESH&Q Name
Signatures and dates		

A location map and address of the Subcontractor's occupational medical facility Hospital Route is attached to this CESH Plan and posted at the work site.

*FRA has identified several medical facilities. Highlight on the map the appropriate subcontractor designated facility. If the subcontractor would like to use another or different facility, please include map and address location of facility.*





SECTION 2a – Subcontractor's ES&H Program		
2a Subcontractor's ES&H Program Required See Technical Specification 013100, Article 1.9	<input type="checkbox"/>	Yes <input type="checkbox"/> No
2b Dedicated Subcontractor Safety Representative required, see Technical Specification 010010 (If yes, Subcontractor Safety Representative resume' required, reference Article 1.5)	<input type="checkbox"/>	Yes <input type="checkbox"/> No

SECTION 2b – Subcontractor's Quality Control Plan (Program) if Section 014100 is required		
2c Subcontractor's Quality Control Plan (Program) Required	<input type="checkbox"/>	Yes <input type="checkbox"/> No
2d Dedicated Subcontractor Quality Control Representative required	<input type="checkbox"/>	Yes <input type="checkbox"/> No

Section 2c - Occupational Exposure Monitoring and Qualifications			
Occupational Exposure Monitoring	Will you be using materials or engaging in an activity that potentially may produce occupational exposures at 10 to 50% of the occupational exposure limits? (e.g., silica, hexavalent chromium, lead, etc.) Reference Section 10 for additional information.	Yes	No
		<input type="checkbox"/>	<input type="checkbox"/>
If yes, you will need to:			
1. Comply with 10 CFR 851, Appendix A, Section 6.			
2. Provide your industrial hygiene provider contact information.			
Certified Industrial Hygienist (CIH) or IH Technician under the supervision of a CIH.	.Enter the name and address of your company's IH provider for this project		

Section 2d - Industrial Hygiene Sampling		
Yes	No	
<input type="checkbox"/>	<input type="checkbox"/>	Asbestos
<input type="checkbox"/>	<input type="checkbox"/>	Asphalt fumes
<input type="checkbox"/>	<input type="checkbox"/>	Diesel Exhaust
<input type="checkbox"/>	<input type="checkbox"/>	Fiberglass Insulation
<input type="checkbox"/>	<input type="checkbox"/>	Hexavalent Chromium
<input type="checkbox"/>	<input type="checkbox"/>	Lead
<input type="checkbox"/>	<input type="checkbox"/>	Naphtha (Coal Tar)
<input type="checkbox"/>	<input type="checkbox"/>	Noise
<input type="checkbox"/>	<input type="checkbox"/>	Non-Ionizing Radiation
<input type="checkbox"/>	<input type="checkbox"/>	Silica
<input type="checkbox"/>	<input type="checkbox"/>	Solvents
<input type="checkbox"/>	<input type="checkbox"/>	Temperature Extremes (Heat or Cold)
<input type="checkbox"/>	<input type="checkbox"/>	Welding, Cutting & Brazing



<input type="checkbox"/>	<input type="checkbox"/>	Other: (List...)
--------------------------	--------------------------	------------------

SECTION 3 - ACKNOWLEDGMENT of 10 CFR 851			
As a subcontractor to FRA, while your workers are physically located at Fermilab you must meet the requirements of Title 10, <i>Code of Federal Regulations</i> , "Energy", Part 851, "Worker Safety and Health Program" (10 CFR 851). As such, you must be aware of, and comply with, the requirements of this regulation. ( <a href="#">Link to 10 CFR 851</a> )			
Acknowledgment	I, (the author of this CEHSP), certify that that I have read the requirements of 10 CFR 851 and attest that my firm and its sub-tier contractors will comply with the requirements of 10 CFR 851.	Yes	No
		<input type="checkbox"/>	<input type="checkbox"/>
MEDICAL SURVEILLANCE AND QUALIFICATION			
Occupational Medicine	Will you have any employees that will work on-site at Fermilab for 30, eight-hour days in a 12-month period, or are enrolled for any length of time in a medical or exposure monitoring program required by federal, state, or local regulations (including hearing conservation, respiratory protection, lead exposure)?	Yes	No
		<input type="checkbox"/>	<input type="checkbox"/>
If yes, you will need to:			
1. Comply with the occupational medicine requirements of 10 CFR 851, Appendix A			
2. Provide your occupational medicine provider contact information			
Clinic / Physician	Enter the name and address of your company's occupational medicine provider for this project	Enter telephone number: xxx-xxx-xxxx	Enter e-mail address: user@domain
Required Medical Surveillance		Task-specific medical testing	
<input type="checkbox"/> DOT/Commercial Vehicle <input type="checkbox"/> Blood Lead <input type="checkbox"/> Hearing Conservation <input type="checkbox"/> Respirator User <input type="checkbox"/> Fit for Duty <input type="checkbox"/> Other(s) List other(s) <input type="checkbox"/> Substance Abuse Testing		List specific task(s) requiring medical surveillance	

ATTACHMENT D



Hazard Analysis Cover Sheet

Job Title \_\_\_\_\_

Job Location \_\_\_\_\_

Subcontract/Work Order/Release # \_\_\_\_\_

<u>Subcontractor or Sub-tier</u>	<u>Fermilab</u>
Company _____	Project Eng/C.M. _____
Project Manager _____	Phone _____
Phone _____	TM/CC/SC _____
ESH Rep. _____	Phone _____
Phone _____	ES&H Rep. _____
	Phone _____

Description of Work: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



Prepared by (print & sign): \_\_\_\_\_

Date \_\_\_\_\_

Accepted by (print & sign): \_\_\_\_\_

Date \_\_\_\_\_

	Yes	No
Does this task impact other Divisions or work groups? <i>If yes, how are they notified?</i> _____		
Do site utilities need to be shut down & locked out? <i>If yes, attach lockout/tagout plan.</i>		
Is a J.U.L.I.E. (utility locate) required prior to the start of work?		

**PPE & RISK HAZARD ASSESSMENT** – Activities that include the following PPE or risks may require safety planning & training documentation beyond what can be completed in the Hazard Analysis/Pre-Task Plan

<input type="checkbox"/> Fall exposures >4 feet (>6 for construction)*	<input type="checkbox"/> Excavations >4 feet	<input type="checkbox"/> Confined space entry*
<input type="checkbox"/> Energized electrical work (requires LOTO or <a href="#">EWP</a> )*	<input type="checkbox"/> Welding/Cutting/Brazing ( <i>req. permit/fire watch</i> )*	<input type="checkbox"/> Overexertion or Repetition
<input type="checkbox"/> Lockout/Tagout (LOTO) activities*	<input type="checkbox"/> Welding on stainless steel*	<input type="checkbox"/> General Demolition
<input type="checkbox"/> High pressure air/fluids*	<input type="checkbox"/> Rotating equipment	<input type="checkbox"/> Ergonomic issues
<input type="checkbox"/> Ladder use	<input type="checkbox"/> Working above others	<input type="checkbox"/> High noise levels
<input type="checkbox"/> Scaffold erection*	<input type="checkbox"/> Traffic controls	<input type="checkbox"/> Potential oxygen deficiency*
<input type="checkbox"/> Scaffold Use	<input type="checkbox"/> Fork lift operations*	<input type="checkbox"/> Ionizing Radiation/Radioactive Material*
<input type="checkbox"/> Lead Work*	<input type="checkbox"/> Aerial boom lift*	<input type="checkbox"/> Nonionizing Radiation (e.g. Lasers, RF)*
<input type="checkbox"/> Chemical use ( <i>attach Safety Data Sheet</i> )	<input type="checkbox"/> Waste generation	<input type="checkbox"/> Critical crane lift(s)*
<input type="checkbox"/> Air emissions (including equipment/generators)	<input type="checkbox"/> Discharges to sanitary system	<input type="checkbox"/> Sandblasting
<input type="checkbox"/> Potential impact to storm water	<input type="checkbox"/> Use of refrigerants	<input type="checkbox"/> Steel erection
<input type="checkbox"/> Potential spill to the environment		<input type="checkbox"/> Work within 10' of overhead utilities
<input type="checkbox"/> Heavy equipment operation ( <i>e.g. crane, boom lift, excavator, etc.</i> )*		<input type="checkbox"/> Structural demolition
<input type="checkbox"/> Potential silica exposure(s) ( <i>concrete/asphalt cutting, drilling, etc.</i> )*		<input type="checkbox"/> _____
<input type="checkbox"/> Installation of underground power – temporary or permanent		<input type="checkbox"/> _____
<input type="checkbox"/> Biological hazards ( <i>e.g. Animal/Insect Bites/Stings, Mold, etc.</i> )		<input type="checkbox"/> _____
<b><i>PPE &amp; CONTROLS REQUIRED In Bold</i></b>		
<input checked="" type="checkbox"/> Hardhat	<input checked="" type="checkbox"/> Safety glasses	<input type="checkbox"/> Welding goggles/helmet
<input type="checkbox"/> Bump cap	<input type="checkbox"/> Safety goggles – chemical	<input type="checkbox"/> Arm – cut protection
<input type="checkbox"/> Steel-toed boots	<input type="checkbox"/> Safety goggles – impact/face shield	<input type="checkbox"/> Leg – cut protection
<input checked="" type="checkbox"/> Steel-toed shoes	<input type="checkbox"/> Hearing protection	<input type="checkbox"/> Whole body – electrical
<input type="checkbox"/> Gloves – leather	<input type="checkbox"/> Fall Protection _____	<input type="checkbox"/> Whole body – Dust, chemical, heat

<input type="checkbox"/> Gloves – chemical _____	<input type="checkbox"/> Respirators (air purifying), cartridge type: _____	<input type="checkbox"/> Danger tape & signage
<input type="checkbox"/> Gloves – electrical	<input type="checkbox"/> Respirators – supplied air	<input type="checkbox"/> Barricades – solid
<input checked="" type="checkbox"/> High visibility clothing	<input type="checkbox"/> Site dust control	<input type="checkbox"/> Barricades – soft (caution tape)
<input type="checkbox"/> Soil/erosion control	<input type="checkbox"/> Underground- cap lamp & self-rescuer	<input type="checkbox"/> _____
<input type="checkbox"/>		<input type="checkbox"/> _____

*\*Denotes Training and/or Competent and/or Qualified Person(s) required*





**SECTION 01 32 00 - CONSTRUCTION PROGRESS DOCUMENTATION****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
1. Preliminary construction schedule.
  2. Subcontractor's construction schedule.
  3. Construction schedule updating reports.
  4. Daily construction reports.
  5. Material location reports.
  6. Site condition reports.
  7. Special reports.
- B. Related Sections
1. Section 01 00 10 – General Requirements
  2. Section 01 29 00 – Payment Procedures
  3. Section 01 30 00 – Project Management and Coordination
  4. Section 01 33 00 - Submittals
  5. Section 01 41 00 – Quality Requirements

**1.2 DEFINITIONS**

- A. Definitions applicable to this Section include the following:
1. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.
    - a) Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
    - b) Predecessor Activity: An activity that precedes another activity in the network.
    - c) Successor Activity: An activity that follows another activity in the network.
  2. Cost Loading: The allocation of the schedule of values for the completion of an activity as scheduled. The sum of costs for all activities must equal the total Contract Sum unless otherwise approved by FRA.
  3. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.
  4. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.
  5. Event: The starting or ending point of an activity.
  6. Float: The measure of leeway in starting and completing an activity.
    - a) Float time is not for the exclusive use or benefit of either FRA or Subcontractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.
    - b) Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
    - c) Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.
  7. Resource Loading: The allocation of manpower and equipment necessary for the completion of an activity as scheduled.

8. Weather Day: When adverse weather prevents work on the project critical path construction activities for the majority of the planned work day as included in the day's schedule, including a weekend day or holiday if Subcontractor has scheduled construction activity that day.
9. Day: Unless otherwise noted, the use of the word "day" is calendar day.

### 1.3 INFORMATIONAL SUBMITTALS

- A. Format for Submittals: Submit required submittals in the following format:
  1. Working electronic copy of schedule file, where indicated.
  2. PDF electronic file.
- B. Preliminary construction schedule.
  1. Approval of cost-loaded, startup construction schedule will not constitute approval of schedule of values for cost-loaded activities.
- C. Preliminary Network Diagram: Of size required to display entire network for entire construction period. Show logic ties for activities.
- D. Subcontractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.
  1. Submit a working electronic copy of schedule, using software indicated, and labeled to comply with requirements for submittals. Include type of schedule (initial or updated) and date on label.
- E. CPM Reports: Concurrent with CPM schedule, submit each of the following reports. Format for each activity in reports shall contain activity number, activity description, cost and resource loading, original duration, remaining duration, early start date, early finish date, late start date, late finish date, and total float in workdays
  1. Activity Report: List of all activities sorted by activity number and then early start date, or actual start date if known.
  2. Logic Report: List of preceding and succeeding activities for all activities, sorted in ascending order by activity number and then early start date, or actual start date if known.
  3. Total Float Report: List of all activities sorted in ascending order of total float.
  4. Earnings Report: Compilation of Subcontractor's and each sub-tier subcontractor's total earnings from the Notice to Proceed until most recent Application for Payment.
- F. Construction Schedule Updating Reports: Submit with Applications for Payment.
- G. Daily Construction Reports: Submit at daily intervals or as requested by FRA. The daily construction report shall record the following information concerning events at Project site:
  1. List of sub-subcontractors at Project site.
  2. List of Separate Subcontractors at Project site.
  3. Approximate count of personnel at Project site.
  4. Equipment at Project site.
  5. Material deliveries.
  6. High and low temperatures and general weather conditions, including presence of rain or snow.
  7. Testing and inspection.
  8. Accidents.
  9. Meetings and significant decisions.
  10. Unusual events.
  11. Stoppages, delays, shortages, and losses.
  12. Meter readings and similar recordings.
  13. Emergency procedures.
  14. Orders and requests of authorities having jurisdiction.
  15. Change Orders received and implemented.
  16. Change Directives received and implemented.

17. Services connected and disconnected.
18. Equipment or system tests and startups.
19. Partial completions and occupancies.
20. Substantial Completions authorized.

- H. Material Location Reports: Submit at weekly intervals.
- I. Site Condition Reports: Submit at time of discovery of differing conditions.
- J. Special Reports: Submit at time of unusual event.
- K. Qualification Data: For scheduling consultant.

#### **1.4 QUALITY ASSURANCE**

- A. Scheduling Manager Qualifications:
1. Within 5 days of Notice of Award, the Subcontractor shall submit to FRA for approval their proposed Schedule Manager's qualifications in the form of a Resume. The Scheduling Manager shall not have less than 10 years of scheduling experience on projects of similar type and size using P6. Interviews may be required at the request of FRA.
  2. FRA reserves the right to approve or reject, at any time, the Subcontractor's Scheduling Manager or consultant.
- B. Prescheduling Conference: Within 15 days of Notice of Award, conduct conference at Project site to comply with requirements in Section 01 30 00 "Project Management and Coordination." Review methods and procedures related to the preliminary construction schedule and Subcontractor's construction schedule, including, but not limited to, the following:
1. Review software limitations and content and format for reports.
  2. Verify availability of qualified personnel needed to develop and update schedule.
  3. Discuss constraints, including work stages, interim milestones and partial FRA occupancy.
  4. Review submittal requirements and procedures.
  5. Review time required for review of submittals and resubmittals.
  6. Review requirements for tests and inspections by independent testing and inspecting agencies.
  7. Review Subcontractor's proposed schedule WBS, and resource and coding structures. FRA may require changes and additions to what is proposed by the Subcontractor for inclusion into future submittals. Examples of activity codes that may be required include responsibility, areas of work, phase of work, work category and contract changes.
  8. Review time required for Project closeout and FRA startup procedures.
  9. Review timeline for schedule submittals and procedures for updating schedule.

#### **1.5 COORDINATION**

- A. Coordinate Subcontractor's construction schedule with the schedule of values, list of subcontracts, submittal schedule, progress reports, payment requests, and other required schedules and reports.
1. Secure time commitments, in writing, from entities involved and provide to FRA upon request. This includes commitments when developing the Initial Construction Schedule and all modifications, recovery and update schedules.
  2. Coordinate each construction activity in the network with other activities and
  3. schedule them in proper sequence.

