

Specifications for

Site Drainage Modification

Building 423

May 31, 2012



Brookhaven National Laboratory
Brookhaven Science Associates
Facilities & Operations Directorate
Modernization Project Office
Upton, NY 11973

BROOKHAVEN
NATIONAL LABORATORY

ESH&Q Risk Level Low (A3-Minor)
Designer: A. Javidfar / M. Talai
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Specification 12717
DMR FY12
Account 18594/18594

STATEMENT OF WORK

In general, work consists of, but is not limited to, the following items as shown and detailed in contract drawings and this specification:

- Excavation and removal of existing concrete slab
- Excavation and removal of existing asphalt pavement and its subgrade
- Installation of new concrete slab with dowels
- Installation of new asphalt pavement
- Installation of 70 feet of new trench drain and gate valve
- Installation of three (3) new leaching pools and connecting pipes
- Installation of five bollards around leaching pools
- Installation of storm drain piping under new concrete slab to discharge roof leaders
- Removal of existing concrete/masonry staircase and replacing it with a wooden/Trex stair similar to the one shown in Attachment 1

Time is of the Essence for this project. See Supplementary Conditions, Clause SC-1.

DRAWING INDEX

Number	Title	Date
	<u>Contract Drawings</u>	
12717-C1	Existing Site and Removal Plan	4/19/2012
12717-C2	New Installations, Sections & Details	4/19/2012

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DIVISION 00 – BIDDING AND CONTRACT REQUIREMENTS
SECTION 000700 – GENERAL CONDITIONS

GC-1. DEFINITIONS

A. As used in these Specifications, the following have the meaning shown opposite each:

1. BNL – Brookhaven Science Associates, operator of Brookhaven National Laboratory, and its authorized representatives of various Divisions and Departments.
2. FOD – BNL's Facilities & Operations Directorate.
3. MPO – BNL's Modernization Project Office and its authorized representative.
4. BNL Site – Land occupied by Brookhaven National Laboratory, Brookhaven Township, Suffolk County, New York.
5. Site – Immediate area of BNL Site assigned to Contractor for performance of work.
6. Work – Includes but is not limited to all labor, materials, tools, and equipment required and reasonably inferred by Contract to complete all construction.
7. Contractor – Person or entity identified in Lump Sum Contract and responsible for completion of all work.
8. Subcontractor – Person or entity directly contracting with Contractor including one who furnishes material worked to a special design according to Drawings and Specifications, but not including one who merely furnishes materials not so worked.

B. Words such as provide, furnish, install, and include, mean work by Contractor. Words such as approved, directed, and inspected, mean MPO's approval, direction and inspection.

C. In the interest of brevity, words such as "Contractor shall," have been omitted from some sections of the Specifications.

GC-2. SCALE OF DRAWINGS

A. Drawings are generally to scale, but Contractor shall follow indicated dimensions. Request clarification if discrepancies are noted. Scaling of drawings shall be at Contractor's own risk.

GC-3. REFERENCE DRAWINGS

A. Drawings of existing building and site are available for reference at MPO office.

GC-4. MANUFACTURERS' SPECIFICATIONS

- A. Conform to specified manufacturer's published specifications and installation instructions unless otherwise specified or indicated.
- B. Federal agencies, to the extent practicable, are required to amend procurement practices so as to minimize the purchase of products manufactured with ozone depleting substances. The Contractor shall, therefore, provide materials that use low or non-ozone depleting substances during their manufacture and/or installation. Materials that do not comply shall be identified in the contractors submittal for approval.
- C. Federal agencies, to the extent practicable, also are required to amend procurement practices so as to utilize, to the maximum extent, construction materials that have been produced with the use of recovered (recycled) materials. For the purposes of this project, where applicable, technical sections that may include building insulations, blast furnace slag containing cement and concrete, carpet, floor tiles, restroom partitions, signage, patio blocks and traffic barricades have been prepared in compliance with Federal Regulation 40 CFR Part 247.
- D. Should this Project be designed to be a high-performance, sustainable facility to receive LEED certification, the criteria will be designated in a separate specification Section 01352.

GC-5. VOLATILE ORGANIC COMPOUNDS (VOC'S)

- A. Volatile Organic Compounds (VOC's) and their emissions are controlled under the New York Codes, Rules and Regulations of the State of New York. Architectural surface coatings must comply with 6NYCRR Part 205, latest edition. Coating lines must comply with 6NYCRR Part 228, latest edition.
 - 1. For the purpose of the BNL location, Nassau, Suffolk, Westchester and Rockland Counties fall under the compliance rules of the New York City metropolitan area.
 - 2. All coatings and coated products to be used in the work, shall comply with the appropriate rules and regulations.

GC-6. PRICE-ANDERSON ACT

- A. Radiological protection is controlled under the requirements of Title 10, Code of Federal Regulations, Part 835, "Occupational Radiation Protection" (10 CFR Part 835).
- B. The provisions of this CFR apply to any activity carried out pursuant to this contract by the Contractor, its subcontractors, suppliers and employees, that has the potential to result in the exposure of an individual to radiation or radioactive material.
- C. The Contractor shall comply, in full, with all applicable requirements of this CFR and shall implement, document, report on, and maintain the required work documents, as necessary to ensure its full compliance.

GC-7. BIOPREFERRED PROGRAM

- A. Clause FAR 52.223.2 – Affirmative Procurement of Biobased Products Under Service and Construction Contracts applies to the work performed under this Contract. In the performance of this Contract, the Contractor shall make maximum use of biobased products that are United States Department of Agriculture (USDA)-designated items. These items can be found on the USDA Web site <http://www.biopREFERRED.gov/DesignationItemList.aspx>.

GC-8. WORK PERMITS

- A. The work of this Contract is controlled by the requirements of BNL Standards-Based Management System; “Work Planning and Control for Experiments and Operations,” latest edition.
- B. A Work Permit, prepared by BNL and signed by the Contractor, shall be posted or on hand at the project site. By signing the Work Permit, the Contractor indicates that they understand the hazards of the job and the permits required.
- C. A Tool Box Meeting shall be held by the Contractor to discuss any requirements noted on the Work Permit with all Contractor and Subcontractor personnel assigned to the Work. A Tool Box Meeting Log shall be kept on the Job Site and be available for auditing by BNL.

GC-9. NOTICE TO PROCEED

- A. The Contractor shall not knowingly, without formal notice from MPO, prematurely commence operations on the BNL Site. The Notice to Proceed will not be issued by MPO prior to receipt, by Contracts and Procurement, of all required bonds and insurance documents, and prior to receipt, and approval by MPO, of the required Safety Plan.
- B. The Notice to Proceed will be issued, in accordance with Clause A above, along with a BNL Integrated Safety Management (ISM) Flowdown Form. This form shall be completed by every Subcontractor to be used on this Project and returned to MPO, by the Contractor, as part of the requirements of the Supplementary Conditions Section “Shop Drawings, Manufacturers Data, and Samples,” Clause R, “Required Submittals.”
- C. Work may proceed, however, in the preparation and submittal of required submissions and the ordering of materials and equipment that do not require prior approval by MPO.

GC-10. WORK HOURS

- A. Perform all work on weekdays, excluding BNL holidays, between 8:00 a.m. and 5:00 p.m., unless otherwise specified or approved. BNL holiday list available upon request.
- B. Notify MPO 24 hours in advance to request approval to work outside of the above working hours. Advise MPO of all planned activities and submit a list of all contractor

and subcontractor employees who are expected on-site during the off-hour period. All employees working during off-hours must possess a valid BNL contractor employee photo identification badge (see GC-12).

- C. If off-hours work request is approved, MPO will notify BNL Police Headquarters and the Main Gate of the days and hours that work is planned. Failure to notify MPO will be cause for BNL Police to deny access to the job-site.

GC-11. CONSTRUCTION NOTIFICATION

- A. MPO must be notified and made aware of all construction work-in-progress.
- B. When construction has not been previously scheduled, notify MPO Construction Services each day before 9:00 a.m. of planned activities.
- C. MPO will provide telephone extension numbers.

GC-12. IDENTIFICATION OF EMPLOYEES

- A. All Contractor and Subcontractor employees must attend the Contractor/Vendor Orientation Training Course (see GC-13), and be approved by BNL in order to work on the BNL site. A contractor employee photo identification badge will then be issued in order to have access to the site.
- B. U.S. citizens must bring proof of citizenship, photo ID and proof of Social Security number. Acceptable citizenship proof is a passport, birth certificate, naturalization papers, voting eligibility, or similar documentation. Drivers' license, military ID cards, union cards, and Social Security cards are insufficient by themselves as proof of citizenship. Proof of Social Security number includes Social Security card, pay stub, W-2 form or medical insurance card. Handwritten documents are not acceptable. Upon arrival at the BNL Main Gate, they will be sent to the Visitors Trailer to receive a temporary pass, which allows them access to the site to attend CVO training.
- C. All Non-U.S. citizen workers, including Legal Permanent Residents, requiring access to BNL shall complete a BNL Form 473 located on the BNL home page, www.bnl.gov, Guest Registration link. Each worker shall provide the requested personal information and information concerning their company, forwarding the completed form to their designated BNL Project Manager. Non-U.S. citizens shall provide documentation showing eligibility to be in the United States. This includes a valid passport and visa. Other documentation, to include but not limited to, a permanent resident card, passport entry "process form 1-551", INS documents 1-94, 1-20, DS-2019, or 1-539 part 3 and proof of Social Security, may be necessary to establish legal status and work on the BNL site. Failure to provide proper documentation will result in access being denied until the required documents are provided. Foreign National Contractor employees must submit all required documents 30 days in advance of the required access date as access approvals may take up to 30 days. All Foreign National Contractor employees are

responsible to ensure they remain in legal INS status. BNL ID badges will expire on the expiration date of their current legal status or one year after issuance, whichever comes first. At that point they must reapply with updated documentation to continue eligibility to work at BNL.

- D. The Contractor shall assure that all Contractor and Subcontractor employees promptly obtain a current BNL contractor employee photo identification badge. Badges shall be obtained in the Badging Office on the Ground Floor of the Research Support Center, Bldg. 400, Monday through Thursday, 8:30 a.m. to 4:00 p.m., and Friday, 8:30 a.m. to 1:00 p.m. In order to keep badging times to a minimum, the Contractor should limit sending all of his employees at the same time. New contract workers will only be issued contractor ID badges (and granted access to the site) after completion of required safety training as well as presentation and approval of citizenship documents, BNL form 473 for foreign nationals, and proof of Social Security Number.
- E. Contractor and Subcontractor employees must wear the badge so as to be visible at all times while on-site.
- F. Contractor employee identification badges will be valid for the anticipated duration that the employee expects to require access to the Site as indicated on the C/VOT application. This period will be a maximum of one (1) year and will then require renewal, upon expiration, at the Badging Office, Bldg. 400. Badges will be provided at no cost to the Contractor. Immediately upon release of employees or project completion, Contractor's Superintendent shall return badges to the Badging Office. (BNL will retain badges for re-issue for one year.)
- G. Contractor employees shall report lost identification badges immediately to the Badging Office, Bldg. 400.