**PART 2 - PRODUCTS****2.1 SUBCONTRACTOR 'S CONSTRUCTION SCHEDULE, GENERAL**

- A. Computer Scheduling Software: Prepare schedules using current version of a program that has been developed specifically to manage construction schedules.
1. Use Primavera P6 for current Windows operating system.
- B. Time Frame: Extend schedule from date established for the Notice to Proceed to date of final completion.
1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.
  2. Contractually specified interim completion dates shall be constrained to show negative float if the calculated early finish date of the last activity in that phase is later than the specified interim completion date
- C. Activities: Develop the Project Schedule to an appropriate level of detail. Failure to develop the Project Schedule to an appropriate level of detail, as determined by FRA, will result in its disapproval:
1. Activity Duration: Define activities so no activity is less than 5 workdays or longer than 1 reporting period, unless specifically allowed by FRA.
  2. Procurement Activities: Include procurement process activities for long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
  3. Submittal Review Time: Include review and resubmittal times indicated in Section 01 33 00 "Submittal Procedures" in schedule. Coordinate submittal review times in Subcontractor's construction schedule with submittal schedule. Provide multiple submittal cycles for those submittals that normally require more than one review cycle.
  4. Startup and Testing Time: Prior to Substantial Completion, include no fewer than 15 workdays for startup and testing of each major system. Startup and testing time is owned by the Subcontractor.
  5. Commissioning Time: Prior to Substantial Completion, include no fewer than 30 workdays for commissioning for each major system. Commissioning time is owned by FRA.
  6. Substantial Completion: Indicate completion in advance of date established for Substantial Completion and allow time for FRA's administrative procedures necessary for certification of Substantial Completion.
  7. Punch List and Final Completion: Include not more than 30 calendar days for completion of punch list items and final completion.
- D. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule and show how the sequence of the Work is affected.
1. Work under More Than One Contract: Include a separate activity for work performed by each individual sub-tier subcontractor. Do not bundle work of more than on sub-tier subcontractor into a single activity.
  2. Work by FRA: Include a separate activity for each portion of the Work performed by FRA or is the responsibility of FRA
  3. Products Ordered in Advance: Include a separate activity for each product. Include delivery date indicated in Section 01 10 00 "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
  4. Work Restrictions: Show the effect of the following items on the schedule:
    - a) Coordination with existing construction.
    - b) Limitations of continued occupancies.
    - c) Uninterruptible services.
    - d) Seasonal variations.
    - e) Environmental control

- f) FRA accelerator shutdown schedule
  5. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:
    - a) Subcontract awards.
    - b) Submittals.
    - c) Purchases.
    - d) Fabrication.
    - e) Sample testing.
    - f) Deliveries.
    - g) Installation.
    - h) Tests and inspections.
    - i) Adjusting.
    - j) Curing.
    - k) Startup and placement into final use and operation.
  6. Construction Areas: Identify each major area of construction for each major portion of the Work. Indicate where each construction activity within a major area must be sequenced or integrated with other construction activities to provide for the following:
    - a) Structural completion.
    - b) Shutdown start.
    - c) Shutdown completion.
    - d) Building dry-in
    - e) Completion of mechanical installation.
    - f) Completion of electrical installation.
    - g) Substantial Completion.
  7. Other Constraints:
    - a) Availability of surface and laydown space.
    - b) Coordination with work of other project scopes on site.
    - c) Scheduled and unscheduled facility operations.
  8. Activity Calendars
    - a) Schedule activities on a calendar to which the activity logically belongs. Activities may be assigned to a 7-day calendar when the contract assigns calendar day durations for the activity such as an FRA Acceptance activity.
    - b) If the Subcontractor intends to perform physical work less than seven days per week, schedule the associated activities on a calendar with non-work periods identified including weekends and holidays.
    - c) Assign the Category of Work Code - Weather Sensitive Installation to those activities that are weather sensitive as otherwise addressed in this contract. Original durations must account for anticipated normal adverse weather, as defined by NOAA, in the vicinity of construction project. FRA will interpret all work periods not identified as non-work periods on each calendar as meaning the subcontractor intends to perform work during those periods.
- E. Cost Correlation: Superimpose a cost correlation timeline, indicating planned and actual costs. On the line, show planned and actual dollar volume of the Work performed as of planned and actual dates used for preparation of payment requests. Activity cost loading shall be reasonable, as determined by FRA.
- F. Project Status Narrative Report: With each schedule submittal, provide a written narrative project status report. The narrative report is expected to communicate to FRA the Subcontractor's thorough analysis of the schedule output and its plans to compensate for any problems, either current or potential, which are revealed through that analysis. The report is to describe the Subcontractor's approach to the work, critical resource utilization, any special problems or assumptions underlying the CPM schedule including but not limited to:
1. Progress made on critical activities and explanations for any lack of work on critical activities planned to be performed during the last update period.
  2. Status of Major material and equipment submittals and procurements, highlighting long-lead items.

3. Value of materials and equipment stored at the site but not yet incorporated into the work-in-place.
  4. Delays encountered during the reporting period.
  5. Describe and justify changes in the critical and nearest to near critical paths.
  6. The Subcontractor shall explain all schedule variances and mitigation measures.
  7. The Subcontractor shall limit the use of logic other than Finish-Start and lags. When used, the Subcontractor shall explain the use of each logic tie that is not Finish-Start and the use of any lags. FRA reserves the right to reject the use of non-standard logic and lags.
  8. Describe and justify any changes to the logic, lags and durations from the last approved project schedule. All such changes are subject to approval by FRA.
  9. Identify activities that have progressed before all preceding logic has been satisfied (Out-of-Sequence Progress). These activities will be allowed only on a case-by-case basis subject to approval by FRA.
  10. In the narrative report, include a matrix with column headings for project completion and interim completion milestones and other project milestones as determined by FRA: Activity ID; Description; Baseline Start/Finish; Previous Month Start/Finish; Current Month Start/Finish; Actual Start/Finish.
- G. Upcoming Work Summary Narrative: Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update. Summarize the following issues:
1. Unresolved Issues.
  2. Unanswered Requests for Information.
  3. Rejected or unreturned submittals.
  4. Notations on returned submittals.
  5. Pending modifications affecting the Work and Subcontract Time.
  6. List of Critical and Near Critical activities scheduled to be performed within the next updates period.
- H. Recovery Schedule: When periodic update indicates the Work is 7 or more calendar days behind the current approved schedule, including delays to all interim and the final completion milestones or if the critical and near-critical activities exceeds 35% of all remaining activities, the Subcontractor shall, if requested by FRA, submit a separate recovery schedule and narrative within ten (10) days of the request, indicating means by which Subcontractor intends to regain compliance with the schedule, without additional cost to FRA. Indicate and describe changes to working hours, working days, crew sizes, and equipment required to achieve compliance, and date by which recovery will be accomplished.

## 2.2 PRELIMINARY CONSTRUCTION SCHEDULE

- A. The Preliminary Project Schedule forms the basis for the Initial Construction Schedule submittal specified herein and must include all of the required Plan and Program preparations, submissions and approvals identified in the contract (for example, Quality Control Plan, Safety Plan, and Environmental Protection Plan) as well as any Subcontractor design activities, the planned submissions of all early design packages, permitting activities, review conference activities and other non-construction activities intended to occur within the first 90 calendar days after Notice of Award.
1. Submit the Preliminary Project Schedule, defining at a minimum the Subcontractor's planned operation for the first 90 calendar days for approval within 15 calendar days after the Notice of Award is acknowledged.
  2. The accepted Preliminary Project Schedule will be used for payment purposes not to exceed 90 calendar days after Notice of Award. Completely cost load the Preliminary Project Schedule to balance the contract award.
  3. Detail the schedule for the first 90 calendar days after Notice of Award in accordance with this specification. It may be summary in nature for the remaining performance period.
  4. It must be early start and late finish constrained and logically tied as previously specified and include all contract milestones and access constraints.

## 2.3 SUBCONTRACTOR'S CONSTRUCTION SCHEDULE (CPM SCHEDULE)

- A. CPM Schedule: Prepare Subcontractor's Construction Schedule using a cost loaded, time-scaled CPM network analysis diagram for the Work. Provide resource loading for any materials and equipment that are critical.
1. Submit CPM schedule no later than 45 days after the Notice of Award.
  2. The CPM Schedule shall include all activities and content as depicted in the Preliminary Construction Schedule for the 90 Day period, as well as activities and content consistent with the requirements of this section, detailing and expanding upon the Summary level Preliminary Schedule for the Work after the first 90 Days
  3. Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.
  4. Use "one workday" as the unit of time for individual activities. Indicate nonworking days and holidays incorporated into the schedule to coordinate with the Subcontract Time.
  5. The CPM schedule will be the basis for managing the weekly progress and for evaluating job progress and time extensions requests.
  6. The CPM schedule shall provide for continuous work and will not be permitted to stop except by prior approval by FRA
  7. All activities shall have at least 1 predecessor and 1 successor, except for the Notice of Award date and Final Contract Completion.
  8. No more than 35% of the activities may be critical or near critical. "Near critical" will be defined as activity float in the range of 1 to 15 workdays. "Critical" will be defined as having zero workdays of activity float.
  9. Failure to include any work item required for performance of this Subcontract shall not excuse Subcontractor from completing all work within applicable completion dates.
- B. CPM Schedule Preparation: Prepare a list of all activities required to complete the Work.
1. Activities: Indicate the estimated time duration, sequence requirements, and relationship of each activity in relation to other activities. Include estimated time frames for the following activities:
    - a) Preparation and processing of submittals.
    - b) Mobilization and demobilization.
    - c) Purchase of materials.
    - d) Delivery.
    - e) Fabrication.
    - f) Utility interruptions.
    - g) Installation.
    - h) Testing.
    - i) Punch List and Final Completion.
    - j) Activities occurring following Final Completion.
  2. Critical Path Activities: Identify critical path activities, including those for interim completion dates. Scheduled start and completion dates shall be consistent with Contract milestone dates.
  3. Cost- and Resource-Loading of CPM Schedule: Assign cost to construction activities on the CPM schedule. Do not assign costs to submittal activities. Obtain FRA's approval prior to assigning costs to fabrication and delivery activities, FRA will decide if billing for work not yet installed shall be allowable. Assign costs under main subcontracts for testing and commissioning activities, operation and maintenance manuals, punch list activities, Project record documents, and demonstration and training (if applicable), in the amount of 5 percent of the Contract Sum.
    - a) Each activity cost shall reflect an appropriate value subject to approval by FRA.
    - b) Total cost assigned to activities shall equal the total Subcontract Sum and that of each sub-tier subcontractor
    - c) Resource loading of the schedule is required for any critical resources.
- C. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using a network fragment to demonstrate the effect of the proposed change on the overall project schedule, including allocation of any change to the contract price

- D. Initial Issue of Schedule: Prepare initial network diagram from a sorted activity list indicating straight "early start-total float." Identify critical activities. Prepare tabulated reports showing the following:
1. Subcontractor or sub-tier subcontractor and the Work or activity.
  2. Description of activity.
  3. Main events of activity.
  4. Immediately preceding and succeeding activities.
  5. Early and late start dates.
  6. Early and late finish dates.
  7. Activity duration in workdays.
  8. Total float or slack time.
  9. Average size of workforce.
  10. Dollar value of activity (coordinated with the schedule of values).
- E. Material Location Reports: At weekly intervals, prepare and submit a comprehensive list of materials delivered to and stored at Project site. List shall be cumulative, showing materials previously reported plus items recently delivered. Include with list a statement of progress on and delivery dates for materials or items of equipment fabricated or stored away from Project site. Indicate the following categories for stored materials:
1. Material stored prior to previous report and remaining in storage.
  2. Material stored prior to previous report and since removed from storage and installed.
  3. Material stored following previous report and remaining in storage.
- F. Site Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

## 2.4 SPECIAL REPORTS

- A. General: Submit special reports directly to FRA within one day(s) of an occurrence. Distribute copies of report to parties affected by the occurrence.
- B. Reporting Unusual Events: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, response by Subcontractor's personnel, evaluation of results or effects, and similar pertinent information. Advise FRA in advance when these events are known or predictable.

## PART 3 - EXECUTION

### 3.1 SUBCONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Weekly Schedule Progress meetings: FRA and the Subcontractor shall meet weekly (or as otherwise mutually agreed to) between the meetings described in paragraph MONTHLY SCHEDULE UPDATE MEETINGS for the purpose of jointly reviewing the actual progress of the project as compared to the as planned progress and to review planned activities for the upcoming six weeks. The then current and accepted schedule update shall be used for the purposes of this meeting and for the production and review of reports. The Subcontractor's Project Manager and authorized Scheduler shall attend. Provide a bar chart produced by the scheduling software, organized by Total Float and Sorted by Early Start Date, and a six week "look-ahead" schedule by filtering all schedule activities to show only current ongoing activities and activities scheduled to start during the upcoming six weeks.

- B. Monthly Schedule Update meetings: Conduct monthly schedule update meetings for the purposes of reviewing the Subcontractor's proposed out of sequence corrections, determining causes for delay, correcting logic, maintaining schedule accuracy and determining earned value. Meetings shall occur monthly prior to the end of the month and reflect proposed actual start dates, actual finish dates, remaining durations and percent complete for each activity it intends to status. Provide a computer with the scheduling software loaded and a projector during the meeting which allows all meeting participants to view the proposed schedule update during the meeting. The meeting and resultant approvable schedule update shall be a condition precedent to a formal submission of the update and to the submission of an invoice for payment. The meeting will be a working interactive exchange which will allow FRA and the Subcontractor the opportunity to review the updated schedule on a real time and interactive basis. The Subcontractor's authorized scheduling representative will organize, sort, filter and schedule the update as requested by FRA. The meeting will last no longer than 8 hours. A rough draft of the proposed activity logic corrections and narrative report shall be provided to FRA three working days in advance of the meeting. The Subcontractor's Project Manager and Authorized Scheduler shall attend the meeting.
- C. Subcontractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule within 3 working days of the end of the reporting month.
1. Provide reports, including narratives and schedules same as those required for the Subcontractors Construction Schedule submittal, outlined in Part 2 above.
  2. FRA must approve proposed revisions to the schedule prior to inclusion of those changes within the project schedule. If the Subcontractor fails to submit the proposed revisions, FRA may furnish the Subcontractor with suggested revisions to the project schedule. The Subcontractor shall include these revisions in the project schedule until revisions are submitted, and final changes and impacts have been negotiated.
    - a) Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
    - b) As the Work progresses, indicate final completion percentage for each activity.
    - c) The Subcontractor's inability to provide an updated construction schedule in accordance with these specifications, FRA may withhold approval of requests for progress payments or may only release a partial payment, until an acceptable schedule is provided.
- D. Distribution: Distribute copies of approved schedule to FRA, separate subcontractors, testing and inspecting agencies, and other parties identified by Subcontractor with a need-to-know schedule responsibility.
1. Post copies in Project meeting rooms and temporary field offices.
  2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

**END OF SECTION 01 32 00**

**SECTION 01 32 33 – PHOTOGRAPHIC DOCUMENTATION****PART 1 - GENERAL****1.1 SUMMARY**

- A. This Section includes administrative and procedural requirements for the following:
  - 1. Preconstruction photographs.
  - 2. Periodic construction photographs.
  - 3. Preconstruction videos.
- B. Related Sections include the following:
  - 1. SECTION 01 33 00: Submittals.
  - 2. SECTION 01 77 00: Closeout Procedures.

**1.2 SUBMITTALS**

- A. Qualification Data: For photographer.
- B. Key Plan: Submit key plan of Project site and building with notation of vantage points marked for location and direction of each photograph or video. Indicate elevation or story of construction. Include same label information as corresponding set of photographs or video. Key plan is to be updated as needed to in order to maintain optimal vantage points for photography.
- C. Construction Photographs: Submit one (1) set of digital photographic views.
  - 1. Submit a complete set of digital image electronic files in Digital PDF format and native format of the Project Site photographic survey prior to any construction work occurring.
  - 2. Submit a complete set of digital image electronic files in Digital PDF format and native format with each submittal of prints on a weekly basis. Identify electronic media with date photographs were taken. Submit images that have same aspect ratio as the sensor, uncropped.
  - 3. Upload photos daily to the project web-based project management system when work is occurring.

**1.3 COORDINATION**

- A. Auxiliary Services: Cooperate with photographer and provide auxiliary services requested, including access to Project site and use of temporary facilities, including temporary lighting required to produce clear, well-lit photographs without obscuring shadows.

**1.4 USAGE RIGHTS**

- A. Obtain and transfer copyright usage rights from photographer to FRA for unlimited reproduction of photographic documentation.

**PART 2 - PRODUCTS****2.1 PHOTOGRAPHIC MEDIA**

- A. Provide digital images in uncompressed TIFF format, produced by a digital camera with minimum sensor size of 4.0 megapixels, and at an image resolution of not less than 1600 by 1200 pixels.

**PART 3 - EXECUTION****3.1 CONSTRUCTION PHOTOGRAPHS**

- A. Take photographs using the maximum range of depth of field, and that are in focus, to clearly show the Work. Photographs with blurry or out-of-focus areas will not be accepted.
  - 1. Maintain key plan with each set of construction photographs that identifies each photographic location.
- B. Take photographs, at a minimum, on a daily basis when work is occurring or as specified within other section of the Contract Documents, whichever is more stringent.
- C. Submit digital images exactly as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.
  - 1. Date and Time: Include date and time in filename for each image.
  - 2. Field Office Images: Maintain one set of electronic images in the field office at Project site, available at all times for reference. Identify images same as for those submitted to FRA.
- D. Preconstruction Photographs: Before commencement of excavation, take color, digital photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points, as necessary to show the condition of the existing facilities prior to the start of work.
  - 1. Flag construction limits before taking construction photographs.
  - 2. Take photographs to show existing conditions adjacent to property before starting the Work.
  - 3. Take photographs of existing buildings either on or adjoining property to accurately record physical conditions at start of construction.
  - 4. Take additional photographs as required to record settlement or cracking of adjacent structures, pavements, and improvements.
- E. Additional Photographs: Circumstances that could require additional photographs include, but are not limited to, the following:
  - 1. In emergency situations.
  - 2. Special events planned at Project site.
  - 3. Immediate follow-up when on-site events result in construction damage or losses.
  - 4. Photographs to be taken at fabrication locations away from Project site.
  - 5. Substantial Completion of a major phase or component of the Work.
  - 6. Extra record photographs at time of final acceptance.
  - 7. Special publicity photographs.

**END OF SECTION 01 32 33**

**SECTION 01 33 00 – SUBMITTALS****PART 1 GENERAL****1.1 SUMMARY**

- A. This section specifies general methods and requirements of Project work related submittals. Additional detailed submittal requirements may be found in the bid design and/or technical specification sections.
- B. References
  - 1. SECTION 01 10 10 – General Requirements
  - 2. SECTION 01 25 00 – Substitution Procedures

**1.2 SHOP DRAWINGS, MATERIAL SAMPLES, AND OPERATIONS MAINTENANCE MANUALS**

- A. Subcontractor shall submit for all materials and assemblies used on the Project which are normally required in the construction industry. In addition, Project Schedules shall be submitted using the "Submittal for Review Transmittal" found in Attachment A and logged as part of the submittal file.
- B. The Subcontractor shall supply digital PDFs of all operation and maintenance manuals or an electronic PDF version for equipment furnished by the Subcontractor or their Sub-tier contractor prior to final acceptance of the Project by FRA.
- C. The Subcontractor shall complete the "Submittal for Review Transmittal" form for each shop drawing submittal, reference Attachment A.
- D. Shop drawings and schedules of all trades shall be submitted by the Subcontractor, who shall indicate by signed stamp on the drawings, that he has checked the shop drawings and that the work shown is in accordance with the Subcontract requirements and that it has been checked for dimension and relationship with the work of all trades. These drawings shall be submitted not later than the approved schedule for shop drawing transmittal, shall contain all required detailed information, and shall be submitted in logical order to facilitate proper review.
- E. Shop drawings which relate to a complete assembly, structure or system with various parts shall not be submitted until all drawings required to completely detail that assembly, structure or system are complete, so that they may be checked in relation to each other.