GC-13. CONTRACTOR TRAINING REQUIREMENTS

- A. All Contractor and Subcontractor employees are required to attend BNL's Contractor/Vendor Orientation Training on their first day on site.
- B. Contractor/Vendor Orientation Training is a one and one-half (1-1/2) hour overview of BNL and OSHA safety requirements. The orientation is offered 8:30 a.m. weekdays in Building 938. Upon completion of the orientation, a card will be issued that must be signed by Construction Inspection, Bldg. 650T. The Contractors' employee (U.S. citizens as well as foreign nationals) information must then be entered in the BNL Guest Information System (GIS). To facilitate this process, the following personnel are trained to enter data in GIS: Donna Pfeiffer in Building 129, and Claudia Hatton, Cindy Klemm and Denise Bingham-Miesell in Building 134C. The employee must then return to the Badging Office, Bldg. 400, to obtain the employee identification badge. This safety orientation will be valid for a period of one year. Satisfactory completion will be indicated by issue of employee identification badge.

- C. Contractor and Subcontractor employees who have not attended the Safety Orientation will be directed to stop work until they have done so.
- D. All Contractor and Subcontractor employees who may be required to “Work On or Near” electrical circuits within the BNL electrical distribution system are required to complete BNL’s Electrical Safety I training course. This course is available on the Web at <http://training.bnl.gov/course/electsaf1> , and is valid training for one (1) year.
- E. In addition to completing the course, each organization’s electrical work Foreman/ Supervisors must discuss NFPA 70E requirements and specific hazard and risk information with their staff. This job briefing should discuss specific electrical work procedures, protective equipment requirements and departmental contacts at the local application level. BNL can provide a document that can be used as guidance for this discussion. This job level discussion can be informal but a record of this briefing shall be documented.
- F. Contractor shall provide a list of workers that he authorizes to “Work On or Near” and perform LOTO. Contractor and Subcontractor employees who may be required to “Work On or Near” electrical circuits and who have not completed the Web-based BNL Electrical Safety 1 training and NFPA 70E briefing will not be allowed to perform such work until they have done so.
- G. All Contractor and Subcontractor employees who may be required to “Work On or Near” electrical circuits must complete an approved NFPA 70E training seminar. Contractor can provide equivalent “in house” NFPA 70E training to his/her employees in lieu of taking “outside” training from an authorized company. Contractor’s program shall follow the guidelines of NFPA 70E and thoroughly demonstrate that all employees have been properly trained in all facets associated with NFPA 70E. If the Contractor decides to provide his/her own NFPA 70E training, Contractor’s program shall be submitted to BNL for approval. All Contractor and Subcontractor employees that “Work On or Near” electrical circuits shall have taken and passed a CPR training program that has been approved by BNL.

GC-14. COORDINATION

- A. Arrange and coordinate work, be responsible for acts and omissions of all parties involved in the work, be responsible for satisfactory performance of all work, ensure that each trade is fully informed of full extent of work required, and coordinate installation of all equipment and shop fabricated material, including that supplied by BNL. BNL assumes no responsibility for contractual relations between Contractor and other parties.

GC-15. MEN AND MATERIALS

- A. Do not utilize men or materials which would cause work stoppage on BNL Site.
- B. Radiation Generating Devices are of special concern. The following industrial equipment, known to contain radiological sources or able to generate radiation, if brought to the BNL

Site, require the Contractor to notify the Project Manager, in advance, and require a Radiological Work Permit to be approved prior to their use on site. RWPs require Health Physics review.

1. Radiography Equipment
2. Moisture Density Gauges
3. Soil Density Gauges
4. X-Ray Equipment

GC-16. SUBCONTRACTOR REVIEW

- A. BNL reserves the right to review, to approve or disapprove proposed Subcontractors based upon past safety and performance quality. No later than two (2) weeks after signed Contract, submit directly to MPO, a complete list of proposed Subcontractors for review.
- B. Subcontractors must meet the current published OSHA DART Rate and Recordable Incidence Rates for construction in their trades. Subcontractors shall also have an insurance Experience Modification Rating equal to or less than one (1).

GC-17. PRE-CONSTRUCTION MEETING

- A. MPO will set up a Pre-Construction Meeting, at which time the ES&H issues, Safety Awareness issues, Submittal procedures, and Site Organization procedures will be addressed. The Contractor's Superintendants, Supervisors, and Foreman are required to attend the Pre-Construction Meeting.

GC-18. CONSTRUCTION SCHEDULE

- A. Within three (3) weeks after signed Contract, submit, directly to MPO, a detailed work schedule which must fall within number of weeks specified.
- B. When work falls behind schedule due to Contractor's fault or negligence, increase all labor and overtime to assure completion within schedule.
- C. BNL will utilize all available contractual remedies to enforce schedule compliance. Should the Contractor encounter delays caused by BNL, it is the Contractor's responsibility to promptly notify the contracting officer and to request an extension of the contract compliance date.

GC-19. JOB MEETINGS

- A. Job meetings will be held at the job site at least monthly unless otherwise designated by MPO.
- B. The Contractor and his field superintendent, and the subcontractors or vendors whose presence is necessary, shall attend job meetings.

- C. Decisions, instructions and interpretations agreed upon at such meetings will be recorded in a "Memorandum of Meeting" prepared by MPO and furnished to the Contractor and each attendee for necessary action.

GC-20. SUBSTITUTIONS

- A. Unless otherwise specified, substitutions may be made for items specified when substitutions are approved equals. Submit substitutions for approval in accordance with heading "SHOP DRAWINGS, MANUFACTURERS DATA, AND SAMPLES" in Supplementary Conditions.
- B. When proposing a substitution, submit:
 - 1. Shop Drawings providing complete descriptive and technical data. Submit samples and additional information when directed.
 - 2. Statement of effect on all other work in Contract.
- C. MPO reserves right to request drawings indicating all required revisions to Contract Drawings prior to giving approval.
- D. If a substitution is approved, be responsible for all resulting changes in work and for all systems, equipment and material, functioning as originally intended.

GC-21. CONTRACTOR'S MATERIALS REMOVALS

- A. Obtain property pass through MPO for removal of Contractor's materials and equipment from BNL Site. Schedule removals during specified work hours.

GC-22. TRANSPORTATION

- A. In transporting materials and equipment, use designated roads and railroad on BNL Site. Obtain information concerning these facilities from, and coordinate all transport operations with, MPO. When necessary to maintain work schedule, ship all materials, including Subcontractors' items, from point of origin to BNL Site by direct means equal to, or better than, express service.
- B. In transporting radioactive materials and waste, or hazardous waste, a DOE-MCAP approved transporter must perform the transportation. The MPO Waste Management Representative will coordinate all shipments of radioactive materials and waste, or hazardous waste.
- C. Shipments requiring a manifest (radioactive or hazardous) shall be prepared by a qualified broker. The broker shall sign as the shipper of record for radioactive shipments, with a qualified BNL Waste Management Representative approving the document. A Hazardous Waste Manifest shall be prepared by a qualified broker and signed by a BNL Waste Management Representative.

GC-23. TRAFFIC WAYS

- A. Schedule, confine, and perform work, as directed, so as not to interfere with BNL traffic on existing roads, walks, parking and other paved areas. Park all vehicles in designated parking areas. Load and unload vehicles where directed. Comply with all BNL traffic regulations. Violations will be backcharged from the Contract amount.

GC-24. CODES AND STANDARDS

- A. Meet requirements of BNL Standards-Based Management System (<https://sbms.bnl.gov>); ES&H Standards and other applicable SBMS standards, and all other codes and standards specified. In cases of conflict, the standard providing the greater protection shall govern.
- B. BNL is an ISO 14001 certified laboratory. It shall be the duty and the responsibility of the Contractor and his subs to comply with the BNL standards and procedures in the area of environmental control, hazardous waste generation, spill prevention, and all other standards specified herein.
- C. Copies are available for reference at MPO.

GC-25. FIRE PROTECTION AND DETECTION SYSTEMS

- A. Do not modify, disconnect and, in any way, impair systems without approval.
- B. Notify MPO forty-eight (48) hours in advance of all work on fire protection systems.

GC-26. OPEN FLAME OPERATIONS

- A. It shall be the duty and responsibility of the Contractor performing any cutting or welding to comply with the provisions of BNL Standards-Based Management System; ES&H Standards, and the National Fire Protection Association's National Fire Codes pertaining to such work.

The Contractor shall read and be familiar with the provisions of these standards and codes. The Contractor shall be responsible for all damages resulting from failure to so comply.

- B. Notify MPO forty-eight (48) hours in advance of cutting, welding, or similar open flame operations.
- C. Provide any required fire watch and take all required precautions where directed.
- D. MPO will make arrangements for a Cutting/Welding Permit. NO WORK shall proceed prior to the issuance of the written Cutting/Welding Permit nor shall work continue after expiration date of permit.

GC-27. PROTECTION OF PROPERTY

- A. Contractor shall be responsible for the security of property within the work site.
- B. Protect, with whatever means and methods required, all new and existing property from damage by and as a result of work in this Contract as approved, including disappearance. Refer to BSA LLC, General Terms and Conditions for Construction and Labor Hour Agreements, Article titled: Contractor's Responsibilities.
- C. Repair, refinish, replace and otherwise correct all damage, and replace all missing materials, as directed and approved by MPO.

GC-28. TEMPORARY SERVICES

- A. All requests by the Contractor for temporary services i.e. electric power, for their own use or for use by any subcontractor, shall be made only through their designated MPO contact.
- B. All methods, materials, and scheduling of temporary services shall be as directed and approved.
 - 1. BNL will furnish, without charge, sources of water and electric power and will perform initial tie-in and removal of same. MPO will, upon request, indicate locations.
 - 2. Contractor shall supply, install, maintain, and remove all equipment and required devices for temporary water, power, and lighting systems from point of initial tie-in as necessary to perform the work.

GC-29. SERVICE INTERRUPTIONS

- A. Do not interrupt service until directed. Notify MPO two (2) weeks in advance of all proposed service interruptions unless otherwise specified or directed.
- B. Keep all interruptions to a minimum. Complete all possible prior work and prefabrication, and have all labor and materials on Site, as approved, prior to interruption.

GC-30. COORDINATION WITH BNL ACTIVITIES

- A. Coordinate and schedule all work with all BNL activities and operations through MPO.

GC-31. CUTTING AND PATCHING

- A. Cut, drill, alter, remove, and replace all existing construction as required for performance of work. Patch and finish all changed and damaged work to match existing construction as approved by BNL.

GC-32. WORK BY TRADES

- A. Work of a trade is not necessarily limited to the Drawing or Specification page describing work to be done by that trade.

GC-33. SALVAGE

- A. Salvage is that material and equipment, as defined in the Specifications, to be removed by the Contractor from the Project facility, but is to remain the property of BNL.
- B. Remove all specified salvageable material and equipment and pass it through the vehicle radiation monitor. Place, where directed by, and turn over to, MPO, on the BNL Site.
- C. Remove all salvageable material and equipment, as specified, and place on BNL Site where directed.
- D. Remove all non-salvageable material and equipment and legally dispose of same off the BNL Site.
- E. All removed salvageable material and equipment, as defined in the Specifications, shall remain property of BNL.
- F. All removed salvageable and non-salvageable materials and equipment shall pass through the vehicle radiation monitor prior to disposal on the BNL Site or exiting the BNL Site.

GC-34. WORK AS BUILT

- A. MPO will provide a complete set of prints of the Contract Drawings. Mark up accurately, showing all changes, in a neat, legible manner. Final payment will not be approved prior to receipt of approved marked up prints.

GC-35. CONSTRUCTION WASTE MANAGEMENT

- A. Waste and demolition materials shall be segregated into disposal categories:
 - 1. Radioactive waste is any refuse, solid or liquid, that must be managed for its radioactive content.
 - 2. Hazardous waste is any refuse, solid or liquid, that is a by-product of processes/ activities that can pose a hazard to health or environment that must be managed for its hazardous nature (usually listed by EPA).
 - 3. Mixed waste is any refuse that contains both Low-Level Radioactive Waste (LLRW) as well as hazardous waste.
 - 4. Non-hazardous waste is any refuse, other than construction debris, that is considered industrial or special in nature (oil, anti-freeze, etc.). The BNL Standards-Based Management System (SBMS) contains the full descriptions.

5. Universal waste is any battery containing hazardous constituents such as mercury/lithium/lead/nickel cadmium, certain pesticides, as well as mercury-containing thermostats and fluorescent lamps and tubes.
 6. Construction rubbish and debris is any refuse as a result of the normal construction or earth clearing activity such as packing and shipping materials, discarded lumber and wood materials, metals, insulation, gypboard, piping, electrical scrap, tree branches, roots, and sweepings.
- B. Radioactive waste and mixed waste disposal will be coordinated by the MPO Waste Management Representative, Gary Olsen, (631) 344-8580.
 - C. Hazardous waste and mixed waste shall be disposed of by the Contractor at the BNL Waste Management Facility, or at an approved off-site facility coordinated by the MPO Waste Management Representative.
 - D. Universal waste shall be disposed of by the Contractor at the BNL Waste Management Facility, or at an approved off-site facility coordinated by the MPO Waste Management Representative.
 - E. Non-hazardous waste shall be disposed of by the Contractor at the BNL Waste Management Facility, or at an off-site disposal facility approved by BNL.
 - F. Construction rubbish and debris shall be disposed per GC-36.

GC-36. SITE CLEANING AND DISPOSAL OF CONSTRUCTION DEBRIS

- A. Keep Site clear of debris and rubbish at all times. Burning of debris and rubbish will not be permitted.
- B. Place all construction debris and rubbish in appropriate containers and legally dispose of same periodically off the BNL Site.
- C. At job completion, promptly remove tools and equipment, and clean premises thoroughly, as approved by BNL.
- D. All removed construction debris, excess clearing, excavation and/or grading material, rubbish, and equipment, removed from the Site, shall pass through the Vehicle Radiation Monitor on East Princeton Avenue, prior to being disposed off the BNL Site.

END OF SECTION 000700

DIVISION 00 – BIDDING AND CONTRACT REQUIREMENTS
SECTION 000800 – SUPPLEMENTARY CONDITIONS

SC-1. CRITICAL MILESTONES

- A. This project is one where critical milestones are required to be met. The contract completion date shall be adhered to, as well as any established as critical. Failure to be "substantially complete" by the completion date established in the signed contract will be considered by BNL as being non-responsive and could lead to the barring of the Contractor from bidding future projects at BNL for a period of one (1) year.
- B. Substantial Completion is the stage in the progress of the Work when the Work or a designated portion thereof is sufficiently complete, as determined by MPO in accordance with the Contract Documents, so as to be able to be occupied or utilized for its intended use.

SC-2. SHOP DRAWINGS, MANUFACTURERS DATA, AND SAMPLES

- A. The term "shop drawings and data" includes drawings, diagrams, layouts, schematics, descriptive literature, illustrations, schedules, performance and test data, similar materials and samples furnished by Contractor to explain and show in detail, specific portions of work required by Contract.
- B. Shop drawings and data for construction shall be submitted with such promptness as to cause no delay in the work. Allow sufficient time for checking, correcting, resubmitting and rechecking. Submittals to BNL by Contractor, subcontractor, or any low tier subcontractor, pursuant to a construction contract, shall show in detail (i) the proposed fabrication and assembly of structural elements and (ii) the installation (i.e., layout, form, fit, setting, and attachment details) of materials or equipment. BNL may duplicate, use, and disclose in any manner and for any purpose shop drawings and data delivered under this Contract.
- C. These contract conditions shall be included in all subcontracts hereunder at any tier.
- D. Before submitting any data for approval, the Contractor shall coordinate all such drawings and data, and check them for accuracy, completeness, and compliance with Contract requirements. The Contractor shall see that all work contiguous with and having bearing on the work indicated on drawings is accurately and distinctly illustrated and that work shown is in conformity with contract requirements.
- E. The Contractor shall indicate his approval on all submittals as evidence of the above coordination and review. Shop drawings and data submitted to BNL without evidence of Contractor's approval, may be returned for resubmission.

- F. Shop drawings shall be numbered consecutively and shall represent:
 - 1. All working and erection dimensions.
 - 2. Arrangement and sectional views.
 - 3. Necessary details, including information for making connections to other work.
 - 4. Kinds of materials and finishes.
- G. Shop drawings shall be dated, and shall contain:
 - 1. Name and Number of project.
 - 2. Description of required equipment, materials, and classification item numbers.
 - 3. Locations at which materials or equipment are to be installed in the work.
 - 4. Identification of drawings and specification sections to which they apply.
- H. BNL's technical liaison will indicate its review action on shop drawings and data and, if rejected as submitted, shall indicate its reasons therefor. No work shall be done on an item or system, including fabrication, prior to MPO taking no exception. Taking no exception by BNL shall not relieve Contractor from responsibility for any errors or omissions in such drawings and data, nor from responsibility for complying with requirements of this Contract, except with respect to variations described and approved in accordance with (I) below.
- I. If shop drawings and data show variations from Contract requirements, Contractor shall describe such variations in writing separate from drawings and data at the time of submission. If BNL approves any such variation(s), it shall issue an appropriate Contract modification, except that, if variation is minor and does not involve a change in price or in time of performance, a modification need not be issued.
- J. Submission of data for approval shall be accompanied by letter of transmittal, in duplicate, containing the name of the project, Contractor's name, number of drawings, titles and other pertinent data.
- K. Submit Shop Drawings on Ozalid copies of original Contractor's Drawings. Submit three (3) sets of Ozalid prints for each submission until approved.
- L. Submit opaque manufacturer's cuts and data sheets clearly marking all applicable data. Submit five (5) copies for each submission until approved.
- M. Submit samples, tagged and labeled and with a 3" x 4" space for approval stamp. Submit two (2) samples for each submission.

- N. The General Conditions portion of the Contractors monthly payment requisitions may be reduced if required Shop Drawings, Manufacturers Data, Samples and any other required submissions are not received, or until they are received in a timely manner.
- O. Except for required submissions specified below, submit Shop Drawings, Manufacturers Data, and Samples only for items where a substitution is requested. Refer to GC-20, Substitutions.
- P. Address all submissions to:
 Brookhaven National Laboratory
 Ali Javidfar, Manager
 Building 134-C
 Upton, New York 11973
- Q. Mark all submission transmittals as follows:
 JOB TITLE: Site Drainage Modification
 JOB NO. 12717, BLDG. NO. 423-326
- R. Required Submissions:

Item	Shop Dwg.	Mfrs. Data	Samples	Other Data
* 1. Schedule of Values				X
* 2. Unit Prices				X
* 3. List of Subcontractors with Completed ISM Flowdown Forms				X
4. Environment, Health and Safety Plan				X
5. Occupational Medicine Program				X
6. Rigging Plan				X
7. Recycled Materials Reports				X
8. Certification of Specification Compliance				X
9. Quantity of GGBF Used in Concrete (Section 033000 A.4.a)				X
10. Concrete Slab Curing Method				X
* 11. Concrete		X		
12. Dowels		X		
13. Concrete Design Mix		X		X
14. Base Course		X		X
15. Asphalt		X		X
16. Joint Sealant		X		X
17. Stair	X	X		X

- S. MPO reserves right to request additional data.
- T. Critical Items:
 - 1. Submit items marked with an asterisk within two (2) weeks after signed Contract.
 - 2. No later than two (2) weeks after receiving approval, submit copies of purchase orders and vouchers showing final purchase agreement and promised delivery date.

SC-3. BNL SUPPLIED ITEMS

- A. Items supplied by BNL:
 - 1. (6) sections of 8' dia. × 4' high rings
 - 2. (3) footing rings
 - 3. (3) top slabs
 - 4. (3) risers
 - 5. (3) castings
 - 6. (7) sections of precast concrete trench drain with grating
- B. Shop Drawings and Manufacturer's Data will be available at MPO.
- C. Check all items in presence of MPO Construction Representative to insure they are complete with all parts and appurtenances, and free from damage. Move items from point of storage on BNL Site and completely install and connect at Site. Handle all items with care.

SC-4. TEMPORARY WORK

- A. All methods, materials, and schedules for installation, operation, maintenance, and removal of all temporary work shall be approved. Upon removal, restore all property to original condition as approved.
- B. Telephone: BNL will not provide telephones. Contact F&O Business Operations Office within five (5) working days after notice to proceed and arrange for a temporary telephone to be installed.
- C. Field Office: BNL will not provide building office space. Within five (5) working days after notice to proceed, provide, where directed, an approved Field Office with lighting. Provide heat, when temperature drops below 60°F.
- D. Toilet Facilities: BNL will not provide toilet facilities. Provide, where directed, and properly maintain, portable toilet facilities, as approved, from start to finish of operations.