**1.3 AS-BUILT SHOP DRAWINGS**

- A. The Subcontractor shall furnish Drawings as outlined below.
- B. The Subcontractor shall maintain a set of prints of the Subcontract drawings in the construction office at the job site. A daily record, in red, shall be kept on these prints of the work installed with all modifications or changes thereon. This set of prints shall be available to FRA for inspection at all times and print copies provided upon request to FRA within 24 hours of the request being made. The FRA Construction Coordinator and the Subcontractor's superintendent shall review the as-built drawings.
- C. The Subcontractor shall transmit the current set of prints to FRA quarterly, at a minimum.
- D. Upon completion of all work, the Subcontractor shall transmit the above set of marked-up prints to FRA. Prior to submittal, the Subcontractor shall sign them to indicate that the work was installed as shown thereon.

**1.4 FRA'S ROLES**

- A. FRA shall be the final judge of the acceptability of any and all drawings. Final acceptance of the work is contingent on the receipt and FRA's approval of the complete set of drawings.

**1.5 USING THE SUBMITTAL FOR REVIEW FORM**

- A. Submittals shall be submitted to FRA via the web-based project management system unless otherwise directed by FRA.

**1.6 SUBMITTAL PROCESS**

- A. FRA will review the submittals and return one copy of all shop drawings within 15 (fifteen) working days with one of the following actions:
1. "No exception Taken" response on the Subcontractor's shop drawings submittal and "NET" as shown on the Submittal for Review Transmittal form indicates the Subcontractor may proceed with procurement, fabrication, manufacture and installation of the material and/or product.
  2. "Revise & Resubmit – Fabrication May Proceed" on the Subcontractor's shop drawing submittal and "R/R" as shown on the Submittal for Review Transmittal form indicates the Subcontractor may proceed with procurement, fabrication, and manufacture of the material and/or product assuming the noted items on the submittal are incorporated into the final design and/or product. The Subcontractor will revise the shop drawings and resubmit them to FRA for approval, but will not be able to erect and/or install any material until he has received either the "No Exception Taken (NET)" or the "Make Corrections and Proceed (MCP)" action by FRA:
    - a. "Make Corrections & Proceed" response on the Subcontractor's shop drawing submittal and "MCP" as shown on the "Submittal for Review Transmittal" form indicates the Subcontractor may proceed with procurement, fabrication, manufacture and installation of the material and/or product assuming the noted items on the submittal are incorporated into the final design and product;
    - b. With the "Rejected" response on the Subcontractor's shop drawing submittal and "R" as shown on the "Submittal for Review Transmittal" form, the reasons for the disapproval will be stated on the shop drawing submittal. The Subcontractor will revise the shop drawing submittal to conform to the drawings and specifications and resubmit them to FRA for approval. No procurement, fabrication, manufacture or installation shall be performed by the Subcontractor until one of the above actions listed above is received.
    - c. "For Information Only" response on the Subcontractor's shop drawing submittal and "FIO" on the "Submittal for Review Transmittal" form acknowledges receipt of such items as test results, professional engineering calculations, welding certificates and inspection reports.

**1.7 MATERIAL SUBSTITUTIONS**

- A. Products or materials which are equal to, or the equivalent of, those specified will be considered for approval by FRA. The submittal procedure will be the same as above, with the following additional conditions: In addition to the required information for the substitute material, the submittal shall contain the same information pertaining to a product named in the specification for purposes of comparison.
1. The submittal shall explain fully the differences, if any, between the proposed product and those named in the specification.
  2. Any change to the drawings or specifications for related work required for proper installation of the proposed substitute product shall be indicated in the submittal.

- B. If the proposed substitute product requires alterations of any kind to other equipment or to the building or necessitates any engineering design changes for its proper installation, such alterations and engineering design changes shall be accomplished at no cost to FRA.
- C. Reference 01 25 00 "Substitution Procedures" for additional information.

**PART 2 PRODUCTS - Not Used****PART 3 EXECUTION – Not Used****END OF SECTION 01 33 00**

**ATTACHMENT A**



**Submittal for Review Transmittal**

TO: Fermi National Accelerator Laboratory  
P.O. Box 500, MS-214  
Batavia, Illinois 60510

Submittal No.:

FROM:

Date:	Project No.: <XX-XX-XXX>
Attn:	
Project Name:	

Submittal Item No.	Specification Section or Drawing No. (If Applicable)	Description
01		
02		
03		
04		
05		
06		
07		
08		
09		
10		
11		

Comments:



## SECTION 01 41 00 – QUALITY REQUIREMENTS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. The purpose of the Construction Quality Management (CQM) Program is to provide principles to encourage a mutual effort on the part of the Subcontractor and FRA to produce a quality Project, on time and in accordance with the requirements of the Subcontract, Specifications and Drawings. The complete CQM Program is composed of the Subcontractor's Quality Control Programs, and the FRA QA Plan, supplemented by the principles stated herein.
- B. References
  - 1. SECTION 01 00 10 - General Requirements
  - 2. SECTION 01 31 00 - Environment, Safety, And Health Requirements
- C. Applicable Standards:
  - 1. U.S. Army Corps of Engineers (USACE) Construction Quality Management for Contractors

#### 1.2 THE QUALITY CONTROL PROGRAM

- A. Subcontractor shall maintain an adequate inspection system and perform such inspections as will ensure that the work called for by the Subcontract conforms to Subcontract requirements. The Subcontractor shall maintain complete inspection records and make them available to FRA for review.
- B. The Subcontractors' staff will be held responsible for the quality of work on the job and are subject to removal for noncompliance with quality requirements specified in the Subcontract.
- C. The Subcontractor's Quality Control (QC) Program shall consist of several components:
  - 1. A QC Organization
  - 2. A documented QC Plan that incorporates "Three Phases of Control"
  - 3. A series of meetings, including an initial Coordination and Mutual Understanding Meeting
  - 4. Production and submittal of contractually required documents, i.e., "submittals"
  - 5. Review and approval of sub-subcontractors' submittals,
  - 6. Testing,
  - 7. Completion inspections,
  - 8. QC certifications and documentation necessary to verify that all contracted work complies with the requirements of the Contract, including materials, equipment, workmanship, fabrication, construction, and operations.



## 1.3 REQUIREMENTS

### A. QC Plan:

1. The Subcontractor is required to provide a tailored QC Plan document that meets the specific Project quality control requirements. This QC Plan shall detail the procedures, instructions, and reports Subcontractor will use during the Project. The QC Plan shall contain the following elements, as applicable:
  - a. Table of Contents
  - b. QC Organization Chart
  - c. Names and Qualifications
  - d. Duties and Responsibilities
  - e. Outside Organizations
  - f. Submittal Procedures
  - g. Testing Lab information
  - h. Testing Plan and Log
  - i. Rework Procedure
  - j. Documentation procedures
  - k. List of Definable Features of Work
  - l. Performing the three phases of control
  - m. Completion Inspection Procedures
2. The QC Plan shall be submitted and approved prior to NTP.
3. FRA must approve the QC Plan before the Subcontractor starts work. The plan outlines and describes the process that the Subcontractor will use and the roles personnel will take on to satisfy the requirements of the QC Program, and identifies the Definable Features of Work (DFOW) for the Subcontract scope of work. A DFOW is a task that is separate and distinct from other tasks, with its own distinct QC requirements. A Draft List of DFOW's is included in this Specification Section as Attachment B.
4. Construction work will not be allowed at the site prior to the approval of the QC Plan. Any exceptions must be authorized in writing by FRA. Recognizing that it is not always practical to delay the start of construction until a complete QC Plan is submitted and approved, exceptions may be made for mobilization work, which includes surveying for location of Subcontractor's offices, laydown areas and temporary utilities, and installation of temporary utilities. The only other possible exception is work approved under an "Approved As Noted" submittal of the QC Plan, which may be appropriate under any of the following three (3) circumstances.
  - a. First 90 Days: In the case that the QC Plan is a preliminary submittal and lists the DFOWs to cover the first ninety (90) days of construction, the LBNF QA Manager may approve this QC Plan as "Approved as Noted" to allow the Subcontractor to start these and only these initial activities.
  - b. Phased Project: It is permissible to allow the Subcontractor to proceed with a series of acceptable QC Plans, one for each phase of the Subcontract.
  - c. Minor Changes: It is permissible to approve the QC Plan with minor changes or additions. FRA may use an "Approved as Noted" approval to grant permission to start work if the Subcontractor agrees in writing to correct the plan by a specified date. The Subcontractor shall not continue work beyond the specified date if a corrected plan has not been approved.
5. If Subcontractor elects to make any changes to its QC Plan, including any personnel changes, the Subcontractor shall submit the revised QC Plan to FRA for approval. FRA reserves the right to make changes to the QC Plan, including interviewing QC personnel to verify submitted qualifications and if necessary, to have personnel replaced.



B. Quality Control Organization

1. The personnel involved in Quality Control range from the laborers and mechanics performing the work, through the on-site supervision and up to the management of the Subcontractors' firms. Examples of roles with specific Quality Control responsibilities would be:
  - a. Quality Control (QC) Manager
  - b. Submittal Reviewer(s)
  - c. QC Specialist(s)
  - d. Manufacturer or Factory Representative
2. Collectively, these individuals are responsible for carrying out the requirements of the QC Plan. As needed, some or all the positions and their qualifications, duties and responsibilities will be included in the Subcontract requirements. The positions needed would depend on the work scope.
  - a. The QC Manager implements and manages the QC Plan and is directly responsible to Subcontractor's project management. The QC Manager shall work through the LBNF QA Representative assigned to the project for quality-related matters.
3. Responsibilities of the QC Manager include:
  - a. Attend QC Plan meeting.
  - b. Attend Coordination and Mutual Understanding Meeting.
  - c. Conduct periodic QC meetings.
  - d. Manage, coordinate and document performance of Three Phases of Control, as defined by the USACE Construction Quality Management for Contractors.
  - e. Manage, coordinate and document work by designated testing laboratory personnel and any other inspection and testing personnel required by the Subcontract.
  - f. Coordinate changes or substitution requests made by the Subcontractor to FRA.
  - g. Inspect all work for compliance and maintain a Rework Items List on all nonconforming work.
  - h. Coordinate all testing required in such a way as to maintain the schedule.
  - i. Provide required QC certifications and documentation.
  - j. Ensure that As-Built Drawings and As-Built Record of Materials are kept current and onsite.
4. The QC Manager has specific responsibilities regarding submittals (this includes submittals from Subcontractor, the sub-tier contractors, vendors, etc.):
  - a. Coordinate all submittal actions in a timely manner so as to avoid Project delays.
  - b. Maintain necessary submittal records in an organized fashion.
  - c. Review and certify all submittals for compliance.
  - d. Approve all submittals except those designated to be approved by FRA; and
  - e. Check all material and equipment delivered to the Project for compliance with the Subcontract.
5. Constructing a quality facility requires proper planning of all DFOV to prevent deficiencies with costly tear out and replacement. The QC Manager should focus on the preparatory and initial phases of control to minimize or prevent rework. The QC Manager is required to obtain assistance from the QC staff or an outside consultant for any discipline(s) where he or she lacks proficiency. The QC Manager must have the authority to correct any deficiency even though it might result in stopping work on a segment of the Project.
6. The QC Manager is always responsible for observing the work and monitoring safe work practices during the normal course of his or her jobsite duties, but as a rule is not assigned as the safety competent person.
7. A Subcontractor may be required to designate a QC specialist at the work site for each of the specific areas of responsibility that



include particularly complex or demanding work. These specialists shall assist and report to the QC Manager. QC specialists may perform production-related duties as long as they are allowed sufficient time to perform their assigned QC duties; or they may be assigned only quality control duties. QC specialists are required to:

- a. Attend the Coordination and Mutual Understanding Meeting
  - b. Attend QC meetings .
  - c. Be present at the construction site to perform the Three Phases of Control.,
  - d. Prepare documentation for each DFOW in their area of responsibility at the frequency. specified in the Subcontract.
  - e. Prepare specific sections of the Subcontractor's QC reports specifically covering the work in their area of responsibility performed by the sub-tier contractors/vendors.
8. Some submittals, typically on large, complex projects, may require review by a registered professional, qualified in the appropriate discipline. The Subcontractor would provide one or more Submittal Reviewers, separate from the QC Manager, in these cases. This Submittal Reviewer will be required to certify that the submittal(s) meet(s) the requirements of the Subcontract prior to certification or approval by the QC Manager. Subcontractor cannot retain the FRA's own A/E to accomplish this work.
9. Depending on the technical specifications, a Subcontract may require the presence of technical representative(s) from a manufacturer or factory to be on-site during certain periods of the Work to ensure compliance with installation recommendations, etc. The representative(s) shall be considered an extension of the QC Program during their presence on-site.

C. Required Meetings shall be held on a regular basis, e.g., weekly. The frequency and scheduling should be agreed to during the Coordination and Mutual Understanding meeting. The QC Manager develops the agenda, conducts the meeting, and prepares the minutes. All problems or questions should be directed to him or her.

1. These meetings should be used to reinforce the philosophy of the CQM Program. Submittal status should be the lead off agenda item of each QC Meeting.
2. Sub-subcontractor QC personnel should attend the meetings to discuss approaches to upcoming phases of work and correction of any deficiencies. Agendas for these meetings include items such as:
  - a. Status of submittals.
  - b. Review of test reports for deficiencies and results.
  - c. Review of the Project Schedule to identify which phases of control, tests or inspections are scheduled for upcoming DFOWs; and
  - d. Review of outstanding problems from previous meeting.
3. The QC Manager shall be required to address how the Subcontractor intends to correct any problems. As part of the project documentation, the QC Manager must keep minutes of the meeting and distribute them to attendees. These minutes become part of the official Subcontract file.

D. Testing

1. Tests shall be identified as individual activities in the Specifications. FRA shall identify critical tests (e.g., for fire protection, elevators, high voltage electrical) that must be included as Project Schedule activities. Subcontractor is required to perform any sampling and testing required under the Subcontract.
2. Subcontractor shall provide an independent construction-materials testing laboratory, or in some cases establish such a laboratory, accredited by an acceptable laboratory accreditation authority, to perform sampling and tests required by the Subcontract.
  - a. Testing laboratories that have obtained accreditation by an acceptable laboratory accreditation authority shall submit for



FRA approval a copy of the Certificate of Accreditation and Scope of Accreditation. The scope of the laboratory's accreditation must include the test methods required by the Subcontract. Testing laboratories that have not yet obtained accreditation by an acceptable laboratory accreditation authority must submit an acknowledgment letter from one of the laboratory accreditation authorities indicating that the application for accreditation has been received and the accreditation process has started. Certified statements, signed by an official of the testing laboratory attesting that the proposed laboratory meets or conforms to the ASTM standards listed in the contract must be submitted to FRA for approval.

3. Laboratory Accreditation Authorities are:
  - a. The National Voluntary Laboratory Accreditation Program (NVLAP) administered by the National Institute of Standards and Technology
  - b. The American Association for Laboratory Accreditation (A2LA) program
4. When reporting on test results, the Subcontractor must cite applicable Subcontract requirements, tests and the analytical procedures used. Actual results must be provided and include a statement that the item tested or analyzed conforms or fails to conform to specified requirement(s). Subcontractor must notify FRA immediately if the item fails to conform. An authorized testing laboratory representative shall certify test results by signing the test report. Subcontractor must furnish the reports, certifications, and other documentation to the QC Manager. A summary report of field tests is required at the end of each month.
  - a. The QC Manager is required to furnish the signed reports, certifications, and a summary report of field tests at the end of each month to FRA, and attach a copy of the summary report to the last Daily Report of each month.

E. Quality Control Certifications

1. Each QC Report signed by the QC Manager shall contain the following statement:
  - a. "On behalf of the Subcontractor, I certify that this report is complete and correct and equipment and material used and work performed during this reporting period is in compliance with the Subcontract drawings and specifications to the best of my knowledge, except as noted in this report."
2. Upon completion of the work, or a specific portion thereof, the QC Manager shall furnish a completion certificate to FRA attesting that "the work has been completed, inspected, tested and is in compliance with the Subcontract."

F. On-going Quality Control Inspections:

1. During the duration of the project, the FRA Construction Coordinator shall identify deficient items that do not adhere to the technical specifications/drawings. This list will be kept current through the duration the project by the Subcontractor's Field Superintendent and made part of the Weekly Progress Meeting Minutes. At a minimum, the Subcontractor shall, within five (5) working days, submit a proposed corrective action plan that details the mitigation method including a schedule for the correction of the noncompliance.
2. Notification of punch list items: The FRA Construction Coordinator will notify the Subcontractor of deficiencies and/or discrepancies in the quality of the construction. These notifications will include:
  - a. Date identified.
  - b. Identifier.
  - c. Location.
  - d. Description, including specification or drawing reference.



3. Subcontractor shall perform periodic inspection for potential suspect counterfeit materials. The most common suspects counterfeit materials found at US Department of Energy facilities have been threaded fasteners fraudulently marked as high strength bolts. Also included are electrical circuit breakers with false certifications. If the Subcontractor suspects any counterfeit material being utilized, contact the FRA Construction Coordinator immediately.

G. Quality Control Completion Inspections

1. Near the completion of all work or any portion thereof, the QC Manager shall conduct an inspection of the work and develop a "punch list" of items that do not conform to the approved Specifications and Drawings. This is called a Punch-Out Inspection. The punch list shall include any remaining items on the "Rework Items List" that were not corrected prior to the Punch-Out Inspection and the estimated date by which the deficiencies will be corrected. A copy of the punch list shall be provided to FRA. The QC Manager or staff shall make follow-on inspections to ascertain that all deficiencies have been corrected. Once this is accomplished Subcontractor shall notify the FRA that the work is ready for "Pre-Final Inspection."
2. FRA will perform a pre-final inspection to verify that the facility is complete and ready to be occupied. A LBNF "Pre-Final Punch List" may be developed as a result of this inspection. Each deficiency noted in the punch list shall reference the applicable specification paragraph, Drawing No., etc., from which the deficiency stems. Any items noted on the "Pre-Final" inspection shall be corrected in timely manner and shall be accomplished within the time slated for completion of the entire work, or any increment thereof if the project is divided into increments by separate completion dates. The QC Manager shall ensure that all items on this list are corrected prior to notifying FRA that a "Final" inspection can be scheduled.
3. Based upon results of the "Pre-Final" inspection, FRA will formally schedule the final acceptance inspection. The QC Manager, the QC Specialists, the superintendent or other primary Subcontractor management personnel, and FRA will attend this inspection.
  - a. At least 14 calendar days prior to the final inspection, notice shall be given to FRA stating that all items previously identified to the Subcontractor as being unacceptable, along with all the remaining work performed under the contract, will be complete and acceptable by the date of the final acceptance inspection.