- E. Fire Extinguishers: One (1) portable tank type fire extinguisher containing fifteen pounds of liquid carbon dioxide, complete with hanger, seat type valve, 3 feet of hose and non-shatterable discharge hose, complete with brackets for wall mounting; as manufactured by Walter Kiddie & Co., Model 15KS, or equal.
- F. First Aid Kit: One (1) industrial first aid kit as manufactured by Acme Products, Kit Number 25, or equal, located where directed by MPO.
- G. Closures: Install temporary, weathertight closures over exterior openings immediately after openings are created.
- H. Partitions: Provide, where indicated on Drawings, temporary, dust-tight partitions, complete with all doors, constructed of noncombustible materials with all joints and edges taped.
- I. Storage Facilities: BNL will not provide storage space. Provide, where directed, an approved storage facility.
- J. Fences: Erect four (4) foot high lath and wire temporary fencing, where indicated on Drawings, before start of other work.

SC-5. POWER AND LIGHT

- A. BNL will provide a source for temporary power for the Contractor's tools and lighting. Refer to GC-28, Temporary Services.
- B. Power will be 20 amp, 110 volt, 1 phase complete with wire, GFI and 1 duplex receptacle.

SC-6. SAFETY REQUIREMENTS

- A. All Contractor and Subcontractor employees are required to attend BNL's Contractor/Vendor Orientation Training (see GC-13).
- B. MPO will arrange and ESH&Q Division will provide additional safety instructions, as required. All personnel shall conform to special requirements for wearing personal protective equipment, protective clothing, respirators, and other safety measures as required.
- C. Refer to Section 000900 for Site and Construction Safety requirements.

SC-7. INDUSTRIAL HYGIENE MONITORING

- A. Refer to Section 000900 for Industrial Hygiene Monitoring requirements.

SC-8. SURVEYS AND STAKEOUT

- A. MPO will establish base lines and bench marks at the site. The Contractor shall establish reference control points and complete the layout of the work to be performed under the Contract.

- B. In addition, MPO will mark and/or stake out all known underground utility locations. Locations are approximate. Contractor shall maintain the markings/stakeouts. Any excavating near these locations shall be by hand to locate utilities exactly.
- C. The Contractor is responsible for all measurements required for execution of the work as specified, as shown on the drawings, or as modified at the direction of MPO.
- D. If, for any reason, bench marks, monuments, and/or utility location markings, established by the Contractor or MPO, are disturbed, the Contractor is responsible to re-establish them, without cost to BNL, as directed by MPO. Work may be suspended at any time when location and limit marks are not reasonably adequate to permit checking the work.

SC-9. CONSTRUCTION SAFETY

- A. Refer to Section 000900 for Site and Construction Safety requirements.

SC-10. CRANES, TRUCKS, MATERIAL HANDLING, AND LIFTING EQUIPMENT

- A. Contractor shall notify MPO 48 hours prior to any earthwork and/or rigging operations. All cranes, boom trucks, and lifting equipment must be approved by MPO prior to use. No equipment operations will be allowed until approval of equipment has been granted. Contact the MPO Hoist and Rigging Inspector, (631) 344-5456, for equipment inspections.
- B. All heavy equipment, including cranes and earth-working equipment must be in compliance with OSHA, ANSI, and DOT requirements, must be in good repair, and is subject to inspection by BNL. Equipment found to be leaking oil or other fluids will not be permitted to operate at BNL.
- C. BNL has several areas throughout the complex where overhead clearance is a concern. Contractor shall disclose overall dimensions of any heavy equipment prior to being brought on BNL site. Contractor and BNL shall walkdown the entire route/path that heavy equipment will use to ensure there are no interferences with overhead lines or other height restricted areas. Any modifications to the agreed upon route/path shall be approved by BNL prior to moving heavy equipment.

SC-11. SCHEDULE OF VALUES

- A. Successful bidder shall submit no later than 2 weeks after contract signing the following Schedule of Values breakdown. Separate the Construction Safety costs from the cost figure for General and Special Conditions, and list separately:
 - 1. General and Special Conditions
 - 2. Bond
 - 3. Occupational Medicine Program
 - 4. Site and Construction Safety

- B. Coordinate preparation of the Schedule of Values with preparation of the Contractor’s Construction Schedule and Applications for Payment. Applications for Payment cannot be processed without an approved Schedule of Values.
- C. Use BNL Form F 2685 and Tabulation Sheet F 2686, or the standard AIA Application for Payment, as the forms for payment, in accordance with BSA LLC, General Terms and Conditions for Construction and Labor Hour Agreements, Article titled: Payment.

SC-12. UNIT PRICES

- A. Successful bidder shall submit no later than 2 weeks after contract signing the following unit price breakdown.
- B. Unit prices to be used as the basis for changing quantities of work items from those indicated by the contract documents. Upon written instruction from PPM and MPO, the following unit prices shall prevail:

	Work Added	Work Deleted
1. Concrete per cubic yard.	\$ _____	\$ _____
2. Excavation per cubic yard.	\$ _____	\$ _____
3. Drainage per cubic yard.	\$ _____	\$ _____
4. Expansion Dowels per unit.	\$ _____	\$ _____
5. Binder per ton.	\$ _____	\$ _____
6. Top Course per ton.	\$ _____	\$ _____
7. Base Course per cubic yard.	\$ _____	\$ _____

SC-13. SPILLS OF HAZARDOUS MATERIALS

- A. When the work requires the Contractor to bring temporary fuel storage facilities on to the BNL Site, the Contractor shall be responsible for providing a temporary impermeable containment area for all fuel transfer operations in accordance with Suffolk County Department of Health Services, Article 12.
- B. If, during construction activities, a release, discharge, or spill of petroleum products or chemicals occurs, the Contractor shall:
 - 1. Immediately notify Safeguards and Security at ext. 2222 (or 911) from Site telephones or 631-344-2222 from cell phones or Direct Connect 173*37738*66 on a Nextel, and MPO, of the release, discharge, or spill.

2. Immediately, per SBMS, initiate cleanup and disposal operations by a BNL approved hazardous waste management contractor, complete the operations, and be responsible for monitoring and/or sampling in the event of a spill, to the satisfaction of BNL.

OR

3. Request MPO to initiate, per SBMS, cleanup and disposal operations with the agreement that the Contractor shall assume all costs associated with the cleanup and disposal work.
- C. The disposal of contaminated material will be coordinated by MPO through the Environmental Waste Management Services Division, with appropriate documentation and disposition forms.

SC-14. RECORD DOCUMENT SUBMITTALS

- A. Do not use the set of Contract Drawings issued by MPO (see GC-34) for construction purposes. Protect record documents from deterioration and loss in a secure, fire-resistant location. Provide access to record documents for MPO's reference during normal working hours.
- B. Maintain a clean, undamaged set of black line white-prints of Contract Drawings and Shop Drawings. Mark the set to show the actual installation where the installation varies substantially from the Work as originally shown. Mark which drawing is most capable of showing conditions fully and accurately. Where Shop Drawings are used, record a cross-reference at the corresponding location on the Contract Drawings. Give particular attention to concealed elements that would be difficult to measure and record at a later date.
 1. Mark record sets with red erasable pencil. Use other colors to distinguish between variations in separate categories of the Work.
 2. Mark new information that is important to BNL but was not shown on Contract Drawings or Shop Drawings.
 3. Particular attention shall be given to recording of all underground utilities as well as the fire protection, fire alarm and fire detection system operations and maintenance manuals and record documents.
 4. Note related change-order numbers where applicable.
 5. Organize record drawing sheets into manageable sets. Bind sets with durable-paper cover sheets; print suitable titles, dates, and other identification on the cover of each set.

- C. Refer to Specification Sections for requirements of miscellaneous record keeping and submittals in connection with actual performance of the Work. Immediately prior to the date or dates of Substantial Completion, complete miscellaneous records and place in good order. Identify miscellaneous records properly and bind or file, ready for continued use and reference. Submit to MPO for the permanent project records.

SC-15. ENVIRONMENTALLY PREFERABLE PURCHASING PROGRAM (A.K.A. RECYCLED MATERIALS USE AND REPORTS)

- A. Contractors and subcontractors must supply building materials that comply with the Federal Government's Executive Order 13423 (Environmentally Preferable Purchasing [EPP] – products that have a lesser/reduced effect on human health and the environment when compared to competing products), Federal/DOE Acquisition Regulations, and DOE Orders 450.1A, 430.2B and 413.3A. EPP Products in the design/construction/renovation industry include, but are not limited to, the following:
 - 1. sustainable building materials (e.g. concrete/cement/masonry/mortar/flowable fill made from recycled materials/fly ash,
 - 2. building and roof materials and insulation materials,
 - 3. carpets, carpet cushions, floor tiles, floor mats and other floor coverings,
 - 4. shower, restroom and room partitions,
 - 5. concrete wheel stops, patio blocks,
 - 6. signage,
 - 7. structural fiberboard,
 - 8. consolidated and re-processed latex paint,
 - 9. Non-pressurized piping,
 - 10. Modular threshold ramps,
 - 11. Recreation /park benches/tables,
 - 12. Plastic fencing,
 - 13. Playground equipment,
 - 14. Bicycle racks,
 - 15. Silt fencing (natural humus),
 - 16. Other miscellaneous materials with any components made from recycled metals, materials, etc.

In the event that non-EPP Products must be used or non-EPP are not available, then a technical justification or explanation, in writing, must be provided.

- B. See the appropriate Section for specific reporting requirements. Additionally, an EPP Spreadsheet is attached at the close of the Supplementary Conditions.
- C. The above reports must include quantities and monetary values of all material and they must be itemized in terms of material types and amount of components that are made from recycled materials.

SC-16. CERTIFICATION

- A. Certification of compliance with specification performance standards and manufacturers' specifications and directions shall be furnished for any portion of this work for which specific performance requirements and/or manufacturers' specifications are listed.
- B. It shall be the responsibility of the General Contractor to secure two (2) copies of each certification when required and transmit same to BNL.
- C. Sample Certification Form (2 pages) is attached as an exhibit at the close of the Supplementary Conditions. Each item requiring certification shall be so noted and affidavits shall be filed singly to cover each specified material, installation, application, and the like.
- D. CERTIFICATION SHALL ACCOMPANY EACH SUBMITTAL.
- E. Packaged Equipment:
 - 1. Where packaged (factory assembled) mechanical and electrical equipment is furnished, a certificate shall be included with the submission of shop drawings or catalog data stating that the equipment complies with OSHA, National Electrical Codes, and applicable Underwriter's Laboratories Standards in respect to motor protection, grounding, and protection against hazards, and is approved by all Regulatory Agencies.

EPP Commodity	Volume (CF)	Weight (lbs.)	Dollar Value (non-EPP Product*)	Dollar Value (EPP Product)	Manufacturer	P/N	Comments [e.g. project name(s), % recycled components, purchasing mechanism- contract/webreq/P.O./Credit Card/BNL stock, etc.], technical basis for use of non-EPP
1. Cement, concrete, masonry(CMU's), mortar, and flowable fill that contains >25% blast furnace slag or >10% cenospheres or 0-40% fly ash or >5% silica fume							
2. Building Insulation products ⁽¹⁾							
3. Roof and roofing insulation ⁽¹⁾							
4. Carpet and carpet cushion ⁽¹⁾							
5. Shower or restroom wall partitions ⁽¹⁾							
6. Wheel/curb stops (concrete with fly ash-any content)							
7. Patio blocks ⁽¹⁾							
8. Signage ⁽¹⁾							
9. Plumbing fixtures EPA-certified 'WaterSense' product(s)							
10. Energy-Star appliances(e.g., HVAC, computers used for process control, motion light sensors, etc.)							
⁽¹⁾ Any recycled content.							

EPP Commodity	Volume (CF)	Weight (lbs.)	Dollar Value (non-EPP Product*)	Dollar Value (EPP Product)	Manufacturer	P/N	Comments
11. Consolidated and re-processed Latex paint – 100% recovered material (consolidated), 20% recovered (reprocessed whites/pastels) or 50% recovered (reprocessed earth-tones/darks)							
12. Modular threshold ramps ⁽¹⁾							
13. Non-pressurized piping ⁽¹⁾							
14. Structural fiberboard ⁽¹⁾							
15. Recreational/Nursery area benches, picnic tables, chairs containing any recovered: aluminum, steel, concrete or plastic content							
16. Playground equipment containing any recovered: aluminum, steel, or plastic content							
17. Playground surfaces ⁽¹⁾ (e.g., recycled tires) -							
18. Tracks used for running ⁽¹⁾							
19. Plastic fencing ⁽¹⁾ or silt fences used for erosion control using compostable materials							
*Annual total purchases of items not meeting criteria of an EPP-Product. ⁽¹⁾ Any recycled content.							

Green construction materials: <http://www.biopreferred.gov/Catalog.aspx>

CERTIFICATION OF SPECIFICATION COMPLIANCE

I/WE, the MANUFACTURER/SUPPLIER and INSTALLER of _____

as specified in Section Number _____ of the Contract Documents prepared by Brookhaven National Laboratory, Upton, New York 11973 for:

(Project Title) _____

(Building) _____ (J/N) _____

(Contract Number) _____

do (does) herein certify that all materials furnished for said project do fully comply with all specification requirements as stated within the Contract Documents and further certifies that installation of this work has been performed in strict accordance with recognized standards of the industry governing such work, and all applicable Codes, Regulations, and Standards.

CONTRACTOR: _____

CERTIFICATION BY: _____ TITLE: _____

ADDRESS: _____

CERTIFICATION DATED: _____

Distribution:

Original and One Copy to:

Brookhaven National Laboratory
Ali Javidfar, Manager
Building 134-C
Upton, New York 11973

CSC-1

CERTIFICATION OF SPECIFICATION COMPLIANCE

CORPORATE ACKNOWLEDGEMENT

On the _____ day of _____, before me came _____
to me known and who by me being duly sworn did depose and say that he resides at _____
_____ that he is the officer of the said corporation executing
the foregoing instrument that he knows the seal of said corporation, that the seal affixed to said
instrument is such corporate seal, that it was so affixed by order of the Board of Directors of said
corporation and that he signed his name thereto by like order.

Notary Public

INDIVIDUAL ACKNOWLEDGEMENT

State of _____
County of _____

On the _____ day of _____, before me came _____
to me known and who by me being duly sworn did depose and say that he resides at _____
_____ that he is the individual who executed the foregoing instrument.

Notary Public

PARTNERSHIP ACKNOWLEDGEMENT

State of _____
County of _____

On the _____ day of _____, before me came _____
to me known and who by me being duly sworn did depose and say that he resides at _____
_____ that he is a partner in the firm of _____
doing business under the name of _____
and that he executed the foregoing instrument on behalf of said partnership.

Notary Public

CSC-2

END OF SECTION 000800

DIVISION 00 – BIDDING AND CONTRACT REQUIREMENTS
SECTION 000900 – SITE AND CONSTRUCTION SAFETY

SCS-1. GENERAL

- A. The Contractor is solely responsible for Construction Safety for the duration of this Contract.
- B. All Contractor's operations shall be in accordance with all applicable safety statutes, requirements and standards, including, but not limited to, the Federal Occupational Safety and Health Administration (OSHA), this document, and applicable sections of the Department of Energy's 10 CFR 851 Worker Safety and Health.
- C. BNL will not tolerate non-adherence to safety requirements under this Contract. Failure to comply will result in BNL's direction to stop work in accordance with BSA LLC, General Terms and Conditions for Construction and Labor Hour Agreements, Article titled: Compliance with 10 CFR 851 and BSA's Worker Safety and Health Program. Non-compliance could also mean the barring of the violating individuals from the BNL Site. Repeated safety violations may also result in a permanent Work Stoppage under the same Article.
- D. A verbal or written Stop Work Order may be imposed by BNL for specific work activities when site conditions are created or exist that pose unacceptable risks or imminent danger. In addition, actions perceived by BNL to be in flagrant disregard of established safety and environmental requirements will be cause for Stop Work actions to be taken. Some examples of justification to take this action, include, but are not limited to the following:
 - 1. Workers who have not attended the BNL-required CVO Orientation Safety Seminar prior to work on BNL property.
 - 2. Failure to follow Contractor's HASP requirements.
 - 3. No BNL-accepted Contractor Safety Representative or Alternate on the work site.
 - 4. Failure to develop or implement the required Phase Hazard Analysis (PHA) plans.
 - 5. No BNL-accepted Contractor's PHA reviewed by all parties involved with such work prior to commencing activities.
- E. BNL reserves the right to refuse access to the Project Site, or require immediate removal from the Project Site, any individual violating or alleged to have violated established site safety or Security regulations.
- F. All debris, or other material or substances that constitutes a hazard, in any form, liquid or solid, shall be cleaned off floors and other walking/working surfaces daily, (indoors or outdoors), or as often as necessary as conditions change/develop.

SCS-2. HEALTH AND SAFETY PLAN (HASP)

- A. The Contractor shall operate the construction site under this contract in accordance with a HASP that has been accepted by BNL.
- B. The Contractor shall prepare and submit a detailed Construction HASP within two (2) weeks of the Contract signing and before the commencement of any physical work on site. The HASP Outline/Template is available on the BNL Construction Safety Subject Area web page, a copy of the Template can also be requested through the BNL Contract Administrator. It is the Contractor's sole responsibility to fully develop an acceptable HASP for submittal to BNL.
- C. The Contractor shall make any revisions and corrections that are noted upon review of the HASP by BNL, and, when accepted, resubmit three (3) printed copies and one (1) electronic copy of the HASP in PDF format to the BNL Technical Representative for distribution.
- D. The HASP shall be revised as necessary to reflect changing hazard conditions.
- E. While an acceptable HASP is a contractual requirement and BNL undertakes to review the same for compliance, BNL is not obligated to accept such program, and neither the initial review nor any subsequent acceptance of the HASP by BNL shall mean that any omission or error contained in the HASP is waived by BNL or shall relieve the contractor of its obligations to conduct the project in an entirely safe manner and in accordance with all applicable safety statutes, requirements and standards.

SCS-3. HASP DOCUMENT ORGANIZATION / REQUIREMENTS

- A. The HASP shall be organized as per the BNL HASP Outline/Template, which provides the minimum requirements for the HASP. The Outline/Template is available on the BNL Construction Safety Subject Area web page, a copy of the Template can also be requested through the BNL Contract Administrator.
- B. Cover page shall include name of Contractor, name of Project, Contract number, revision number, date of revision(s), name and signature of Contractor Safety Representative approving the HASP.
- C. Table of contents listing all Sections and Exhibits.
- D. A brief description of the Project.
- E. Organization chart of Contractor and Subcontractor personnel responsible for implementing the HASP and their duties and responsibilities. The chart shall show the reporting relationship and integration of the Safety Representative and Alternate with all personnel, including top level managers; responsible for implementing the Health and Safety Plan, (HASP), Program. The chart will also show reporting relations of Competent Persons as defined in this section.

- F. The HASP shall include but not be limited to the following information and requirements as applicable to the project:
1. Compliance Letters
 - a. The contractor shall submit a letter or certificate of compliance indicating that the Contractor is aware of, and has reviewed, and will comply with, the safety regulations of the OSHA Standards (29 CFR 1910 & 1926), Standard for Electrical Safety in the Workplace (NFPA 70E), DOE Worker Safety & Health Program (10 CFR 851), F&O Directorate’s ES&H Procedures, BNL Standards-Based Management System (SBMS), and all other federal, state and local environmental, safety and health requirements applicable to the scope of work. (Contact the Contract Administer for access to or copies of applicable F&O and SBMS documents for this contract.) The letter shall be signed by an Officer of the Contractor’s company that shall include signatures of all Subcontractors, (continuously updated as they are retained by the Contractor).
 - b. A copy of one of the following:
 - 1) A copy of the company record of past injury, accident, fire and property damage experience, including motor vehicle, for the previous two (2) years, Experience Modification Rate (EMR) from Insurance Broker for previous (2) years, and Environmental Citations/Violations received for the last five years, if any, or
 - 2) Contractor’s OSHA 300 Logs for the current year and past three years, EMR from Insurance Broker for previous (2) years, and a list of OSHA and Environmental Citations/Violations received for the last three years, if any.
 2. Statement of Accident Prevention Program: Include a thorough description of the Contractor’s safety program including, but not limited to, the following as it applies to this Project:
 - a. Personal Protective Equipment (PPE): BNL has PPE requirements for work on the Project. Mandatory items shall be worn at all times as determined through the HASP. These PPE requirements include, but are not limited to:
 - 1) ANSI Compliant Z87.1 – Eye Protection (Mandatory): Grinding, chipping or other similar particle producing operations shall also require a face shield.
 - 2) ANSI Compliant Z89.1 1997 – Head Protection (Mandatory): SEI certified hard hats meeting the requirements for Type I Class E protection shall be properly worn and maintained (i.e., no bump caps or cowboy type hard hats).