H. Subcontractor Documentation

1. The CQM Program requires Subcontractor to control quality and document that control.
2. The Subcontractor's reports in conjunction with FRA's reports provide the written record of job progress, control inspections, and tests. It is therefore critical that the Subcontractor's reports be correct and timely. These reports constitute the official record of Work performance and compliance with Specifications and Drawings. The QA Representative must obtain and review the Subcontractor's reports daily for accuracy and completeness. Any area(s) of disagreement must be resolved at the field level that day if possible. FRA should review these reports and ensure the QC/QA process is working.
3. The documentation that is generated by the QC System must be maintained in the WBPMS.
  - a. Subcontractor is required to develop and provide daily Subcontractor Production and Quality Control Reports to FRA. These reports are the daily record of operations on the job site. This series of reports is intended to fully document the Work, any test results, dimensional checks, equipment, and material checks. Depending on the complexity of the Work being performed and the duties of the QC Manager, the Subcontractor may combine these reports into one daily report. The QC portion of the report will include the reports from each sub tier contractor working on the site. Entries on the report(s) must be tied to the schedule activities.
  - b. These reports are to be delivered to the FRA QA Representative no later than 10:00 a.m. local time the following workday. It is important that the reports be current, factual, and complete as they provide a complete record of the contract.



- c. FRA will review the Subcontractor's reports daily for accuracy and completeness, and to ensure the QC/QA process is working.
  - 1) The Subcontractor Production Report, prepared by the Subcontractor's Project Manager, documents the efforts expended and the progress made on a daily basis; it is not specifically a Quality Control report. Each entry in the Subcontractor's Production Report must tie to an associated activity on the Subcontractor's schedule and clearly identify the on-site labor support for each sub tier contractor.
  - 2) The Subcontractor Quality Control Report, prepared by the QC Manager, is specifically intended to address the progress and issues with the Quality Control Program as it proceeds on the Project site. Space is designated for documenting actions on all three phases of control, as well as rework. Entries shall be clearly tied to the activities on the Subcontractor's schedule. Documenting the controls for any "follow-up" phase work is of importance. Additional reports, discussed below, are available to provide detailed documentation of the "preparatory" and "initial" phases. The report must include a certification by the QC Manager that the work is in compliance with the contract, except as noted in the report.
4. There are several other records and schedules required of the Subcontractor, in addition to the daily reports. They are a critical part of the overall written record of the contract and shall be maintained in the WBPMS. The Three Phases of Control are defined in Section J.
  - a. The Preparatory phase of control for each DFOW concludes in a meeting at which all the required activities for this phase of the DFOW are reviewed and checked off. The Preparatory Phase Checklist is intended to aid the QC Manager in effectively accomplishing the Preparatory phase of control for each DFOW, and conducting this termination meeting. It provides a simple means of documenting that the required meeting occurred for the DFOW and that the QC Manager may now proceed to the Initial Phase.
  - b. Similar to the Preparatory Phase, the Initial phase of control for each DFOW concludes in a meeting at which all the required activities for this phase of the DFOW are reviewed and checked off. The Initial Phase Checklist is intended to aid the QC Manager in effectively accomplishing the Initial phase of control for each DFOW, and conducting this termination meeting. It provides a simple means of documenting that the required meeting occurred for the DFOW and that the QC Manager may now proceed to the follow-up phase. In this checklist, activities shall be clearly tied to the section and paragraph of the applicable specification, and the submittal being reviewed. It shall also identify any phasing or workmanship issues that must be followed, particularly addressing safety aspects of the installation.
  - c. The submittal status log, prepared in the WBPMS shows the status of all shop drawings, certifications, and other submittals. For each submittal, the log shall show the Subcontract and/or Specification paragraphs requiring the submittal, a description of the submittal, whether it is Subcontractor-approved or FRA-approved, and actual submission and approval dates on all actions. This allows the QC Manager to track the status as well as pending or planned actions required by the Subcontractor or FRA.
  - d. Subcontractor is required to prepare and maintain a Testing Plan and Log to document the specification requirements, DFOWs, test plan, test location, tester, and frequency of all required tests. With this information, the QC Manager and the QA Representative can monitor the plans and status of all required testing.
  - e. Two full-size sets of drawings shall be maintained at the work site and updated on a daily basis, showing all deviations from the Subcontract drawings, including buried or enclosed utilities and conditions revealed during construction. Upon completion of construction, the As-Built Drawings shall be certified as accurate by the QC Manager and submitted to FRA for record purposes. The QA Representative shall check the As-Built each month.
  - f. The QC Manager shall establish a list of items requiring rework, and an agenda item for the QC meetings to review the progress of corrective actions on these items. The list shall indicate the date identified, describe each deficiency, contract



requirement, action taken, and resolution, and indicate the date corrected. Deficiencies corrected on the same day they are discovered are exempt from the rework list. The QC Manager should not allow the adding to, building upon, or enclosing of, nonconforming work.

I. Non-Compliance

1. The primary focus of the QC System is prevention. When this fails and non-compliance is encountered, the QC organization shall identify, document, and correct the non-compliance. In a case where the Subcontractor's QC Organization is not effective and/or an unacceptable number of non-compliance issues are identified, the QA Representative must take actions in accordance with the Quality Improvement section of the FRA QA Plan.
2. Subcontractor is responsible to respond to Non-Compliance Notices that may be issued by the Subcontractor or by FRA.
3. The Subcontractor shall maintain a procedure for controlling, tracking, and reporting construction deficiencies, nonconforming items from identification through acceptable corrective action. Refer to Attachment B. The procedure shall establish measures to identify, segregate (when possible), and remove from work operation the nonconforming items to prevent inadvertent use/incorporation into the subcontract, identify root cause and provide documented verification that the identified deficiencies have been corrected and approved by FRA if required.
4. Subcontractor is responsible to respond to Non-Compliance Notices that may be issued by the Subcontractor or by FRA.
5. The Subcontractor shall maintain a procedure for controlling, tracking, and reporting construction deficiencies, nonconforming items from identification through acceptable corrective action. Refer to Attachment B. The procedure shall establish measures to identify, segregate (when possible), and remove from work operation the nonconforming items to prevent inadvertent use/incorporation into the subcontract, identify root cause and provide documented verification that the identified deficiencies have been corrected and approved by FRA if required.

J. Three Phases of Control

1. The Three Phases of Control process, which includes Preparatory, Initial and Follow-up phases, provides the backbone of the Subcontractors' Quality Control Program.
2. The Three Phases of Control process breaks down the scope of Work into DFOW, and establishes required QC activities that apply to them in each phase. A DFOW is a task that is separate and distinct from other tasks, with its own distinct QC requirements. The Three Phases of Control process applies to both on-site and off-site work.
3. Each DFOW is distinguished by trade or discipline and appears as a distinct item or activity on the Project Schedule. In some cases a single DFOW corresponds to a specification section in the contract, in other cases a specification section is more logically broken into multiple DFOWs.
  - a. The preparatory phase takes place prior to beginning work on each DFOW, and consists in large part in planning, procuring materials and discussions. The Subcontractor is required to notify FRA prior to the start of the preparatory phase for each DFOW. This phase shall include a meeting conducted by the QC Manager and attended by the QC specialists, the superintendent, and the foreman responsible for the DFOW. The results of all preparatory phase actions must be documented in the daily QC Report and/or in the Preparatory Phase Checklist. The following functions must be performed during the QC Manager's meeting, prior to beginning work on each DFOW:
    - 1) Review each paragraph of the applicable specification sections in the Subcontract.
    - 2) Review the Subcontract drawings.
    - 3) Verify that appropriate shop drawings and submittals for materials and equipment have been submitted and certified by the QC Manager and approved.



- 4) Verify receipt of approved factory test results, when required.
  - 5) Review the testing plan and ensure that provisions have been made for the required QC testing.
  - 6) Examine the work area to ensure that the required preliminary work has been completed.
  - 7) Examine the required materials, equipment, and sample work to ensure that they are on hand and conform to the approved shop drawings and submitted data.
  - 8) Plan and identify potential problems for each DFW and discuss the approach to adopt in order to provide quality construction.
  - 9) Discuss construction methods, construction tolerances, workmanship standards.
  - 10) Review the safety plan and appropriate activity hazard analysis to ensure that applicable safety requirements are met, and that required Material Safety Data Sheets (MSDS) are submitted.
- b. The Subcontractor is required to notify FRA at least two workdays prior to the start of the Initial phase for each DFW. The QC Manager conducts the initial phase with the QC Specialists, the superintendent, and the foreman responsible for that definable feature of work. The QC Manager observes the initial segment of the definable feature of work to ensure that the work complies with Subcontract requirements. The results of all initial phase actions must be documented in the daily QC Report and/or in the Initial Phase Checklist. The following functions must be performed over the course of this phase for each DFW:
- 1) Establish with the work crew the quality of workmanship.
  - 2) Resolve conflicts.
  - 3) Ensure that testing is performed by the approved laboratory.
  - 4) Check work procedures for compliance with the Safety Plan and the appropriate activity hazard analysis to ensure that applicable safety requirements are met.
- c. Subcontractor and sub-tier contractor foremen shall document all Initial Phase Checklists and include them with the QC Report.
- d. Follow-up phase activities are performed daily, or more frequently as necessary, on each in-progress DFW, according to the schedule until the DFW is complete and documented as such in the daily QC Report. The following functions must be performed over the course of this phase for each DFW:
- 1) Ensure the work for each activity is in compliance with Subcontract requirements.
  - 2) Maintain the required quality of workmanship.
  - 3) Ensure that testing is performed by the approved laboratory.
  - 4) Ensure that rework items are being corrected.
- e. Subcontractor and sub-tier subcontractors document follow-up phase activities for each DFW on the QC Report and the Production Report.
- f. Additional Preparatory and Initial Phases shall be conducted on the same DFW if:
- 1) The quality of on-going work is unacceptable.
  - 2) There are changes in the applicable QC organization.
  - 3) There are changes in the on-site production supervision or work crew.
  - 4) Work on a DFW is resumed after a substantial period of inactivity; or
  - 5) Other problems develop.



When the contract consists of off-site work, Subcontractor shall notify FRA prior to the start of the preparatory and initial phases for the off-site work.

**PART 2 - PRODUCTS - Not Used**

**PART 3 - EXECUTION – Not Used**

**END OF SECTION 01 41 00**



**Attachment A**



QA/QC Punch List Item Status

Item#	Room/ Location	Description	Author Initials	Subcontractor Responsible	Date Inspected	Date Due	Date Completed	Subs Initials	Closed/ Confirmed By	Notes
1										
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QA/QC Punch list Items Status					
<Subcontractor>	Assigned Items	Closed Items	Open Items	% Closed	% Open
	0	0	0	#DIV/0!	#DIV/0!
<b>Totals</b>					



## Attachment B

### **Beamline Complex Draft Definable Features of Work (DFOW)**

Below is a draft list of Definable Features of Work (DFOW) as a starting point for the Subcontractor to develop a complete DFWO List for the Work. The Subcontractor is responsible to fully identify and develop the DFWO List. The DFWO List may need further breakdown and/or definition as the Construction Work starts or is in progress.

#### Sitework

- SW 1 - Mobilization
- SW 2 - Temporary Construction
- SW 3 - SWPPP Installation
- SW 4 - Site Clearing
- SW 5 - Demolition
- SW 6 - Dewatering
- SW 7 - Mass Excavation/Fill
- SW 8 - Rock Blasting
- SW 9 - Rock Removal
- SW 10 - Hardstand/Roadway
- SW 11 - Site Utilities – Gas
- SW 12 - Site Utilities – Domestic Water
- SW 13 - Site Utilities – Industrial Cooling Water
- SW 14 - Site Utilities – Electrical/Communication Ductbank/Structures
- SW 15 - Site Utilities – Stormwater
- SW 16 - Site Utilities – Sump Piping
- SW 17 - Site Utilities – Cooling Pond Water (Supply, Return & Transfer)
- SW 18 - Site Electrical/Communications
- SW 19 - Asphalt Pavement
- SW 20 - Final Grading
- SW 21 - Site Restoration

#### Extraction Enclosure (EE)

- EE 1 - Earth Retention System
- EE 2 - Temporary Construction
- EE 3 - Demolition/Sawcutting
- EE 4 - Excavation
- EE 5 - Cast-In-Place Concrete (Footings/Slab on Grade)
- EE 6 - Cast-In-Place Concrete (Walls)
- EE 7 - Cast-In-Place Concrete (Roof)



### Extraction Enclosure (EE) (continued)

- EE 8 - Masonry
- EE 9 - Structural Steel
- EE 10 - Miscellaneous Metals (Stairs & Railings)
- EE 11 - Roofing and Accessories
- EE 12 - Building Specialties
- EE 13 - Doors, Frames & Hardware
- EE 14 - Overhead Doors
- EE 15 - Underground Plumbing
- EE 16 - Aboveground Plumbing
- EE 17 - Plumbing Equipment
- EE 18 - Plumbing Controls
- EE 19 - Mechanical
- EE 20 - Mechanical Controls
- EE 21 - MI-14 Electrical Modifications
- EE 22 - Electrical Underground
- EE 23 - Electrical Rough-In
- EE 24 - Electrical Wiring & Connections
- EE 25 - Electrical Communications & Low Voltage Systems
- EE 26 - Start Up & Commissioning

### Primary Beam Enclosure (PBE)(including Magnet Installation Tunnel & Service Building LBNF 5)

- PBE 1 - Excavation/Fill
- PBE 2 - Drilled Shafts
- PBE 3 - Cast-In-Place Concrete (Drilled Shaft Caps/Slab on Grade)
- PBE 4 - Cast-In-Place Concrete (Walls)
- PBE 5 - Cast-In-Place Concrete (Roof)
- PBE 6 - Cast-In-Place Concrete (LBNF 5 Foundations)
- PBE 7 - Cast-In-Place Concrete (LBNF Slab on Grade)
- PBE 8 - Waterproofing
- PBE 9 - Shielding Steel Installation
- PBE 10 - Masonry
- PBE 11 - Structural Steel
- PBE 12 - Miscellaneous Metals
- PBE 13 - Metal Wall Panels
- PBE 14 - Roofing and Accessories
- PBE 15 - Building Specialties
- PBE 16 - Doors, Frames & Hardware
- PBE 17 - Overhead Doors
- PBE 18 - Underground Plumbing
- PBE 19 - Aboveground Plumbing
- PBE 20 - Plumbing Equipment
- PBE 21 - Plumbing Controls



### Primary Beam Enclosure (PBE)(continued)

- PBE 22 - Fire Protection
- PBE 23 - Mechanical Ductwork
- PBE 24 - Mechanical Equipment
- PBE 25 - Mechanical Controls
- PBE 26 - Electrical Underground
- PBE 27 - Electrical Rough-In
- PBE 28 - Electrical Wiring & Connections
- PBE 29 - Electrical Equipment
- PBE 30 - Electrical Communications & Low Voltage Systems
- PBE 31 - Start Up & Commissioning

### Target Complex (TC) (LBNF 20)

- TC 1 - Drilled Shafts
- TC 2 - Pier Caps
- TC 3 - Water Barrier System
- TC 4 - Structural Mat Foundation
- TC 5 - Cast-In-Place Concrete (Walls)
- TC 6 - Fermilab Provided Window Frames Installation
- TC 7 - Cast-In-Place Concrete (Elevated Decks)
- TC 8 - Cast-In-Place Concrete (Slab on Grade)
- TC 9 - Structural Steel
- TC 10 - Precast Concrete
- TC 12 - Shielding Steel Installation
- TC 13 - Masonry
- TC 14 - Miscellaneous Metals (Removable Structures, Grating, Stairs, Railings, etc.)
- TC 15 - Metal Siding and Accessories
- TC 16 - Roofing and Accessories
- TC 17 - Building Specialties
- TC 18 - Doors, Frames & Hardware
- TC 19 - Overhead Doors
- TC 20 - Bridge Cranes & Monorail/Hoist
- TC 21 - Underground Plumbing
- TC 22 - Aboveground Plumbing
- TC 23 - Plumbing Equipment & Controls
- TC 24 - Fire Protection
- TC 25 - Mechanical Ductwork
- TC 26 - Mechanical Piping
- TC 27 - Mechanical Equipment
- TC 28 - Mechanical Controls
- TC 29 - Electrical Underground
- TC 30 - Electrical Rough-In



TC 31 - Electrical Wiring & Connections  
Target Complex (TC) (continued)

TC 32 - Electrical Equipment  
TC 33 - Electrical Communications & Low Voltage Systems  
TC 34 - Start Up & Commissioning

Decay Region (DK)

DK 1 - Excavation/Fill  
DK 2 - Rock Blasting  
DK 3 - Rock Removal  
DK 4 - Curtain Grouting  
DK 5 - Drilled Shafts  
DK 6 - Earth Retention System  
DK 7 - Cast-In-Place Concrete (Pier Cap & Mud Mat)  
DK 8 - Cast-In-Place Concrete (Slab on Grade)  
DK 9 - Shielding Concrete Steel, Bracing Steel & Embeds  
DK 10 - Cast-In-Place Concrete (Shielding Concrete)  
DK 11 - Mechanical Decay Vessel  
DK 12 - Mechanical Ductwork  
DK 13 - Cast-In-Place Concrete (Walls)  
DK 14 - Cast-In-Place Concrete (Roof)  
DK 15 - Waterproofing  
DK 16 - Plumbing (Tritiated Condensate)

Absorber Hall (AH) (including Absorber Service Building & Steel Muon Shield Kern)

AH 1 - Excavation/Fill  
AH 2 - Rock Blasting  
AH 3 - Rock Removal  
AH 4 - Cast-In-Place Concrete (Foundation Slab & Leveling Slab)  
AH 5 - Cast-In-Place Concrete (Muon Kern Slab)  
AH 6 - Cast-In-Place Concrete (Walls)  
AH 7 - Cast-In-Place Concrete (Elevated Slabs)  
AH 8 - Cast-In-Place Concrete (Roof)  
AH 9 - Precast Concrete  
AH 10 - Muon Shield Kern Steel Shielding Installation  
AH 11 - Water Barrier  
AH 12 - Geomembrane  
AH 13 - Cast-In-Place Concrete (Service Building Slab on Grade)  
AH 14 - Masonry  
AH 15 - Structural Steel



AH 16 - Miscellaneous Metals (Stairs, Railings, Grating and etc.)