- 3) ANSI/ISEA 107-2004, Class 2 Compliant High Visibility Reflective Apparel or Safety Vests (Mandatory): All Contractor employees shall wear flame retardant safety vests that have 360-degree reflective visibility; the front of the vest may be fitted with a transparent plastic pocket, flush mounted, to accommodate the BNL photo ID. The Contractor and all Subcontractors shall utilize safety vests with a label on the front and back identifying them as a “Contractor”.
 - a) A specific variance may be granted for not wearing Hi-Vis reflective vests that involves hot work activities i.e. welding, grinding, brazing etc, This variance must be evaluated and authorized, in writing, by BNL. Vests can be obtained from and are manufactured by:
 - (1) The Industries for the Blind of New York State, 296 Washington Avenue Extension, Albany, New York 2203-5316, Tel. (800) 421-9010, Fax (518) 456-3587.
 - 4) ANSI Z41-1991 Compliant Foot Protection (Mandatory): Shoes shall be durable and in good condition without breaks or splits, be at least six inches high, be equipped with a safety toe, and be completely laced or buckled. The shoes shall have defined heels that are no more than one inch high, (sneakers/gym shoes are prohibited). The sole of the footwear shall provide good traction under slippery conditions.
 - 5) Minimal Acceptable Clothing for Construction Work (Mandatory): Long pants, short-sleeved shirts, (4-inch sleeve minimum).
 - 6) Other PPE as required by Contractor’s scope of work, HASP, OSHA, DOE, and BNL.
- b. Contractor Safety Representative
- 1) The Contractor shall assign an individual employed by the Contractor as Safety Representative, and one (1) Alternate. The Contractor Safety Representative and Alternate will be responsible for safety on the job site whenever work is being conducted. Representative or Alternate shall be immediately available and present on the Construction Site whenever construction activities are being performed, otherwise work will not be conducted. These individuals shall be named in the HASP.
 - 2) The Contractor shall submit to BNL for acceptance the documentation that describes the qualifications of the proposed candidates for Safety Representative and Alternate for the awarded scope of work. Prior to acceptance, BNL may interview the candidate for Safety Representative or Alternate. The submitted documentation shall include for a 3-year

period, a description of the duties, responsibilities, accomplishments and safety record of preceding assignments from which the candidate has gained effective safety engineering experience. The Contractor shall not change the accepted Safety Representative or Alternate without receiving BNL's acceptance of the replacement. The Safety Representative and Alternate shall be subject to BNL's continuing acceptance.

- 3) A Multi-Discipline Contractor Safety Representative and Alternate shall:
 - a) have completed the "30-Hour OSHA Compliance for the Construction Industry" Outreach construction safety course;
 - b) have a working knowledge of the 29 CFR 1926 construction safety standards and 29 CFR 1910 General Industry standards as referenced by the construction safety standards
 - c) have a working knowledge of the requirements of 10 CFR 851 as they relate to construction safety; and
 - d) demonstrate the ability to effectively supervise and assure the safety of the type of work for which they will be responsible.
- 4) A Single-Discipline Contractor Safety Representative and Alternate shall:
 - a) have completed the "10-Hour OSHA" Construction Outreach course, and
 - b) demonstrate their ability to effectively supervise the type of work for which they will be responsible.
- 5) The Contractor Safety Representative shall maintain a daily site Safety Log for all project site safety matters. All safety-related activities including safety deficiencies and corrective actions taken shall be included in the Log. The Log shall be updated and signed daily reflecting safety issues by the designated Safety Representative. This Log shall be maintained on site and be available for BNL's review. It must also accompany the Safety Representative to Project progress meetings for discussion. Whenever the Safety Representative is not present, the responsibilities of maintaining the safety Log shall be that of the assigned Safety Alternate.

c. Competent Person(s)

- 1) Specific identification of "Competent Person(s)" is per OSHA. The Competent Person(s) qualifications include, but are not limited to, formal Construction Safety Awareness courses taken, applicable to the nature of this Project, and where applicable, the method of accomplishment in a

specific plan, i.e. fall protection, excavation, etc. Competent Person must have had formal, documented training, have knowledge of existing standards, and have authority to take actions deemed necessary.

- a) A “Competent Person” certification is not achieved by successfully completing a 10- or 30-hour Construction Outreach Safety training course. It is through specialized courses of instruction for that particular field or topic.
 - b) A “Competent Person” shall have the authority to stop the work if an unsafe condition develops or an unsafe act is occurring.
- 2) Competent Person(s) shall be designated in the HASP.
 - 3) Competent Person(s) shall be designated by the Contractor’s Safety Representative to oversee safety matters in an individual group performing work at individual work locations. They may be Subcontractor personnel and have other Project responsibilities in addition to their safety function. They shall be familiar with the work being performed, shall have appropriate OSHA-related training, be familiar with the hazards to be encountered at the particular Work Site, and shall be capable of being designated as the OSHA-defined “Competent Person”.
 - 4) An interview may be required with BNL to establish their competency and to secure the BNL’s acceptance/concurrence prior to their assignment as a Competent Person.
- d. Inspections: A written program to provide for the frequent (daily), written inspections and reporting of job site conditions relating to safety. These documents shall be available for inspection by BNL upon request.
- e. Walking and Working Surfaces
- 1) A written program describing the design, maintenance, protection and inspection of walking and working surfaces in compliance with the fall protection requirements of 29CFR1926 Subpart M.
 - 2) All workers on a working/walking surface 6 feet or more above a lower level shall be protected from falling by a guardrail system, a safety net system, or personal fall arrest system. This 6 feet requirement also applies to Steel Erection. The other requirements of 29CFR 1926 Subpart R apply to Steel Erection.
 - 3) Where a guardrail system is employed, and a controlled access zone has been established for leading edge work, the control line may be used in lieu of a guardrail system along the edge that parallels the leading edge

as described in the written and accepted site-specific fall protection program. The program shall include the designation of the “Competent Person”. The Contractor’s “Competent Person” shall have been formally trained in ANSI fall protection standards and safety, and have authority to take actions deemed necessary. See Section on “Competent Person(s)” in this section.

f. Contractor/Subcontractor Responsibilities

- 1) The Contractor shall include, and shall require the compliance with, all the applicable safety requirements of this contract in all contracts with all tiers of Subcontractors. The Contractor is totally responsible for the safety performance and compliance of subcontractors of any tier.
- 2) Prior to the start of work, a pre-construction meeting shall be scheduled by the Contractor with his subcontractors to review specific safety requirements of the project, including the HASP. The meeting will also include the following:
 - a) That BNL will not tolerate non-adherence to safety and environmental requirements under this Contract, including the HASP. Failure to comply will result in BNL’s direction to stop work in accordance with the Article titled: Compliance with 10 CFR 851 and BSA’s Worker Safety and Health Program. Non-compliance could also mean the barring of the violating individuals from the BNL Site. Repeated safety violations may also result in a permanent Work Stoppage under the same Article.
 - b) A verbal or written Stop Work Order may be imposed by BNL for specific work activities when site conditions are created or exist that pose unacceptable risks or imminent danger.
 - c) BNL reserves the right to refuse access to the Project Site, or require immediate removal from the Project Site, any individual violating or alleged to have violated established site safety, environmental, or Security regulations.
 - d) All debris, or other material or substances that constitutes a hazard, in any form, liquid or solid, shall be cleaned off floors and other walking/working surfaces daily, (indoors or outdoors), or as often as necessary as conditions change/develop.

3. Safety Training and Communication
 - a. A written program describing the training employees in the recognition and avoidance of unsafe conditions and in the safety regulations applicable to this Project.
 - b. The conducting of informal “tool box” safety and health training sessions at least weekly for all employees on the worksite. Depending on the size and nature of the project, this may be accomplished in single or multiple sessions and may address different topics for different work crews. Documentation of all “tool box” training sessions shall be prepared by the Contractor and annotated with the date, time, and names of all employees in attendance.
 - c. Provisions through meetings, established contacts, documents or other means, for the mutual exchange of information with Contractor and Subcontractor personnel on:
 - 1) Changes in scope of work
 - 2) Recognized hazards
 - 3) Identified inspection deficiencies
 - 4) Future phases of work
 - 5) Potential problem areas
 - 6) Coordination of crafts/trades
 - d. A written program to ensure that all employees and Subcontractors have been properly trained for the hazards anticipated on this project as specified in the Phase Hazard Analysis. Severe or repetitive safety violations shall be cause for permanent removal from the job site.
 - e. A written program to establish and implement a drug and alcohol-free workplace program.
 - 1) A single violation of this program shall result in the offending individual being removed from the job-site and recommendation for participation in an approved drug abuse assistance or rehabilitation program, and/or reporting to the civil authorities for criminal prosecution. BNL’s Contracting Officer shall be notified in writing within 10 days after receiving notice of an employee's or subcontractor employee’s conviction under a criminal drug statute for a violation occurring in the workplace. Notification shall include the position title of the employee and the appropriate personnel action to be taken within 30 days under the requirements of this program.

- 2) The program shall include ongoing mandatory documented drug-free awareness training, intervention procedures, and program enforcement.
 - 3) The program shall include pre-hiring and random and post accident drug and alcohol testing.
 - 4) The program shall identify the individual responsible for implementing this program.
4. Hazard Communication
- a. A written hazard communication program to inform employees and all sub-contractor employees of known chemical hazards that may exist in the workplace in compliance with OSHA 29 CFR 1910 Subpart Z. This program shall apply to chemicals known to be present in the workplace in such a manner that employees may be exposed under normal conditions, non-routine tasks, or foreseeable emergencies.
 - b. The program shall address labels and other forms of warning, Material Safety Data Sheets (MSDS) and employee information and training, a listing of hazardous chemicals known to be present in the workplace, methods for informing employees of hazards of non-routine tasks, and methods for informing employees and subcontractor employees of hazards they may be exposed to while working on the Project.
5. Emergencies: Fire, Medical, Environmental and Accidents
- a. A written program for response to emergencies, including emergency notification. The program shall address injury reporting, first aid, notification of BNL emergency and project personnel, and accident and injury investigation. The program shall also address fire protection and prevention, including hot work permits, fire watches, and fire extinguishers, in conformance with 29 CFR 1926 Subparts F and J. The Contractor shall identify and post indoor and outdoor assembly area locations and evacuation routes from the Project Site.
 - b. The Contractor shall have a program to protect the environment, to include spill prevention and response. The contractor is responsible to immediately notify BNL project/safety personnel of all injuries, and to conduct a thorough and timely accident investigation, determine the cause(s), and implement corrective and preventive measures. The Laboratory reserves the right to monitor all such investigations and causal analysis processes for all recordable injuries, and further reserves the right to conduct its own investigations.

6. Excavations

- a. A written program is required describing the design, maintenance, protection and inspection of excavations in compliance with 29 CFR 1926 Subpart P. The program shall include the designation of the “Competent Person”. The Contractor’s Competent Person shall have been formally trained in OSHA excavation standards and safety, and have authority to take actions deemed necessary. See Section on “Competent Person(s)” in this section.
- b. The Contractor shall submit to BNL for acceptance the documentation that describes the qualifications of the proposed candidate(s) for Competent Person. The program shall ensure all personnel engaged in work within excavations are trained on current project-specific excavation hazards prior to start of each shift.
- c. The soil at BNL is classified as Class C soil, and the excavation safety program shall comply with the requirements for that soil classification.

7. Concrete and Masonry Penetrations

- a. The Contractor shall ensure safe penetration into or through any existing concrete or masonry surface.
- b. BNL SBMS and F&O Directorate’s Policies and Procedures shall be followed, including the completion of appropriate Penetration Permits and the provision and use of utility locating/detecting equipment. The Contractor shall provide trained “Authorized Employees” and shall submit, for MPO review and approval, the name and type of the utility locating/detecting equipment to be used, as well as the names of the trained personnel who will perform the locating task with this equipment and who will execute the penetration work.
- c. Non-aggressive penetrations cannot be executed without first using utility locating/detecting equipment and obtaining approval by MPO.
- d. Aggressive penetrations cannot be executed without first using utility locating/detecting equipment followed by the completion and approval of a MPO Aggressive Penetration Permit.

8. Electrical Safety

- a. A program is required certifying the safe operating condition, and assuring the proper maintenance of, permanent and/or temporary light, power and electrical equipment, including protective devices (GFCI) for portable electric tools, in conformance with 29 CFR 1926 Subpart K.

- b. Working on or near energized electrical circuits will only be allowed when all methods available to perform the work in a de-energized state have been evaluated and determined to be infeasible. Working on or near energized conductors is subject to the restrictions and provisions of the Standard for Electrical Safety in the Workplace (NFPA 70E), and MPO Procedure DF-ESH-102 Electrical Safety.
- c. All Contractor and Subcontractor employees who work on or near energized parts as defined in NFPA 70E shall complete the BNL Electrical Safety 1 Training Course. The course is available on the Web at <http://training.bnl.gov/course/electsaf1>, and is valid for one (1) year. In addition to completing this course, each organization's Electrical Work Supervisor must discuss the "Standard for Electrical Safety in the Workplace" (NFPA 70E) requirements and specific hazard(s) and risk information with their staff. This job briefing shall discuss specific electrical work procedures, protective equipment requirements, and departmental contacts at the local application level. This job level discussion can be informal; however, a record of this briefing shall be documented. The Contractor shall ensure that all employees and subcontractor employees who may be required to "Work On or Near" electrical circuits within the BNL AC Distribution System and all associated equipment are trained and authorized employees. A "trained and authorized employee" is deemed to be an individual who has been qualified in the skills and knowledge related to the service, maintenance, construction and/or operation of electrical equipment and installations, and has received safety training on the hazards involved, including the wearing of the appropriate PPE.
- d. The Contractor shall provide documentation which clearly indicates the qualifications and training of all employees performing such work.
- e. All Contractor and Subcontractor employees that "Work On or Near" electrical circuits shall have taken and passed a CPR training program that has been accepted by BNL.
- f. The Contractor will arrange for the issuance of a "Working On or Near" Permit as required by DF-ESH-102 Electrical Safety. The Contractor shall give BNL a minimum of 48 hours notice of any requirement to "Work On or Near" to allow time for the BNL permitting process. "Working On or Near" operations that only involve testing, diagnostic work, and/or service tasks on equipment for voltages less than 600 Volts AC-to-ground may be covered by a Testing, Troubleshooting, and Voltage measuring Electrical Energized Permit, which may also cover the entire project period up to a maximum of one year. Operations involving "Working On or Near" for voltages greater than 50 Volts AC-to-ground may require a specific "Working On or Near" Permit for each

work situation required. Work may only proceed when the “Working On or Near” Permit is completed and all parties performing the work have been informed of the hazards involved and the PPE to be worn. An authorized Supervisor from the Contractor who is performing the work and a BNL-designated Manager must sign the permit before any work can be performed.

9. Mobile Equipment Program

- a. A program is required certifying the safe operating condition of, and assuring the proper maintenance of, earth-moving equipment, cranes, vehicles and other such heavy equipment, including an environmental protection spill prevention plan, in conformance with 29CFR 1926 Subparts N and O.
- b. A Rigging Plan shall be submitted in conformance with 29 CFR1926.251 and the BNL Construction Safety Subject Area as a part of the HASP and in accordance with the conditions noted in the Supplementary Conditions clause, “SHOP DRAWINGS, MANUFACTURERS DATA, AND SAMPLES” whenever this equipment is to be used on Site. Incremental submission of the Rigging Plan is acceptable, but in no case shall be submitted less than four (4) working days prior to any scheduled lift. Acceptance of the Rigging Plan by BNL is required prior to the commencement of any lift.

10. Fall Protection

- a. A written program certifying that all temporary staging, platforms, scaffolding, planking, bracing, scaffold towers and walkway work are to be designed, erected, used, maintained, and dismantled in accordance with OSHA 29 CFR 1926 Subpart L, and BNL SBMS.
- b. The Contractor’s Competent Person shall have been formally trained in scaffold standards and safety, and shall assure that all personnel engaged in the erection and/or dismantling of scaffolding meet the definition of a “Competent Person”. See Section on “Competent Person(s)” in this section.
- c. Scaffolds shall be physically tagged as to their condition and verified by the “Competent Person” on a daily basis, when they are being used. The scaffold tagging system shall include:
 - 1) Green Tag: To be placed on all scaffolds at all access points by the designated competent person indicating that the completed scaffold complies with all regulatory requirements.
 - 2) Yellow Tag: To be placed on all scaffolds at all access points by the designated competent person indicating that the scaffolds are structurally sound, but an accessory such as a handrail cannot be installed due to the location of the scaffold, or the nature of the work to be

performed. Other forms of fall protection are required on all yellow-tagged scaffolds.

- 3) Red Tag: To be placed on scaffolds by the designated competent person on scaffolds that are damaged, defective, being constructed or dismantled indicating that no access is permitted by personnel not authorized to erect, dismantle or make repairs to scaffolds and in a visible location, preferably at the access points.
- d. The Contractor's scaffold "Competent Person" shall also assure that all personnel working on or from the scaffolds have been trained in the proper procedures and precautions while using the scaffolding. Tool Box training at the Site is acceptable.

11. Lockout/Tagout Program

- a. A Lock-Out/Tag-Out program shall comply with OSHA 29 CFR 1926.417 and 29 CFR 1910.147, and BNL's LOTO Subject Area.
- b. Lock-Out/Tag-Out is the required method of control when performing service, maintenance, or construction around any machinery where personnel could be injured by startup of the equipment or release of stored energy. Sources of energy shall include, but not limited to, mechanical (kinetic/potential), electrical, electromagnetic, chemical, thermal, hydraulic, and pneumatic.
- c. Contractor shall provide his own locks in compliance with the BNL LOTO Subject Area, lockout devices, and red tags for Lock-Out/Tag-Out of energy sources(s). A logbook shall also be maintained and kept in a designated area assigned by BNL.

12. Hot Work (Welding/Cutting & Open Flame Operations)

- a. Proper cutting/welding permits shall be obtained from the BNL Construction Inspector. The contractor will participate in the review for the permit and comply with all requirements on the permit. Cease operations if permit conditions cannot be met.
- b. Requirements of the SBMS Fire Safety Subject Area shall be observed.
- c. Hot Work Permits are required for:
 - 1) Welding and allied processes;
 - 2) Heat treating by use of open flame;
 - 3) Grinding;

- 4) Thawing pipe by open flame or resistance from electrical current flowing through the pipe;
- 5) Powder-driven anchors;
- 6) Hot riveting;
- 7) Thermite welding;
- 8) Brazing, braze welding, silver solder and soldering;
- 9) Similar applications producing or using a spark, flame, or heat.

13. Confined Space Entry

- a. When Confined Space Entry is required, the Contractor shall have a written Confined Space Entry Program which complies with OSHA 29 CFR 1910.146 and BNL Confined Space Subject Area (<https://sbms.BNL.gov>).
 - 1) The program shall require the “Competent Person” (as defined by OSHA) to:
 - a) Establish procedures and practices for safe entry.
 - b) Have air monitors to check concentration of oxygen, explosive/flammable gases and the specific contaminants of concern (e.g. hydrogen sulfide in sewer utility holes).
 - c) Test and monitor conditions to identify and evaluate hazards.
 - d) Prevent unauthorized entry.
 - e) Station an attendant outside permit spaces during entry.
 - f) Post procedures to summon rescuers and prevent unauthorized personnel from attempting rescue.
 - g) Develop a system for preparing, issuing, using, and canceling entry permits.
 - 2) Permits are required to include an identification of the confined space, its hazards, a list of authorized entrants, the purpose of their entry, and the date and duration of their permits; the current attendants and entry supervisor; and both the results of tests performed and any measures necessary to isolate the permit space and eliminate or control the hazards. The permit must also describe the acceptable entry conditions, emergency equipment and the means to summon rescue and emergency services.

- 3) Authorized entrants into confined spaces must be effectively trained to be aware of any hazards they may face and be able to recognize signs and symptoms of exposure. They must also be familiar with any emergency equipment in the confined space.

14. Respiratory Protection & Exposure Monitoring

- a. All work on this Project with regard to, and of, the conditions listed must be done within the occupational exposure limits for Industrial Hygiene hazards set in OSHA 29 CFR 1926, 29 CFR 1910, and ACGIH *Threshold Limit Values*® (see BSA LLC, General Terms and Conditions for Construction and Labor Hour Agreements, Article titled: Compliance with 10 CFR 851 and BSA’s Worker Safety and Health Program). Compliance with the OSHA Permissible Exposure Limits and American Conference of Governmental Industrial Hygienists (ACGIH) *Threshold Limit Values*® shall be determined by representative personnel exposure monitoring and dosimetry conducted by the Contractor and his Industrial Hygienist. Monitoring shall be continuously performed during the total duration of the hazardous condition. The details of the project’s exposure monitoring equipment, methods, and monitoring strategy shall be included in the Contractor’s Environmental, Health and Safety Plan. Conditions that require industrial hygiene monitoring include, but are not limited to:
 - 1) Working with Chemicals, Adhesives, or Lead
 - 2) Release of Silica (grinding, drilling, core boring, jackhammering of concrete, masonry, mortar, etc.)
 - 3) Heat Stress
 - 4) Noise and Hearing Conditions
- b. The Contractor is required to provide qualified monitoring and hazard assessment personnel (per DOE G440.1-3 *Occupational Exposure Assessment*) to conduct all Industrial Hygiene monitoring.
- c. The Contractor is required to conduct monitoring with calibrated equipment using NIOSH or OSHA approved methods, and to have analysis conducted by an American Industrial Hygiene Association (AIHA) Proficiency Analytical Testing certified laboratory or by National Institute of Standards and Technology (NIST) traceable calibrated direct reading instrumentation. All instrumentation used for surveys shall have been calibrated in compliance with the manufacturer’s specification prior to use in the field.
- d. Copies of all equipment calibration, field sampling sheets, laboratory analysis reports, and hazard assessment evaluation reports are to be provided to MPO, in accordance with the Shop Drawings, Manufacturers Data, and Samples Section above.