AH 17 - Metal Siding and Accessories

AH 18 - Building Specialties

Absorber Hall (AH) (continued)

AH 19 - Doors, Frames & Hardware

AH 20 - Roofing and Accessories

AH 21 - Bridge Crane

AH 22 - Elevator

AH 23 - Fire Protection

AH 24 - Underground Plumbing

AH 25 - Aboveground Plumbing

AH 26 - Plumbing Equipment

AH 27 - Plumbing Controls

AH 28 - Mechanical Ductwork

AH 29 - Mechanical Piping

AH 30 - Mechanical Equipment

AH 31 - Mechanical Controls

AH 32 - Electrical Underground

AH 33 - Electrical Rough-In

AH 34 - Electrical Equipment

AH 35 - Electrical Wiring & Connections

AH 36 - Electrical Communications & Low Voltage Systems

AH 37 - Start Up & Commissioning

AH 38 - Asphalt Pavement Installation



**ATTACHMENT C  
QA/QC Punch List Item Status**

Item#	Room/ Location	Description	Author Initials	Subcontractor Responsible	Date Inspected	Date Due	Date Completed	Subs Initials	Closed/ Confir med By	Notes
1										
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QA/QC Punch list Items Status					
<Subcontractor>	Assigned Items	Closed Items	Open Items	% Closed	% Open
	0	0	0	#DIV/0!	#DIV/0!
<b>Totals</b>					

**SECTION 01 42 20 - REFERENCES****PART 1 - GENERAL****1.1 INDUSTRY STANDARDS**

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
- B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.
- C. Copies of Standards: Each entity engaged in construction on Project should be familiar with construction industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
  - 1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

**1.2 ABBREVIATIONS AND ACRONYMS**

- A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.
  - 1. AABC - Associated Air Balance Council; [www.aabc.com](http://www.aabc.com).
  - 2. AAPFCO - Association of American Plant Food Control Officials; [www.aapfco.org](http://www.aapfco.org).
  - 3. AASHTO - American Association of State Highway and Transportation Officials; [www.transportation.org](http://www.transportation.org).
  - 4. ABMA - American Bearing Manufacturers Association; [www.americanbearings.org](http://www.americanbearings.org).
  - 5. ACI - American Concrete Institute; (Formerly: ACI International); [www.concrete.org](http://www.concrete.org).
  - 6. ACPA - American Concrete Pipe Association; [www.concrete-pipe.org](http://www.concrete-pipe.org).
  - 7. AGA - American Gas Association; [www.aga.org](http://www.aga.org).
  - 8. AISC - American Institute of Steel Construction; [www.aisc.org](http://www.aisc.org).
  - 9. ANSI - American National Standards Institute; [www.ansi.org](http://www.ansi.org).
  - 10. AOSA - Association of Official Seed Analysts, Inc.; [www.aosaseed.com](http://www.aosaseed.com).
  - 11. ASCE - American Society of Civil Engineers; [www.asce.org](http://www.asce.org).
  - 12. ASCE/SEI - American Society of Civil Engineers/Structural Engineering Institute; (See ASCE).
  - 13. ASME - ASME International; (American Society of Mechanical Engineers); [www.asme.org](http://www.asme.org).
  - 14. ASSE - American Society of Safety Engineers (The); [www.asse.org](http://www.asse.org).
  - 15. ASSE - American Society of Sanitary Engineering; [www.asse-plumbing.org](http://www.asse-plumbing.org).
  - 16. ASTM - ASTM International; (American Society for Testing and Materials International); [www.astm.org](http://www.astm.org).
  - 17. AWS - American Welding Society; [www.aws.org](http://www.aws.org).
  - 18. CFSEI - Cold-Formed Steel Engineers Institute; [www.cfsei.org](http://www.cfsei.org).
  - 19. CLFMI - Chain Link Fence Manufacturers Institute; [www.chainlinkinfo.org](http://www.chainlinkinfo.org).
  - 20. CRSI - Concrete Reinforcing Steel Institute; [www.crsi.org](http://www.crsi.org).
  - 21. CSI - Construction Specifications Institute (The); [www.csinet.org](http://www.csinet.org).
  - 22. CTI - Cooling Technology Institute; (Formerly: Cooling Tower Institute); [www.cti.org](http://www.cti.org).
  - 23. FSA - Fluid Sealing Association; [www.fluidsealing.com](http://www.fluidsealing.com).
  - 24. ICC - International Code Council; [www.iccsafe.org](http://www.iccsafe.org).
  - 25. ICEA - Insulated Cable Engineers Association, Inc.; [www.icea.net](http://www.icea.net).
  - 26. Intertek - Intertek Group; (Formerly: ETL SEMCO; Intertek Testing Service NA); [www.intertek.com](http://www.intertek.com).

27. ISO - International Organization for Standardization; [www.iso.org](http://www.iso.org).
28. MFMA - Metal Framing Manufacturers Association, Inc.; [www.metalframingmfg.org](http://www.metalframingmfg.org).
29. MHIA - Material Handling Industry of America; [www.mhia.org](http://www.mhia.org).
30. NAAMM - National Association of Architectural Metal Manufacturers; [www.naamm.org](http://www.naamm.org).
31. NACE - NACE International; (National Association of Corrosion Engineers International); [www.nace.org](http://www.nace.org).
32. NAIMA - North American Insulation Manufacturers Association; [www.naima.org](http://www.naima.org).
33. NCMA - National Concrete Masonry Association; [www.ncma.org](http://www.ncma.org).
34. NECA - National Electrical Contractors Association; [www.necanet.org](http://www.necanet.org).
35. NEMA - National Electrical Manufacturers Association; [www.nema.org](http://www.nema.org).
36. NETA - International Electrical Testing Association; [www.netaworld.org](http://www.netaworld.org).
37. NRMCA - National Ready Mixed Concrete Association; [www.nrmca.org](http://www.nrmca.org).
38. NSF - NSF International; (National Sanitation Foundation International); [www.nsf.org](http://www.nsf.org).
39. NSPE - National Society of Professional Engineers; [www.nspe.org](http://www.nspe.org).
40. PDI - Plumbing & Drainage Institute; [www.pdionline.org](http://www.pdionline.org).
41. RCSC - Research Council on Structural Connections; [www.boltcouncil.org](http://www.boltcouncil.org).
42. SEI/ASCE - Structural Engineering Institute/American Society of Civil Engineers; (See ASCE).
43. SMA - Screen Manufacturers Association; [www.smainfo.org](http://www.smainfo.org).
44. SMACNA - Sheet Metal and Air Conditioning Contractors' National Association; [www.smacna.org](http://www.smacna.org).
45. SSPC - SSPC: The Society for Protective Coatings; [www.sspc.org](http://www.sspc.org).
46. SWPA - Submersible Wastewater Pump Association; [www.swpa.org](http://www.swpa.org).
47. UL - Underwriters Laboratories Inc.; [www.ul.com](http://www.ul.com).

- B. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is believed to be accurate as of the date of the Contract Documents.

ICC - International Code Council; [www.iccsafe.org](http://www.iccsafe.org).

1. ICC-ES - ICC Evaluation Service, LLC; [www.icc-es.org](http://www.icc-es.org).

- C. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Information is subject to change and is up-to-date as of the date of the Contract Documents.

1. COE - Army Corps of Engineers; [www.usace.army.mil](http://www.usace.army.mil).
2. DOC - Department of Commerce; National Institute of Standards and Technology; [www.nist.gov](http://www.nist.gov).
3. DOE - Department of Energy; [www.energy.gov](http://www.energy.gov).
4. EPA - Environmental Protection Agency; [www.epa.gov](http://www.epa.gov).
5. FG - Federal Government Publications; [www.gpo.gov](http://www.gpo.gov).
6. GSA - General Services Administration; [www.gsa.gov](http://www.gsa.gov).
7. OSHA - Occupational Safety & Health Administration; [www.osha.gov](http://www.osha.gov).
8. USDJ - Department of Justice; Office of Justice Programs; National Institute of Justice; [www.ojp.usdoj.gov](http://www.ojp.usdoj.gov).

- D. Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.

1. CFR - Code of Federal Regulations; Available from Government Printing Office; [www.gpo.gov/fdsys](http://www.gpo.gov/fdsys).
2. FED-STD - Federal Standard; (See FS).
3. FS - Federal Specification; Available from Department of Defense Single Stock Point; <http://dodssp.daps.dla.mil>.  
Available from Defense Standardization Program; [www.dsp.dla.mil](http://www.dsp.dla.mil).
  - a. Available from General Services Administration; [www.gsa.gov](http://www.gsa.gov).
  - b. Available from National Institute of Building Sciences/Whole Building Design Guide; [www.wbdg.org/cdb](http://www.wbdg.org/cdb).
4. USACE Construction Quality Management for Contractors
5. USAB - United States Access Board; [www.access-board.gov](http://www.access-board.gov).

6. USATBCB - U.S. Architectural & Transportation Barriers Compliance Board; (See USAB).

**PART 2 - PRODUCTS (Not Used)**

**PART 3 - EXECUTION (Not Used)**

**END OF SECTION 01 42 20**

**SECTION 01 50 00 - TEMPORARY FACILITIES AND CONTROLS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section includes requirements for temporary conditions, support facilities, and security and protection facilities.
- B. References
  - 1. SECTION 01 00 10 – General Requirements For Services Furnished By FRA.

**1.2 SUBMITTALS**

- A. Site Plan: Show temporary facilities, utility hookups, staging areas, and parking areas for construction personnel.
- B. Soil Erosion and Sedimentation Control Plan: Show compliance with environmental permit requirements, including but not limited to the U.S. Army Corps of Engineering Regional Permit, the Illinois Environmental Protection Agency National Pollutant Discharge Elimination System permit, and the Stormwater Pollution Prevention Plan.
- C. Traffic Control Plan
- D. Moisture-Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage.
  - 1. Describe delivery, handling, and storage provisions for materials subject to water absorption or water damage.
  - 2. Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and replacing water-damaged Work.
  - 3. Indicate sequencing of work that requires water, such as sprayed fire-resistive materials, plastering, and terrazzo grinding, and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.
- E. Dust- and HVAC-Control Plan: Submit coordination drawing and narrative that indicates the dust- and HVAC-control measures proposed for use, proposed locations, and proposed time frame for their operation. Include the following:  
Locations of dust-control partitions at each phase of work.
  - 1. HVAC system isolation schematic drawing.
  - 2. Location of proposed air-filtration system discharge.
  - 3. Waste-handling procedures.
  - 4. Other dust-control measures.

**1.3 QUALITY ASSURANCE**

- A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
- B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

**1.4 PROJECT CONDITIONS**

- A. Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before FRA's acceptance, regardless of previously assigned responsibilities.

**PART 2 - PRODUCTS****2.1 MATERIALS**

- A. Chain-Link Fencing: Minimum 2-inch, 0.148-inch thick, galvanized-steel, chain-link fabric fencing; minimum 6 feet high with galvanized-steel pipe posts; minimum 2-3/8-inch-OD line posts and 2-7/8-inch-OD corner and pull posts, with 1-5/8-inch-OD top rails.

**2.2 TEMPORARY FACILITIES**

- A. Field Offices, General: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.
- B. Field Office, Construction Personnel: Of sufficient size to accommodate needs of construction personnel office activities and to accommodate Project meetings specified in other Division 01 Sections. Keep office clean and orderly.
- C. Sanitary Facilities: Provide temporary toilets, wash facilities, and hot, cold and drinking water for use of construction personnel. Comply with authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.
- D. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations. Store combustible materials apart from building.
- E. Store combustible materials apart from building.

**2.3 EQUIPMENT**

- A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.
- B. HVAC Equipment: Unless FRA authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.
  - 1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
  - 2. Heating, Cooling, and Dehumidifying Units: Listed and labeled for type of fuel being consumed, by a qualified testing agency acceptable to authorities having jurisdiction and marked for intended location and application.
  - 3. Permanent HVAC System: If FRA authorizes use of permanent HVAC system for temporary use during construction, provide filter with MERV of 8 at each return-air grille in system and remove at end of construction and clean HVAC system as required in Section 01 77 00 "Closeout Procedures."

**PART 3 - EXECUTION****3.1 TEMPORARY FACILITIES, GENERAL**

- A. Coordinate construction and use of temporary facilities with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.
  - 1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. See other Sections for disposition of salvaged materials that are designated as FRA's property.

**3.2 INSTALLATION, GENERAL**

- A. Temporary buildings (e.g., storage sheds, shops, offices) and utilities may be erected by the Subcontractor only with the FRA approval and shall be built with labor and materials furnished by the Subcontractor without expense to FRA. The temporary buildings and utilities shall remain the property of the Subcontractor and shall be removed by the Subcontractor at its expense upon completion of the work. With the written consent of FRA, the buildings and utilities may be abandoned and need not be removed.
- B. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
  - 1. Locate facilities to limit site disturbance as specified in Section 01 10 00 "Summary."
  - 2. All installations shall be subject to FRA approval.
- C. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

**3.3 TEMPORARY UTILITY INSTALLATION**

- A. General: Install temporary service.
  - 1. Arrange with utility company, FRA, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
  - 2. Refer to Section 01 00 10 General Requirements for provisions for use of FRA's existing power.
- B. Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.
- C. Fire Protection: Temporary fire protection shall be in accordance with the OSHA (29 CFR 1926).
  - 1. An approved fire extinguisher shall be provided by the Subcontractor on all trucks and similar equipment, at all enclosures, and at on-site construction offices.
  - 2. Each extinguisher shall be inspected monthly and a date tag certifying adequacy of the charge and workability of the extinguisher shall be affixed.
  - 3. The Subcontractor shall remove the temporary extinguishers at the conclusion of the job.
- D. Water Service: Install water service and distribution piping in sizes and pressures adequate for construction.
- E. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.
- F. Heating: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.

1. Provide protective coverings and temporary enclosures as necessary to protect the work and to provide a safe working environment for personnel.
  2. Provide temporary dehumidification systems when required to reduce ambient and substrate moisture levels to level required to allow installation or application of finishes and their proper curing or drying.
  3. Coal or kerosene type salamanders, pots or open fires shall not be permitted.
  4. Where permanent heating equipment has been installed and made operational prior to completion of the project, the Subcontractor may request temporary use of such equipment, at no cost, provided it is properly maintained by the Subcontractor and that all required warranties are extended to include the period of use by the Subcontractor prior to Final Acceptance of the Project by FRA. Such equipment shall be turned over to FRA in like-new condition, including new filters and similar consumables
- G. Ventilation: Temporary ventilation shall be sufficient to provide a safe working environment for construction personnel, in accordance with OSHA 29 CFR 1926.57. Subcontractor shall provide exhaust and supply air fans, ducting and other equipment as needed.
- H. Electric Power Service: Provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations.
- I. Lighting: Provide temporary lighting throughout the site with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions. The installation shall comply with the National Electric Code (NFPA 70)
1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.
  2. Install lighting for Project identification sign.
- J. Telephone Service: Provide temporary telephone service in common-use facilities for use by all construction personnel. Install Wi-Fi cell phone access equipment and one land-based telephone line(s) for each field office.
1. At each telephone, post a list of important telephone numbers.
    - a. Police and fire departments.
    - b. Ambulance service.
    - c. Contractor's home office.
    - d. Contractor's emergency after-hours telephone number.
    - e. Architect/Engineer's office.
    - f. Engineers' offices.
    - g. FRA's office.
    - h. Principal subcontractors' field and home offices.
- K. Electronic Communication Service: Provide secure Wi-Fi wireless connection to internet with provisions for access by FRA and CMg.

### 3.4 SUPPORT FACILITIES INSTALLATION

- A. General: Comply with the following:
1. Provide construction for temporary offices, shops, and sheds located within construction area or within 30 feet of building lines that is noncombustible according to ASTM E 136. Comply with NFPA 241.
  2. Maintain support facilities through Substantial Completion. After Substantial Completion, maintain support facilities at a level to support personnel through Final Acceptance. FRA
  3. Temporary Roads and Paved Areas: Construct and maintain temporary roads and paved areas adequate for construction operations. Locate temporary roads and paved areas within construction limits indicated on Drawings.
  4. Provide dust-control treatment that is nonpolluting and nontracking. Reapply treatment as required to minimize dust.

5. Temporary Use of Permanent Roads and Paved Areas: Locate temporary roads and paved areas in same location as permanent roads and paved areas. Construct and maintain temporary roads and paved areas adequate for construction operations. Extend temporary roads and paved areas, within construction limits indicated, as necessary for construction operations.
  6. Coordinate elevations of temporary roads and paved areas with permanent roads and paved areas.
  7. Prepare subgrade and install subbase and base for temporary roads and paved areas according to Section 32 15 45.
  8. Recondition base after temporary use, including removing contaminated material, regrading, proof rolling, compacting, and testing.
  9. Traffic Controls: Submit traffic control plan covering each phase of construction for approval by Fermilab.
  10. Protect existing site improvements to remain including curbs, pavement, and utilities.
  11. Maintain access for fire-fighting equipment and access to fire hydrants.
  12. Access to MI-14 and MI-20 driveways must be maintained at all times or temporary drives as approved by FRA.
  13. Parking: Use designated areas of FRA's existing parking areas for construction personnel.
- B. Temporary Drainage: Shall be sufficient to remove standing water and prevent flooding.
1. Subcontractor shall furnish pumping equipment and other dewatering equipment as required for proper operation.
  2. Pump discharges from dewatering activities shall be intercepted by silt removal or sedimentation basins before being directed to natural drainage courses and away from adjacent work limits of other sub-tier subcontractors, Separate Subcontractors, and other work at the FRA site
- C. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.
1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties or endanger permanent Work or temporary facilities.
  2. Remove snow and ice as required to minimize accumulations.
- D. Snow Removal: The Subcontractor shall plow roads and hardstands within the construction limits within 12 hours when snow depth is 2 inches or greater. The Subcontractor shall use deicing products on roads and hardstands when ice is present.
- E. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.
1. Identification Signs: Provide Project identification signs as indicated on Drawings.
  2. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.  
Provide temporary, directional signs for construction personnel and visitors.
  3. Maintain and touchup signs so they are legible at all times.
- F. Waste Disposal Facilities: Comply with requirements specified in Section 01 74 19 "Construction Waste Management and Disposal."
- G. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with progress cleaning requirements in Section 01 73 00 "Execution."
- H. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.
1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

**3.5 SECURITY AND PROTECTION FACILITIES INSTALLATION**

- A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.
- B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
- C. Comply with work restrictions specified in Section 01 10 00 "Summary."
- D. Temporary Erosion and Sedimentation Control: Comply with requirements of 2003 EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent and requirements specified in Section 31 25 13 "Erosion and Sediment Control."
- E. Stormwater Control: Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.
- F. Tree and Plant Protection: Comply with requirements specified in Section 01 56 39 "Temporary Tree and Plant Protection."
- G. Site Enclosure Fence: Before construction operations begin, furnish, and install site enclosure fence in a manner that will prevent people and animals from easily entering site except by entrance gates.
  - 1. Extent of Fence: As required to enclose entire Project site or portion determined sufficient to accommodate construction operations as indicated on Drawings.
  - 2. Maintain security by limiting number of keys and restricting distribution to authorized personnel. Furnish one set of keys to FRA.
- H. Security Enclosure and Lockup: Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each work day.
- I. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
- J. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities.
- K. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire-prevention program.
  - 1. Prohibit smoking in construction areas. Comply with additional limits on smoking specified in other Sections.
  - 2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition in accordance with requirements of authorities having jurisdiction.
  - 3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
  - 4. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign, stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

### 3.6 MOISTURE AND MOLD CONTROL

- A. Protect stored materials and installed Work in accordance with Moisture and Mold Protection Plan.
- B. Exposed Construction Period: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:
  - 1. Protect porous materials from water damage.
  - 2. Protect stored and installed material from flowing or standing water.
  - 3. Keep porous and organic materials from coming into prolonged contact with concrete.
  - 4. Remove standing water from decks.
  - 5. Keep deck openings covered or dammed.
- C. Partially Enclosed Construction Period: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:
  - 1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.
  - 2. Keep interior spaces reasonably clean and protected from water damage.
  - 3. Periodically collect and remove waste containing cellulose or other organic matter.
  - 4. Discard or replace water-damaged material.
  - 5. Do not install material that is wet.
  - 6. Discard and replace stored or installed material that begins to grow mold.
  - 7. Perform work in a sequence that allows wet materials adequate time to dry before enclosing the material in gypsum board or other interior finishes.
- D. Controlled Construction Period: After completing and sealing of the building enclosure but prior to the full operation of permanent HVAC systems, maintain as follows:
  - 1. Control moisture and humidity inside building by maintaining effective dry-in conditions.
  - 2. Use temporary or permanent HVAC system to control humidity within ranges specified for installed and stored materials.
  - 3. Comply with manufacturer's written instructions for temperature, relative humidity, and exposure to water limits.

Hygroscopic materials that may support mold growth, including wood and gypsum-based products, that become wet during the course of construction and remain wet for 48 hours are considered defective and require replacing.

    - a. Measure moisture content of materials that have been exposed to moisture during construction operations or after installation. Record readings beginning at time of exposure and continuing daily for 48 hours. Identify materials containing moisture levels higher than allowed. Report findings in writing to FRA and Architect/Engineer.
    - b. Remove and replace materials that cannot be completely restored to their manufactured moisture level within 48 hours.

### 3.7 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. Maintenance: Maintain facilities in good operating condition until removal.
  - 1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
- C. Operate Project-identification-sign lighting daily from dusk until 12:00 midnight.

- D. Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.
- E. Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
1. Materials and facilities that constitute temporary facilities are property of Subcontractor. FRA reserves right to take possession of Project identification signs.
  2. Remove temporary roads and paved areas not intended for or acceptable for integration into permanent construction. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.
  3. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 01 77 00 "Closeout Procedures."

**END OF SECTION 01 50 00**

**SECTION 01 56 39 - TEMPORARY TREE AND PLANT PROTECTION****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section includes general protection and pruning of existing trees and plants that are affected by execution of the Work, whether temporary or permanent construction.
- B. Related Sections:
  - 1. SECTION 01 50 00: Temporary Facilities And Controls.
  - 2. SECTION 31 10 00: Site Clearing.

**1.2 DEFINITIONS**

- A. Caliper: Diameter of a trunk measured by a diameter tape or the average of the smallest and largest diameters at 6 inches above the ground for trees up to, and including, 4-inch size; and 12 inches above the ground for trees larger than 4-inch size.
- B. Plant-Protection Zone: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction, and indicated on Drawings.
- C. Tree-Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction, and indicated on Drawings defined by a circle concentric with each tree with a radius 1.5 times the diameter of the drip line unless otherwise indicated. Tree-protection zones are to be identified in the field with FRA present.
- D. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

**1.3 SUBMITTALS**

- A. Product Data: For each type of product indicated.
- B. Samples for Verification: For each type of the following:
  - 1. Organic Mulch: 1-pint volume of organic mulch; in sealed plastic bags labeled with composition of materials by percentage of weight and source of mulch.
  - 2. Protection-Zone Signage: Full-size Samples of each size and text, ready for installation.
- C. Tree Pruning Schedule: Written schedule detailing scope and extent of pruning of trees to remain that interfere with or are affected by construction.
  - 1. Species and size of tree.
  - 2. Location on site plan. Include unique identifier for each.
  - 3. Reason for pruning.
  - 4. Description of pruning to be performed.
  - 5. Description of maintenance following pruning.
- D. Qualification Data: For qualified arborist and tree service firm.
- E. Certification: From arborist, certifying that trees indicated to remain have been protected during construction according to recognized standards and that trees were promptly and properly treated and repaired when damaged.

- F. Maintenance Recommendations: From arborist, for care and protection of trees affected by construction during and after completing the Work.
- G. Existing Conditions: Documentation of existing trees and plantings indicated to remain, which establishes preconstruction conditions that might be misconstrued as damage caused by construction activities.
  - 1. Use sufficiently detailed photographs or videotape.
  - 2. Include plans and notations to indicate specific wounds and damage conditions of each tree or other plants designated to remain.

#### **1.4 QUALITY ASSURANCE**

- A. Arborist Qualifications: Certified Arborist as certified by ISA.
- B. Tree Service Firm Qualifications: An experienced tree service firm that has successfully completed temporary tree and plant protection work similar to that required for this Project and that will assign an experienced, qualified arborist to Project site during execution of the Work.
- C. Preinstallation Conference: Conduct conference at Project site.
  - 1. Review methods and procedures related to temporary tree and plant protection including, but not limited to, the following:
    - a. Project Schedule. Verify availability of materials, personnel, and equipment needed to make progress and avoid delays.
    - b. Enforcing requirements for protection zones.
    - c. Arborist's responsibilities.
    - d. Field quality control.

#### **1.5 PROJECT CONDITIONS**

- A. The following practices are prohibited within protection zones:
  - 1. Storage of construction materials, debris, or excavated material.
  - 2. Parking vehicles or equipment.
  - 3. Foot traffic.
  - 4. Erection of sheds or structures.
  - 5. Impoundment of water.
  - 6. Excavation or other digging unless otherwise indicated.
  - 7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.
- B. Do not direct vehicle or equipment exhaust toward protection zones.
- C. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones and organic mulch.

### **PART 2 - PRODUCTS**

#### **2.1 MATERIALS**

- A. Topsoil: Natural or cultivated top layer of the soil profile or manufactured topsoil; containing organic matter and sand, silt, and clay particles; friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than 1 inch in diameter; and free of weeds, roots, and toxic and other non-soil materials.
  - 1. Obtain topsoil only from well-drained sites where topsoil is 4 inches deep or more; do not obtain from bogs or marshes.

- B. Protection-Zone Fencing: Fencing fixed in position and meeting the following requirements.
1. Chain-Link Protection-Zone Fencing: Galvanized-steel fencing fabricated from minimum 2-inch opening, 0.148-inch diameter wire chain-link fabric; with pipe posts, minimum 2-3/8-inch OD line posts, and 2-7/8-inch OD corner and pull posts and 0.177-inch-diameter bottom tension wire; with tie wires, hog ring ties, and other accessories for a complete fence system.
    - a. Height: 6 feet.
  2. Plywood Protection-Zone Fencing: Plywood framed with four 2-by-4-inch rails, with 4-by-4-inch preservative-treated wood posts spaced not more than 8 feet apart.
    - a. Height: 6 feet.
  3. Plywood and Lumber: Comply with requirements in Section 06 10 00 "Rough Carpentry."
  4. Gates: Single swing access gates matching material and appearance of fencing, to allow for maintenance activities within protection zones; leaf width 36 inches.
- C. Protection-Zone Signage: Shop-fabricated, rigid plastic or metal sheet with attachment holes pre-punched and reinforced; legibly printed with nonfading lettering and as follows:
1. Lettering: 3-inch high minimum, black characters on white background.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Erosion and Sedimentation Control: Examine the site to verify that temporary erosion- and sedimentation-control measures are in place. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.
- B. For the record, prepare written report, endorsed by arborist, listing conditions detrimental to tree and plant protection.

#### 3.2 PREPARATION

- A. Locate and clearly identify trees, shrubs, and other vegetation to remain or to be relocated. Tie a 1-inch blue-vinyl tape around each tree trunk at 54 inches above the ground.
- B. Protect tree root systems from damage caused by runoff or spillage of noxious materials while mixing, placing, or storing construction materials. Protect root systems from ponding, eroding, or excessive wetting caused by dewatering operations.
- C. Tree-Protection Zones: Mulch areas inside tree-protection zones and other areas indicated. Apply 4-inch average thickness of organic mulch. Do not place mulch within 6 inches of tree trunks.

#### 3.3 TREE AND PLANT PROTECTION ZONES

- A. Protection Zone Fencing: Install protection-zone fencing along edges of protection zones before materials or equipment are brought on the site and construction operations begin in a manner that will prevent people from easily entering protected area except by entrance gates. Construct fencing so as not to obstruct safe passage or visibility at vehicle intersections where fencing is located adjacent to pedestrian walkways or in close proximity to street intersections, drives, or other vehicular circulation.
1. Chain-Link Fencing: Install to comply with ASTM F 567 and with manufacturer's written instructions.
  2. Posts: Set or drive posts into ground one-third the total height of the fence without concrete footings. Where a post is located on existing paving or concrete to remain, provide appropriate means of post support acceptable to FRA.

3. Access Gates: Install where indicated; adjust to operate smoothly, easily, and quietly, free of binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range. Confirm that latches and locks engage accurately and securely without forcing or binding.
- B. Protection Zone Signage: Install protection-zone signage in visibly prominent locations in a manner approved by FRA. Install one sign spaced approximately every 20 feet on protection-zone fencing, but no fewer than signs with each facing a different direction.
- C. Maintain protection zones free of weeds and trash.
- D. Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations, in a manner approved by FRA.
- E. Maintain protection-zone fencing and signage in good condition as acceptable to FRA and remove when construction operations are complete and equipment has been removed from the Project Site.
  1. Do not remove protection-zone fencing, even temporarily, to allow deliveries or equipment access through the protection zone.
  2. Temporary access is permitted subject to preapproval in writing by arborist if a root buffer effective against soil compaction is constructed as directed by arborist. Maintain root buffer so long as access is permitted.

### 3.4 EXCAVATION

- A. Do not excavate within protection zones without written approval by FRA.
- B. Trenching near Trees: Where utility trenches are required within protection zones, hand excavate under or around tree roots or tunnel under the roots by drilling, auger boring, or pipe jacking. Do not cut main lateral tree roots or taproots; cut only smaller roots that interfere with installation of utilities. Cut roots as required for root pruning.
- C. Redirect roots in backfill areas where possible. If encountering large, main lateral roots, expose roots beyond excavation limits as required to bend and redirect them without breaking. If encountered immediately adjacent to location of new construction and redirection is not practical, cut roots approximately 3 inches back from new construction and as required for root pruning.
- D. Do not allow exposed roots to dry out before placing permanent backfill. Provide temporary earth cover or pack with peat moss and wrap with burlap. Water and maintain in a moist condition. Temporarily support and protect roots from damage until they are permanently relocated and covered with soil.

### 3.5 ROOT PRUNING

- A. Prune roots that are affected by temporary and permanent construction. Prune roots as follows:
  1. Cut roots manually by digging a trench and cutting exposed roots with sharp pruning instruments; do not break, tear, chop, or slant the cuts. Do not use a backhoe or other equipment that rips, tears, or pulls roots.
  2. Cut Ends: Coat cut ends of roots more than 1-1/2 inches in diameter with an emulsified asphalt or other coating formulated for use on damaged plant tissues and that is acceptable to arborist.
  3. Temporarily support and protect roots from damage until they are permanently redirected and covered with soil.
  4. Cover exposed roots with burlap and water regularly.
  5. Backfill as soon as possible according to requirements in Section 31 23 00.

- B. Root Pruning at Edge of Protection Zone: Prune roots 12 inches outside of the protection zone, by cleanly cutting all roots to the depth of the required excavation.
- C. Root Pruning within Protection Zone: Clear and excavate by hand to the depth of the required excavation to minimize damage to root systems. Use narrow-tine spading forks, comb soil to expose roots, and cleanly cut roots as close to excavation as possible.

### 3.6 CROWN PRUNING

- A. Prune branches that are affected by temporary and permanent construction. Prune branches as follows:
  - 1. Prune trees to remain to compensate for root loss caused by damaging or cutting root system. Provide subsequent maintenance during Contract period as recommended by arborist.
  - 2. Pruning Standards: Prune trees according to ANSI A300 (Part 1).
  - 3. Cut branches with sharp pruning instruments; do not break or chop.
  - 4. Do not apply pruning paint to wounds.
- B. Chip removed branches and dispose of off-site.

### 3.7 REGRADING

- A. Lowering Grade: Where new finish grade is indicated below existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the protection zone.
- B. Lowering Grade within Protection Zone: Where new finish grade is indicated below existing grade around trees, slope grade away from trees as recommended by arborist unless otherwise indicated.
  - 1. Root Pruning: Prune tree roots exposed by lowering the grade. Do not cut main lateral roots or taproots; cut only smaller roots. Cut roots as required for root pruning.
- C. Raising Grade: Where new finish grade is indicated above existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the protection zone.
- D. Minor Fill within Protection Zone: Where existing grade is 2 inches or less below elevation of finish grade, fill with topsoil. Place topsoil in a single uncompacted layer and hand grade to required finish elevations.

### 3.8 FIELD QUALITY CONTROL

- A. Inspections: Engage a qualified arborist to direct plant-protection measures in the vicinity of trees, shrubs, and other vegetation indicated to remain and to prepare inspection reports.

### 3.9 REPAIR AND REPLACEMENT

- A. Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations, in a manner approved by FRA.
  - 1. Submit details of proposed root cutting and tree and shrub repairs.
  - 2. Have arborist perform the root cutting, branch pruning, and damage repair of trees and shrubs.
  - 3. Treat damaged trunks, limbs, and roots according to arborist's written instructions.
  - 4. Perform repairs within 24 hours.
  - 5. Replace vegetation that cannot be repaired and restored to full-growth status, as determined by FRA.

- B. Trees: Remove and replace trees indicated to remain that are more than 25 percent dead or in an unhealthy condition or are damaged during construction operations that FRA determines are incapable of restoring to normal growth pattern.
  - 1. Provide new trees of same size and species as those being replaced for each tree that measures 4 inches or smaller in caliper size.
  
- C. Soil Aeration: Where directed by FRA, aerate surface soil compacted during construction. Aerate 10 feet beyond drip line and no closer than 36 inches to tree trunk. Drill 2-inch diameter holes a minimum of 12 inches deep at 24 inches o.c. Backfill holes with an equal mix of augured soil and sand.

### **3.10 DISPOSAL OF SURPLUS AND WASTE MATERIALS**

- A. Remove excess excavated material, displaced trees, trash and debris, and legally dispose of them off FRA's property.

**END OF SECTION 01 56 39**

**SECTION 01 60 00 - PRODUCT REQUIREMENTS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.
- B. Related Requirements:
  - 1. SECTION 01 00 10: General Requirements
  - 2. SECTION 01 25 00: Substitution Procedures
  - 3. SECTION 01 33 00: Submittals
  - 4. SECTION 01 41 00: Quality Requirements
  - 5. SECTION 01 42 00: References.

**1.2 DEFINITIONS**

- A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
  - 1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature, that is current as of date of the Contract Documents.
  - 2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
  - 3. Comparable Product: Product that is demonstrated and approved through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B. Basis-of-Design Product Specification: A specification in which a specific manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specification.

**1.3 SUBMITTALS**

- A. Provide documentation showing that low-emitting materials have been used. Products shall not use ozone-depleting or high global warming potential chemicals. If any recycled materials have been used, indicate percent.
- B. Comparable Product Requests: Submit request for consideration of each comparable product. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.  
Include data to indicate compliance with the requirements specified in "Comparable Products" Article.
  - 1. FRA's Action: If necessary, FRA will request additional information or documentation for evaluation using the Revise and Resubmit action as specified in Section 01 33 00 "Submittals." one week of receipt of a comparable product request. FRA will notify Subcontractor of approval or rejection of proposed comparable product through the submittal process.  
Form of Approval: As specified in Section 01 33 00 "Submittals."

- a. Use product specified if FRA does not issue a decision on use of a comparable product request within time allocated.
2. Basis-of-Design Product Specification Submittal: Comply with requirements in Section 01 33 00 "Submittals." Show compliance with requirements.

#### 1.4 QUALITY ASSURANCE

- A. Compatibility of Options: If Subcontractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.
  1. Each Subcontractor is responsible for providing products and construction methods compatible with products and construction methods of other sub-tier contractors or Separate Subcontractors.
  2. If a dispute arises between contractors over concurrently selectable but incompatible products, FRA will determine which products shall be used.

#### 1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.
- B. Delivery and Handling:
  1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
  2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
  3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
  4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.
- C. Storage:
  1. Store products to allow for inspection and measurement of quantity or counting of units.
  2. Store materials in a manner that will not endanger Project structure.
  3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
  4. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
  5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
  6. Protect stored products from damage and liquids from freezing.
  7. Provide a secure location and enclosure at Project site for storage of materials and equipment by FRA's construction forces. Coordinate location with FRA.

#### 1.6 PRODUCT WARRANTIES

- A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Subcontractor of obligations under requirements of the Contract Documents.
  1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to FRA.
  2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for FRA.

- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.
  - 1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
  - 2. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
  - 3. See other Sections for specific content requirements and particular requirements for submitting special warranties.
  
- C. Submittal Time: Comply with requirements in Section 01 77 00 "Closeout Procedures."

## PART 2 - PRODUCTS

### 2.1 PRODUCT SELECTION PROCEDURES

- A. Basis of Design Products listed on the drawings or in the specifications are intended to define material and performance qualities but does not guarantee compliance with Buy America Act. If a basis of design product does not meet compliance per the Buy America Act it will be the responsibility of the Subcontractor to select and equivalent product that satisfies all Buy America Act requirements.
  
- B. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.
  - 1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
  - 2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
  - 3. FRA reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
  - 4. Where products are accompanied by the term "as selected," FRA will make selection.
  - 5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
  - 6. "Products" or "Manufacturers" paragraphs where FRA allows naming of available products or manufacturers but does not limit selection to those named and does not consider unnamed products as substitutions, which may require a Change Order or Construction Change Directive.
  
- C. Product Selection Procedures:
  - 1. It shall be the responsibility of the Subcontractor to select and provide products that comply with the Buy American Act and all quality and performance standards set forth on the Drawings and in the Specifications.
  - 2. Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Subcontractor's convenience will not be considered.
  - 3. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Subcontractor's convenience will not be considered.
  - 4. Products:
    - a. Nonrestricted List: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product.
  - 5. Manufacturers:

- a. Nonrestricted List: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed, or a product by an unnamed manufacturer, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed manufacturer's product.
6. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.

## **2.2 COMPARABLE PRODUCTS**

- A. Conditions for Consideration: FRA will consider Subcontractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, FRA may return requests without action, except to record noncompliance with these requirements:
  1. Evidence that the proposed product does not require revisions to the Contract Documents, that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
  2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
  3. Evidence that proposed product provides specified warranty.
  4. List of similar installations for completed projects with project names and addresses and names and addresses of Architect/Engineers and FRAs, if requested.
  5. Samples, if requested.

## **PART 3 - EXECUTION (Not Used)**

**END OF SECTION 01 60 00**

**SECTION 01 73 00 - EXECUTION****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:
  - 1. Construction layout.
  - 2. Field engineering and surveying.
  - 3. Installation of the Work.
  - 4. Cutting and patching.
  - 5. Coordination of FRA-installed products.
  - 6. Progress cleaning.
  - 7. Starting and adjusting.
  - 8. Protection and repair of installed construction.
  
- B. Related Requirements:
  - 1. SECTION 01 33 00: Submittal Procedures.
  - 2. SECTION 01 41 00: Quality Requirements.
  - 3. SECTION 01 77 00: Closeout Procedures.

**1.2 DEFINITIONS**

- A. Cutting: Removal of in-place construction necessary to permit installation or performance of other work.
  
- B. Patching: Fitting and repair work required to restore construction to original conditions after installation of other work.

**1.3 PREINSTALLATION MEETINGS**

- A. Layout Conference: Conduct conference at Project site.
  - 1. Prior to establishing layout of new perimeter and structural column grid(s), review building location requirements. Review benchmark, control point, and layout and dimension requirements. Inform Architect/Engineer and FRA of scheduled meeting. Require representatives of each entity directly concerned with Project layout to attend, including the following:
    - a. Subcontractor's superintendent.
    - b. Professional surveyor responsible for performing Project surveying and layout.
  - 2. Review meanings and intent of dimensions, notes, terms, graphic symbols, and other layout information indicated on the Drawings.
  - 3. Review requirements for including layouts on Shop Drawings and other submittals.
  - 4. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

**1.4 SUBMITTALS**

- A. Qualification Data: For land surveyor.
  
- B. Certificates: Submit certificate signed by land surveyor certifying that location and elevation of improvements comply with requirements.

- C. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.
- D. Certified Surveys: Submit one copies and a digital reproduction signed by land surveyor.
- E. Final Property Survey: Submit 1 copy and a digital reproduction showing the Work performed and record survey data.
- F. Cutting and Patching Plan: Submit plan describing procedures at least 10 days prior to the time cutting and patching will be performed. Include the following information:
  - 1. Extent: Describe reason for and extent of each occurrence of cutting and patching.
  - 2. Changes to In-Place Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building appearance and other significant visual elements.
  - 3. Products: List products to be used for patching and firms or entities that will perform patching work.
  - 4. Dates: Indicate when cutting and patching will be performed.
  - 5. Utilities and Mechanical and Electrical Systems: List services and systems that cutting and patching procedures will disturb or affect. List services and systems that will be relocated and those that will be temporarily out of service. Indicate length of time permanent services and systems will be disrupted. Include description of provisions for temporary services and systems during interruption of permanent services and systems.

## 1.5 QUALITY ASSURANCE

- A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.
- B. Professional Engineer Qualifications: Refer to Section 01 40 00 "Quality Requirements."
- C. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.
  - 1. Structural Elements: When cutting and patching structural elements, or when encountering the need for cutting and patching of elements whose structural function is not known, notify FRA of locations and details of cutting and await directions from FRA before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection.
  - 2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety. Operational elements include the following:
    - a. Primary operational systems and equipment.
    - b. Fire separation assemblies.
    - c. Air or smoke barriers.
    - d. Fire-suppression systems.
    - e. Plumbing piping systems.
    - f. Mechanical systems piping and ducts.
    - g. Control systems.
    - h. Communication systems.
    - i. Fire-detection and -alarm systems.
    - j. Conveying systems.
    - k. Electrical wiring systems.
    - l. Operating systems of special construction.

3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety.
  4. Water, moisture, or vapor barriers.
    - a. Membranes and flashings.
    - b. Exterior curtain-wall construction.
    - c. Sprayed fire-resistive material.
    - d. Equipment supports.
    - e. Piping, ductwork, vessels, and equipment.
    - f. Noise- and vibration-control elements and systems.
  5. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in FRA's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
- D. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

## **PART 2 - PRODUCTS**

### **2.1 MATERIALS**

- A. Comply with requirements specified in other Sections.
- B. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces. Use cleaning products that comply with Green Seal's GS-37, or if GS-37 is not applicable, use products that comply with the California Code of Regulations maximum allowable VOC levels.
- C. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities, mechanical and electrical systems, and other construction affecting the Work.
  1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; underground electrical services, and other utilities.
  2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.
- B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
  1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.

- C. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
  - 1. Description of the Work.
  - 2. List of detrimental conditions, including substrates.
  - 3. List of unacceptable installation tolerances.
  - 4. Recommended corrections.
- D. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

### **3.2 PREPARATION**

- A. Existing Utility Information: Furnish information to local utility and/or the FRA that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
- B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Subcontractor, submit a request for information to FRA according to requirements in Section 01 30 00 "Project Management and Coordination."

### **3.3 CONSTRUCTION LAYOUT**

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify FRA Construction Coordinator promptly.
- B. General: Engage a land surveyor to lay out the Work using accepted surveying practices.
  - 1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
  - 2. Establish limits on use of Project site.
  - 3. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
  - 4. Inform installers of lines and levels to which they must comply.
  - 5. Check the location, level and plumb, of every major element as the Work progresses.
  - 6. Notify FRA when deviations from required lines and levels exceed allowable tolerances.
  - 7. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.
- C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.
- D. Lines and Levels: Locate and lay out control lines and levels for structures, foundations, columns, grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.

- E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by FRA Construction Coordinator.

### **3.4 FIELD ENGINEERING**

- A. Identification: FRA will identify existing benchmarks, control points, and property corners.
- B. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.
  - 1. Do not change or relocate existing benchmarks or control points without prior written approval of FRA. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to FRA Construction Coordinator before proceeding.
  - 2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.
- C. Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.
  - 1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
  - 2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
  - 3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.
- D. Certified Survey: On completion of foundation walls, major site improvements, and other work requiring field-engineering services, prepare a certified survey showing dimensions, locations, angles, and elevations of construction and sitework.
- E. Final Property Survey: Engage a land surveyor to prepare a final property survey showing significant features (real property) for Project. Include on the survey a certification, signed by land surveyor, that principal metes, bounds, lines, and levels of Project are accurately positioned as shown on the survey.
  - 1. Show boundary lines, monuments, streets, site improvements and utilities, existing improvements and significant vegetation, adjoining properties, acreage, grade contours, and the distance and bearing from a site corner to a legal point.

### **3.5 INSTALLATION**

- A. Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
  - 1. Make vertical work plumb and make horizontal work level.
  - 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
  - 3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.
  - 4. Maintain minimum headroom clearance of 96 inches (2440 mm) in occupied spaces and 90 inches (2300 mm) in unoccupied spaces, unless otherwise indicated on Drawings.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.

- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.
- F. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.
- G. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.
  - 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect/Engineer.
  - 2. Allow for movement, including thermal expansion and contraction.
  - 3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- J. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.
- K. Repair or remove and replace damaged, defective, or nonconforming Work.

### **3.6 CUTTING AND PATCHING**

- A. Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
  - 1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Temporary Support: Provide temporary support of Work to be cut.
- C. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- D. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to prevent interruption to occupied areas.
- E. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.

1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
  2. Concrete: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
  3. Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.
  4. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
  5. Proceed with patching after construction operations requiring cutting are complete.
- F. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.
1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
  2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.
  3. Clean piping, conduit, and similar features before applying paint or other finishing materials.
    - a. Restore damaged pipe covering to its original condition.
- G. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
1. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch, corner to corner of wall and edge to edge of ceiling. Provide additional coats until patch blends with adjacent surfaces.
- H. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

### 3.7 PROGRESS CLEANING

- A. Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.
1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
  2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F.
  3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations. Use containers intended for holding waste materials of type to be stored.
  4. Coordinate progress cleaning for joint-use areas where Subcontractor and other contractors are working concurrently.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
1. Remove liquid spills promptly.
  2. Where dust would impair proper execution of the Work, broom-clean the entire work area, as appropriate.

- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Section 01 74 19 "Construction Waste Management and Disposal."
- H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

### **3.8 STARTING AND ADJUSTING**

- A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- B. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.
- C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Manufacturer's Field Service: Comply with qualification requirements in Section 01 40 00 "Quality Requirements."

### **3.9 PROTECTION AND REPAIR OF INSTALLED CONSTRUCTION**

- A. Repair or remove and replace defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.
  - 1. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that already show evidence of repair or restoration.
  - 2. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.
  - 3. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
  - 4. Replace burned-out lamps and starters to comply with requirements for new fixtures.

- B. Comply with manufacturer's written instructions for temperature and relative humidity.

**END OF SECTION 01 73 00**

**SECTION 01 74 19 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section includes administrative and procedural requirements for the following:
  - 1. Recycling nonhazardous demolition and construction waste.
  - 2. Disposing of nonhazardous demolition and construction waste.
- B. Related Requirements:
  - 1. SECTION 01 56 39: Temporary Tree and Plant Protection.
  - 2. SECTION 01 33 00: Submittals.
  - 3. SECTION 31 10 00: Site Clearing.

**1.2 DEFINITIONS**

- A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction operations. Construction waste includes packaging.
- B. Demolition Waste: Building and site improvement materials resulting from selective demolition operations. Demolition waste includes material resulting from demolition of existing buildings and site infrastructure.
- C. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.
- D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.

**1.3 PLAN REQUIREMENTS**

- A. Develop, submit, and implement a Construction Waste Management plan to recycle or salvage at a minimum 50 percent by weight, excluding metals, of the non-hazardous construction, demolition and land clearing materials, excluding soil, for compliance with DOE Guiding Principles. Acceptable means of recycling or salvaging include resale, recycling, or adaptive reuse. Whereas the minimum requirement is 50 percent the Subcontractor shall establish a Project goal of 80 percent.

**1.4 SUBMITTALS**

- A. Construction Plan: Submit construction waste management plan describing methods and procedures for implementation and monitoring compliance including the following:
  - 1. Transportation company hauling construction waste to waste processing facilities.
  - 2. Recycling and adaptive reuse processing facilities and waste type each facility will accept.
  - 3. Construction waste materials anticipated for recycling and adaptive reuse.
  - 4. On site sorting and site storage methods.
- B. Progress reports are to be submitted to FRA on a monthly basis validating that the plan is being complied with.

- C. Submit documentation prior to Substantial Completion, substantiating construction waste management plan was maintained and goals were achieved.
  - 1. Trash: Quantity by weight deposited in landfills. Include associated fees, transportation costs, container rentals, and taxes for total cost of disposal.
  - 2. Salvaged Material: Quantity by weight with destination for each type of material salvaged for resale, recycling, or adaptive reuse. Include associated fees, transportation costs, container rentals, and taxes for total cost of disposal. Also include reimbursements due to salvage resale.
  - 3. Total Cost: Indicate total cost or savings for implementation of construction waste management plan.
  
- D. Informational submittals:
  - 1. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.
  - 2. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

## 1.5 CONSTRUCTION WASTE MANAGEMENT PLAN

- A. Construction Waste Landfill Diversion: refer to Section 1.4.A.
- B. Implement construction waste management plan at start of construction.
- C. Review construction waste management plan at pre-construction meeting and progress meetings
- D. Distribute approved construction waste management plan to sub-tier contractors and others affected by Plan Requirements.
- E. Oversee plan implementation, instruct construction personnel for plan compliance, and document plan results.

## 1.6 CONSTRUCTION WASTE RECYCLING

- A. The Contractor shall have the option of sorting the materials off-site or on-site.
  - 1. Off-Site: If the Subcontractor chooses to sort the material off-site, it shall provide the provide the name of the vendor and provide procedures on the documentation of the recyclable waste.
  - 2. On-Site: The Subcontractor shall provide separate collection containers for a minimum of the following materials:
    - a. Untreated lumber.
    - b. Gypsum wallboard.
    - c. Paper, paper products, and cardboard.
    - d. Plastics.
    - e. Metals.
    - f. Glass.
    - g. Other salvageable materials

## 1.7 CONSTRUCTION WASTE ADAPTIVE RE-USE

- A. Arrange with processing facility for salvage of construction material and processing for reuse. Do not reuse construction materials on site except as accepted by FRA.

**1.8 QUALITY ASSURANCE**

- A. Refrigerant Recovery Technician Qualifications: Certified by EPA-approved certification program.
- B. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.

**PART 2 - PRODUCTS (Not Used)****PART 3 - EXECUTION****3.1 GENERAL**

- A. No trash burning, dumping, or disposal is permitted on Fermilab property. The disposal of regulated waste generated from the use of materials provided by Fermilab (Government property) shall be the responsibility of the designated FRA representative. Disposal of all other trash and waste materials generated during the performance of this subcontract shall be the responsibility of the Subcontractor and must be performed in compliance with all applicable federal, state and local laws and regulations.
- B. The governing statutes include, but are not limited to, the Resource Conservation and Recovery Act, the Toxic Substances Control Act, the Hazardous Materials Transportation Act, the Illinois Environmental Protection Act/Solid and Special Waste Management Regulations, and the laws and regulations of any other state receiving regulated waste material generated during the performance of this Subcontract.
- C. Every Subcontractor's and sub-tier contractor's recycled or waste dumpster(s) leaving site must have a radiological survey. Coordinate with the FRA Construction Coordinator for this survey prior to dumpster removal.
- D. The Subcontractor shall furnish all necessary dumpsters or containers to prevent dispersion of debris both within and outside of the construction site.

**3.2 PLAN IMPLEMENTATION**

- A. Implement a waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.
- B. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work.
  - 1. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.
- C. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
  - 1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.
  - 2. Comply with Section 01 50 00 "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.

### 3.3 RECYCLING DEMOLITION AND CONSTRUCTION WASTE, GENERAL

- A. FRA-Approved Recycling:
  - 1. The Subcontractor shall utilize a recycling waste hauler, obtain a report on percentage recycled by weight from the vendor and submit the report to the FRA Construction Coordinator.
  - 2. The minimum amount of recycled material is 50% as measured by weight excluding metals.
  - 3. The Subcontractor shall submit a report that details the percentage, by weight, of recycled materials.
- B. Recycle paper and beverage containers used by on-site workers.
- C. Preparation of Waste: Prepare and maintain recyclable waste materials according to recycling or reuse facility requirements. Maintain materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process.
- D. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project Site to the maximum extent practical.
  - 1. Provide appropriately marked containers or bins for controlling recyclable waste until removed from Project site. Include list of acceptable and unacceptable materials at each container and bin. Inspect containers and bins for contamination and remove contaminated materials if found.
  - 2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
  - 3. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
  - 4. Store components off the ground and protect from the weather.
  - 5. Remove recyclable waste from the Project Site and transport to recycling receiver or processor.

### 3.4 RECYCLING DEMOLITION WASTE

- A. Asphalt Paving: Break up and transport paving to asphalt-recycling facility.
- B. Concrete: Remove reinforcement and other metals from concrete and sort with other metals.
  - 1. Pulverize concrete to maximum 1-1/2-inch size.
- C. Masonry: Remove metal reinforcement, anchors, and ties from masonry and sort with other metals.
  - 1. Pulverize masonry to maximum 1-1/2-inch size.
  - 2. Clean and stack undamaged, whole masonry units on wood pallets.
- D. Wood Materials: Sort and stack members according to size, type, and length. Separate lumber, engineered wood products, panel products, and treated wood materials.
- E. Metals: Separate metals by type.
  - 1. FRA remains subject to a DOE-wide suspension of recycling metal originating from radiological areas. Refer to Section 01 00 10 "General Requirements" for requirements pertaining to recycling metals. Off-site disposal of recycled materials, trash, debris, demolished material, pallets, crates, packing materials, rubbish and all waste material shall be the responsibility of the Subcontractor. The goal for recycling construction and demolition waste is 80% based on weight, excluding metals restricted in Section 01 00 10 "General Requirements".
  - 2. Structural Steel: Stack members according to size, type of member, and length.
  - 3. Remove and dispose of bolts, nuts, washers, and other rough hardware.
- F. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location. Remove edge trim and sort with other metals. Remove and dispose of fasteners.
- G. Acoustical Ceiling Panels and Tile: Stack large clean pieces on wood pallets and store in a dry location.

- H. Metal Suspension System: Separate metal members, including trim and other metals from acoustical panels and tile, and sort with other metals.
- I. Carpet: Roll large pieces tightly after removing debris, trash, adhesive, and tack strips.
  - 1. Store clean, dry carpet in a closed container or trailer provided by carpet reclamation agency or carpet recycler.
- J. Carpet Tile: Remove debris, trash, and adhesive.
  - 1. Stack tile on pallet and store clean, dry carpet in a closed container or trailer provided by carpet reclamation agency or carpet recycler.
- K. Piping: Reduce piping to straight lengths and store by type and size. Separate supports, hangers, valves, sprinklers, and other components by type and size.
- L. Conduit: Reduce conduit to straight lengths and store by type and size.
- M. Lamps: Separate lamps by type and store according to requirements in 40 CFR 273.

### 3.5 RECYCLING CONSTRUCTION WASTE

- A. Packaging:
  - 1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
  - 2. Polystyrene Packaging: Separate and bag materials.
  - 3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project Site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
  - 4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.
- B. Wood Materials:
  - 1. Clean Cut-Offs of Lumber: Grind or chip into small pieces.
  - 2. Clean Sawdust: Bag sawdust that does not contain painted or treated wood. Comply with requirements in Section 01 56 39 "Temporary Tree and Plant Protection" for use of clean sawdust as organic mulch.
- C. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location.
  - 1. Clean Gypsum Board: Grind scraps of clean gypsum board using small mobile chipper or hammer mill. Screen out paper after grinding.
- D. Paint: Seal containers and store by type.

### 3.6 DISPOSAL OF WASTE

- A. The governing statutes include, but are not limited to, the Resource Conservation and Recovery Act, the Toxic Substances Control Act, the Hazardous Materials Transportation Act, the Illinois Environmental Protection Act/Solid and Special Waste Management Regulations, and the laws and regulations of any other state receiving regulated waste material generated during the performance of this Subcontract.
  - 1. Where regulated waste is generated (waste regulated by the Resource Conservation and Recovery Act Hazardous, Toxic Substances Control Act, Illinois Special Waste, etc.) the Subcontractor shall immediately notify the FRA Construction Coordinator.
  - 2. Unless specified elsewhere in the Specification Section, all regulated waste shall be disposed through the Fermilab Hazard Control Technology Team.

- B. Regulated Waste:
1. Where regulated waste is generated (waste regulated by the Resource Conservation and Recovery Act Hazardous, Toxic Substances Control Act, Illinois Special Waste, etc.) the Subcontractor shall immediately notify the FRA Construction Coordinator; and
  2. Unless specified above, all regulated waste shall be disposed through the Fermilab Hazard Control Technology Team.
- C. Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.
1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
  2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- D. No trash burning, dumping, or disposal is permitted on Fermilab property. The disposal of regulated waste generated from the use of materials provided by Fermilab (Government property) shall be the responsibility of the designated FRA representative. Disposal of all other trash and waste materials generated during the performance of this subcontract shall be the responsibility of the Subcontractor and must be performed in compliance with all applicable federal, state and local laws and regulations.
- E. The Subcontractor shall furnish all necessary dumpsters or containers to prevent dispersion of debris both within and outside of the construction site.
- F. All Subcontractor's and sub-tier subcontractor's recycled or waste dumpster(s) leaving site must have a radiological survey. Coordinate with the FRA Construction Coordinator for this survey prior to dumpster removal.

**END OF SECTION 01 79 19**

**SECTION 01 77 00 - CLOSEOUT PROCEDURES****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
  - 1. Substantial Completion procedures.
  - 2. Final Acceptance procedures.
  - 3. Warranties.
  - 4. Final cleaning.
  
- B. Related Requirements:
  - 1. SECTION 01 00 10: General Requirements.
  - 2. SECTION 01 32 33: Photographic Documentation.
  - 3. SECTION 01 33 00: Submittal.
  - 4. SECTION 01 73 00: Execution.
  - 5. SECTION 01 78 39: Project Record Documents.

**1.2 SUBMITTALS**

- A. Product Data: For cleaning agents.
  
- B. Subcontractor's List of Incomplete Items: Initial submittal at Substantial Completion.
  
- C. Certified List of Incomplete Items: Final submittal at Final Acceptance.
  
- D. Certificate of Insurance: For continuing coverage.
  
- E. Schedule of Maintenance Material Items: For maintenance material submittal items specified in other Sections.

**1.3 SUBSTANTIAL COMPLETION PROCEDURES**

- A. Subcontractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Subcontractor's punch list), indicating the value of each item on the list and reasons why the Work is incomplete.
  
- B. Submittals Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items that are incomplete at time of request.
  
- C. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting FRA unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
  - 1. Submit closeout submittals specified in other Division 01 Sections, including but not limited to project record documents, operation and maintenance manuals, Final Acceptance construction photographic documentation, damage or settlement surveys, property surveys, and similar final record information.

2. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
  3. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by FRA. Label with manufacturer's name and model number where applicable.
  4. Schedule of Maintenance Material Items: Prepare and submit schedule of maintenance material submittal items, including name and quantity of each item and name and number of related Specification Section. Obtain FRA's signature for receipt of submittals.
- D. Procedures Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
1. Advise FRA of pending insurance changeover requirements.
  2. Make final changeover of permanent locks and deliver keys to FRA. Advise FRA's personnel of changeover in security provisions.
  3. Complete startup and testing of systems and equipment.
  4. Perform preventive maintenance on equipment used prior to Substantial Completion.
  5. Instruct FRA's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in Section 01 79 00 "Demonstration and Training."
  6. Participate with FRA in conducting inspection and walkthrough with local emergency responders.
  7. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
  8. Complete final cleaning requirements, including touchup painting.
- E. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, FRA Construction Coordinator will either proceed with inspection or notify Subcontractor of unfulfilled requirements. FRA Construction Coordinator will prepare the Certificate of Substantial Completion after inspection or will notify Subcontractor of items, either on Subcontractor's list or additional items identified by FRA Construction Coordinator, that must be completed or corrected before certificate will be issued.
1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
  2. Results of completed inspection will form the basis of requirements for Final Acceptance.

#### 1.4 AUTHORIZATION FOR USE AND POSSESSION (AUP) PRIOR TO COMPLETION

- A. AUP is an interim inspection process used when FRA assumes responsibility for portions of the work. The following summarizes the AUP process:
1. The Subcontractor shall provide a 10 day notice to the FRA Construction Coordinator before this inspection is performed.
  2. The Subcontractor's punch list with status noted shall be attached to the AUP documentation
  3. The FRA Construction Coordinator will complete the AUP form.

#### 1.5 FINAL ACCEPTANCE PROCEDURES:

- A. Submittals Prior to Final Acceptance: Before requesting final inspection for determining Final Acceptance, complete the following:
1. Statement from the Subcontractor that indicates that the Work was installed as shown on the Project Record Documents;
  2. Acceptance of complete As-Built documentation as described in Section 01 78 39 – PROJECT RECORD DOCUMENTS, Article 2.1.
  3. Shop drawing record set submitted and approved.
  4. Submit a final Application For Payment in accordance with the Construction Subcontract.

5. Certified List of Incomplete Items: Submit certified copy of FRA Construction Coordinator's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by FRA Construction Coordinator. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
  6. Warranty documentation
  7. Spare stock (material consumables), if required by the technical specifications/drawings.
  8. Operations and Maintenance manuals
  9. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
  10. Submit pest-control final inspection report.
- B. Final Punchlist Inspection: An inspection of the uncompleted items of the Subcontract documents. The following describes the punch list process:
1. When the Subcontractor believes the work is substantially complete the Subcontractor shall update the deficiency list for presentation to the FRA Construction Coordinator;
  2. The Subcontractor shall provide a 10 day notice to the FRA Construction Coordinator in order to make arrangements for the final inspection of the construction Project with FRA personnel.
  3. The FRA Construction Coordinator will arrange for a final inspection visit of FRA stakeholders to verify the accuracy of the Subcontractor's deficiency list and to add, as necessary, those items of work that are not complete.
  4. The FRA will develop a comprehensive punch list and issue it to the Subcontractor after the final inspection
  5. The Subcontractor and the FRA Construction Coordinator will sign off on the completion of each punch list item.
- C. Final Punchlist Reinspection and Acceptance: This inspection will document the completion of the project scope. The following describes this process.
1. The Subcontractor shall provide a five (5) day notice prior to the Final Acceptance inspection;
  2. The Subcontractor shall submit documentation that the work associated with the punch list is complete.
  3. The FRA will coordinate the final inspection walkthrough with FRA stakeholders;
  4. The FRA will develop and issue the final acceptance documentation when the punch list items have been completed
  5. Submit a written request for final inspection to determine acceptance a minimum of 5 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, FRA Construction Coordinator will either proceed with inspection or notify Subcontractor of unfulfilled requirements. FRA Construction Coordinator will prepare a final Payment after inspection or will notify Subcontractor of construction that must be completed or corrected before certificate will be issued.
- D. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

## 1.6 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Subcontractor that are outside the limits of construction.
1. Include the following information at the top of each page:
    - a. Project name.
    - b. Date.
    - c. Name of FRA Construction Coordinator.
    - d. Name of Subcontractor.
    - e. Page number.
  2. Submit list of incomplete items in the following format:
    - a. MS Excel electronic file.

**1.7 SUBMITTAL OF PROJECT WARRANTIES**

- A. Time of Submittal: Submit written warranties upon FRA request for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated, or when delay in submittal of warranties might limit FRA's rights under warranty.
- B. AUP: Submit properly executed warranties within 15 days of completion of designated portions of the Work that are completed and occupied or used by FRA during construction period by separate agreement with Subcontractor.
- C. Organize warranty documents into an orderly sequence based on the table of contents of Specifications Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
  - 1. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
  - 2. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Subcontractor.
  - 3. Warranty Electronic File: Scan warranties and bonds and assemble complete warranty and bond submittal package into a single indexed electronic PDF file with links enabling navigation to each item. Provide bookmarked table of contents at beginning of document.
  - 4. Provide additional copies of each warranty to include in operation and maintenance manuals.

**PART 2 - PRODUCTS****2.1 MATERIALS**

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.
  - 1. Use cleaning products that comply with Green Seal's GS-37, or if GS-37 is not applicable, use products that comply with the California Code of Regulations maximum allowable VOC levels.

**PART 3 - EXECUTION****3.1 FINAL CLEANING**

- A. Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
  - 1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:
    - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
    - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
    - c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
    - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
    - e. Remove snow and ice to provide safe access to building.

- f. Remove labels that are not permanent.
  - g. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
  - h. Leave Project clean and ready for occupancy.
2. Construction Waste Disposal: Comply with waste disposal requirements in Section 01 74 19 "Construction Waste Management and Disposal."

**3.2 REPAIR OF THE WORK**

- A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion. Refer to Section 01 73 00 "Execution".

**END OF SECTION 01 77 00**

**SECTION 01 78 39 - PROJECT RECORD DOCUMENTS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section includes administrative and procedural requirements for Project record documents, including the following:
  - 1. Record Drawings.
  - 2. Record Specifications.
  - 3. Record Product Data.
  - 4. Miscellaneous record submittals.
  
- B. Related Requirements:
  - 1. SECTION 01 00 10: General Requirements.
  - 2. SECTION 01 73 00: Execution.
  - 3. SECTION 01 77 00: Closeout Procedures.

**1.2 SUBMITTALS**

- A. Record Drawings: Comply with the following:
  - 1. Number of Copies.
  - 2. Initial Submittal:
    - a. Submit record digital data files.
    - b. FRA will indicate whether general scope of changes, additional information recorded, and quality of drafting are acceptable.
  - 3. Final Submittal:
    - a. Submit PDF electronic files of scanned record prints.
    - b. Print each drawing, whether or not changes and additional information were recorded.
  
- B. Record Specifications: Submit annotated PDF electronic files of Project's Specifications, including addenda and Subcontract modifications.
  
- C. Record Product Data: Submit annotated PDF electronic files and directories of each submittal.
  - 1. Where record Product Data are required as part of operation and maintenance manuals, submit duplicate marked-up Product Data as a component of manual.
  
- D. Miscellaneous Record Submittals: See other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit annotated PDF electronic files and directories of each submittal.
  
- E. Reports: Submit written reports, weekly, indicating items incorporated into project record documents concurrent with progress of the Work, including revisions, concealed conditions, field changes, product selections, and other notations incorporated.

**PART 2 - PRODUCTS****2.1 RECORD DRAWINGS**

- A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.

1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is installer, sub-tier subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.  
Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
    - a. Accurately record information in an acceptable drawing technique.
    - b. Record data as soon as possible after obtaining it.
    - c. Record and check the markup before enclosing concealed installations.
    - d. Cross-reference record prints to corresponding archive photographic documentation.
  2. Content: Types of items requiring marking include, but are not limited to, the following:
    - a. Dimensional changes to Drawings.
    - b. Revisions to details shown on Drawings.
    - c. Depths of foundations below first floor.
    - d. Locations and depths of underground utilities.
    - e. Revisions to routing of piping and conduits.
    - f. Revisions to electrical circuitry.
    - g. Actual equipment locations.
    - h. Duct size and routing.
    - i. Locations of concealed internal utilities.
    - j. Changes made by Change Order or Construction Change Directive.
    - k. Changes made following FRA's written orders.
    - l. Details not on the original Contract Drawings.
    - m. Field records for variable and concealed conditions.
    - n. Record information on the Work that is shown only schematically.
  3. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
  4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
  5. Mark important additional information that was either shown schematically or omitted from original Drawings.
  6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.
  7. Progress Record Sets are to be reviewed with FRA on a monthly basis and Subcontractor to present compliance with current work and Contract Documents.
- B. Record Digital Data Files: Immediately before inspection for Certificate of Substantial Completion, review marked-up record prints with FRA. When authorized, prepare a full set of corrected digital data files of the Contract Drawings, as follows:
1. Format: Annotated PDF electronic file.
  2. Incorporate changes and additional information previously marked on record prints. Delete, redraw, and add details and notations where applicable.
  3. Refer instances of uncertainty to FRA for resolution.
  4. FRA will furnish Subcontractor one set of digital data files of the Contract Drawings for use in recording information.  
See Section 01 33 00 "Submittals" for requirements related to use of FRA's digital data files.
    - a. FRA will provide data file layer information. Record markups in separate layers.
- C. Newly Prepared Record Drawings: Prepare new Drawings instead of preparing record Drawings where FRA determines that neither the original Contract Drawings nor Shop Drawings are suitable to show actual installation.
1. New Drawings may be required when a Change Order is issued as a result of accepting an alternate, substitution, or other modification.

2. Consult FRA for proper scale and scope of detailing and notations required to record the actual physical installation and its relation to other construction. Integrate newly prepared record Drawings into record Drawing sets; comply with procedures for formatting, organizing, copying, binding, and submitting.
  3. Format: Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
- D. Record Prints: Organize record prints and newly prepared record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
1. Format: Annotated PDF electronic file.
  2. Record Digital Data Files: Organize digital data information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each digital data file.
  3. Identification: As follows:
    - Project name.
    - a. Date.
    - b. Designation "PROJECT RECORD DRAWINGS."
    - c. Name of FRA.
    - d. Name of Subcontractor.

## 2.2 RECORD SPECIFICATIONS

- A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and Subcontract modifications.
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
  2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
  3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
  4. For each principal product, indicate whether record Product Data has been submitted in operation and maintenance manuals instead of submitted as record Product Data.
  5. Note related Change Orders, record Product Data, and record Drawings where applicable.
  6. Progress Record Specification are to be reviewed with FRA on a monthly basis and Subcontractor to present compliance with current work and contract documents.
  7. Format: Submit record Specifications as annotated PDF electronic file.

## 2.3 RECORD PRODUCT DATA

- A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.  
Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
1. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
  2. Note related Change Orders, record Specifications, and record Drawings where applicable.
  3. Format: Submit record Product Data as annotated PDF electronic file.
  4. Include record Product Data directory organized by Specification Section number and title, electronically linked to each item of record Product Data.

## 2.4 MISCELLANEOUS RECORD SUBMITTALS

- A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

1. Format: Submit miscellaneous record submittals as PDF electronic file.
2. Include miscellaneous record submittals directory organized by Specification Section number and title, electronically linked to each item of miscellaneous record submittals.

**PART 3 - EXECUTION****3.1 RECORDING AND MAINTENANCE**

- A. Recording: Maintain one copy of each submittal during the construction period for Project record document purposes. Post changes and revisions to project record documents as they occur; do not wait until end of Project.
- B. Maintenance of Record Documents and Samples: Store record documents and Samples in the field office apart from the Contract Documents used for construction. Do not use project record documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to project record documents for FRA reference during normal working hours.
- C. Quarterly Submittal of Record Documents: Submit record documents quarterly to FRA.

**END OF SECTION 01 78 39**

End of RFP Documents Package No. 3 of 4

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