15. Phase Hazard Analysis Program

- a. The Phase Hazard Analysis (PHA) shall provide BNL with a defined plan of action for identified hazards and comprehensive prevention methods for exposures to workers, the BNL populous/public, and property. The PHA shall identify the specific tasks to be completed, including access, egress, set-up and breakdown, under all expected or created environmental conditions. It shall include the method of work for completing these tasks, associated work hazards, and the corresponding equipment and methods that will be used to prevent loss to persons or property for all contracted work, including that of Subcontractors.
- b. Subcontractors may develop their own PHA's and forward them to the General Contractor for their written approval, who will then forward the PHA's to BNL for acceptance.
- c. The PHA shall be used as the basis for Contract coordination items and safety planning discussions in the Construction Management process.
- d. BNL requires a minimum of 5 working days to review the Contractor's submitted PHA's.
- e. Work shall not proceed on a task until the PHA has been accepted in writing by BNL.
- f. Assistance in developing effective PHA's is available from the BNL Construction Safety Engineering Staff.
- g. All workers shall comprehend the scope of work and safety instructions required to perform the job. All workers employed by the Contractor and all Sub-Contractors shall acknowledge, in writing, that they have read and understood the HASP and all subsequently accepted modifications and PHAs. If workers cannot read or speak English or are hearing impaired, an interpreter shall be provided by the Contractor to ensure that the scope of work, information regarding hazards associated with the work-site, and safety requirements are relayed to them in a manner in which they can understand. The interpreter shall sign that he has explained the plan, and shall be at the work-site whenever these workers are on the job. The accepted HASP and all subsequently accepted modifications and PHAs shall be available at the job site to all Contractor and Sub-Contractor employees for review.

16. Sources of Radiation

- a. Lasers brought onto the BNL site must be reviewed by the BNL Laser Safety Officer. Only lasers which are Class 2, 3A, or 3R, will be permitted on the construction site.

- b. Only qualified and trained employees will be assigned to install, adjust, and operate laser equipment. Proof of qualification of the laser equipment operator will be available and in possession of the operator at all times. (Name of Contractor) will have the training documentation on file or it will be readily available.
- c. Areas in which lasers are used will be posted with standard laser warning placards.
- d. Only those devices labeled as Class 2 or 3a, or 3r (no greater than 5 milliwatts) will be used.
- e. Areas in which lasers are used will be posted with standard laser warning placards. These can be obtained from the BNL Laser Safety Officer.
- f. Beam shutters or caps will be utilized, or the laser turned off, when laser transmission is not actually required. When the laser is left unattended for a substantial period of time, such as during lunch hour, overnight, or at change of shifts, the laser will be turned off. Consideration to best mitigate laser beam transmissions to passing motorists will be evaluated.
- g. When it is raining or snowing, or when there is dust or fog in the air, the operation of laser systems will be prohibited where practicable; in any event, employees will be kept out of range of the area of the source and target during such weather conditions.
- h. Laser unit in operation should be set up above the heads of the employees, when possible.

17. Occupational Medicine Program

- a. A written program describing the comprehensive occupational medicine services provided to each of the Contractor employees and subcontractor employees who: work at BNL for 30 or more days in a 12 month period; or work for any length of time at BNL and are required by statute to be enrolled in a medical or exposure monitoring program. The services shall be provided by an occupational medicine provider (“OMP”) that:
 - 1) Plans and implements the occupational medicine services
 - 2) Is under the direction of a physician licensed in the state of New York.
 - 3) Is staffed by health care professionals with valid New York State licenses in their respective professions.

- b. These services shall be fully compliant with all provisions of Section 8 (“Occupational Medicine”) of Appendix A of the Federal Regulation 10 CFR 851.
- c. The contractor shall provide a written acknowledgement signed by the OMP that the medical surveillance and medical certification to be provided will be in compliance with OSHA, DOE or other statutory or contractual requirements, and will be fully compliant with the provisions of Section 8 (Occupational Medicine) of Appendix A of the Federal Regulation 10 CFR 851.

END OF SECTION 000900

DIVISION 03 – CONCRETE

SECTION 033000 – CAST-IN-PLACE CONCRETE

A. General:

1. Furnish all labor, materials and equipment necessary to provide cast-in-place concrete work, including, but not limited to, reinforcement, concrete materials, mix design, placement procedures, formwork, anchorages, finishes, and accessories.
2. To the maximum extent, cement and concrete shall be supplied from manufacturers and batch plants that incorporate ground granulated blast furnace (GGBF) slag into their product during its production.
3. GGBF is available from many sources including Blue Circle Cement, Inc., Lehigh Portland Cement Co., and Lone Star Industries, Inc.
4. At the completion of the concrete work, submit the following:
 - a. Quantity in cubic yards and dollar value of concrete provided that incorporated GGBF slag in its design mix.
5. Transit mix supplier must be experienced in manufacturing ready-mixed concrete products that comply with ASTM C94, and be located within a 30 minute travel range of BNL. Submit name of transit mix supplier that uses GGBF slag within 15 days of signed Contract. Approval of supplier is dependent on receipt of written guarantee that concrete strength will conform to strength specified. Failure to conform to specified strength will result in removal of supplier and of understrength concrete from the job and a new supplier provided, all at no additional cost to BNL.
6. Conform with ACI 301 & 318, latest editions.
7. Provide air entrained concrete developing minimum compressive strength of 4,000 psi in 28 days with a slump of $5 \pm$ one (1) inch maximum. Air content to be $5\% \pm 1\%$ by volume, 3% maximum for trowel-finished floors.

B. Materials:

1. Formwork: Furnish formwork and form accessories according to ACI 301, faced to provide required finish, in largest practicable sizes to minimize number of joints.
2. Steel Reinforcement:
 - a. Reinforcing Bars: ASTM A 615, Grade 60, deformed.
 - b. Plain-Steel Welded Wire Fabric: ASTM A 185, plain, fabricated from as-drawn steel wire into flat sheets.
 - c. Bar Supports: Bolsters, chairs, spacers and other devices as required, CRSI “Manual of Standard Practice.”

3. Concrete Materials:
 - a. Portland Cement: ASTM C 150, Type I or Type II, with ground granulated blast furnace slag.
 - b. Normal-Weight Aggregate: ASTM C 33, uniformly graded, 1-1/2-inch (38-mm) nominal maximum aggregate size.
 - c. Water: Complying with ASTM C 94, potable.
 4. Admixtures:
 - a. Air-Entraining Admixture: ASTM C 260.
 - b. Water-Reducing and Accelerating Admixture: ASTM C 494, Type E.
 - c. Only those admixtures and their combinations included in the approved design mix will be permitted.
 5. Joint-Filler Strips:
 - a. ASTM D 1751, asphalt-saturated cellulosic fiber or ASTM D 1752, cork or self-expanding cork.
 6. Curing Materials:
 - a. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
 - b. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf.
 - c. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
 - d. Water: Potable.
 - e. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A. Do not apply on concrete slabs scheduled for finishes other than paint.
- C. Concrete Mixtures:
1. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.
 2. Cementitious Materials: Use fly ash, pozzolan, ground granulated blast-furnace slag, and silica fume as needed to reduce the total amount of portland cement, which would otherwise be used, by not less than 40 percent.
 3. Comply with ACI 301 requirements for concrete mixtures.

4. Prepare design mixes, proportioned according to ACI 301, for normal-weight concrete determined by either laboratory trial mix or field test data bases, as follows:
 - a. The required average compressive strength of the trial mix specimens (f'_{cr}) shall exceed the specified minimum compressive strength (f'_c) by at least 1,200 psi for specified concrete strengths of 4,000 psi.
 - b. Trial mixes having proportions and consistencies required for the proposed work, and made with samples of the materials to be used, shall be made using at least three (3) water to cementitious materials ratios that will produce a range of strengths encompassing the required average strength (f'_{cr}).
 - c. For each water to cementitious materials ratio or cementitious materials content, at least three (3) test cylinders for each test age shall be made and tested.
 - d. The mix design for the proposed mix shall be that trial mix which produces the required average strength (f'_{cr}) unless a lower water-cementitious material ratio or higher minimum cementitious material content is required elsewhere within these specifications.
 5. Comply with Clause A.7 above.
- D. Concrete Mixing:
1. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mix type, mix time, quantity, and amount of water added. Record approximate location of final deposit in structure.
- E. Installation, General:
1. Formwork: Design, construct, erect, shore, brace, and maintain formwork according to ACI 301.
 2. Vapor Retarder: Install as, and where, detailed on the Drawings, protect, and repair vapor-retarder sheets according to ASTM E 1643; place sheets in position with longest dimension parallel with direction of pour.
 - a. Lap joints 6 inches (150 mm) and seal with manufacturer's recommended tape.
 3. Steel Reinforcement: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.
 - a. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

4. Joints: Construct joints true to line with faces perpendicular to surface plane of concrete.
 - a. Construction Joints: Locate and install so as not to impair strength or appearance of concrete, at locations indicated or as approved by MPO.
 - b. Isolation Joints: Install joint-filler strips at junctions with slabs-on-grade and vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
 - 1) Extend joint fillers full width and depth of joint, terminating flush with finished concrete surface, unless otherwise indicated.
 - c. Contraction Joints in Slabs-On-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of the concrete thickness, as follows:
 5. Other Embedded Items: All sleeves, inserts, anchors, and embedded items required for adjoining work or for its support shall be placed prior to concreting. All trades, whose work is related to the concrete or must be supported by it, shall be given ample notice and opportunity to introduce or furnish embedded items before the concrete is placed. All ferrous metal sleeves, inserts, anchors, and other embedded ferrous items exposed to the weather or where rust would impair the appearance or finish of the structure shall be galvanized.
 6. Tolerances: Comply with ACI 117, “Specifications for Tolerances for Concrete Construction and Materials.”
- F. Concrete Placement:
1. Comply with recommendations in ACI 304R for measuring, mixing, transporting, and placing concrete.
 2. Do not add water to concrete during delivery, at Project site, or during placement.
 3. Consolidate concrete with mechanical vibrating equipment.
- G. Finishing Unformed Surfaces:
1. General: Comply with ACI 302.1R for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
 2. Screed surfaces with a straightedge and strike off. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane before excess moisture or bleedwater appears on the surface.
 - a. Do not further disturb surfaces before starting finishing operations.

3. Float Finish: Apply float finish to surfaces indicated, to surfaces to receive trowel finish, and to floor and slab surfaces to be covered with fluid-applied or sheet waterproofing, built-up or membrane roofing, or sand-bed terrazzo.

H. Concrete Protection Curing:

1. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection, and follow recommendations in ACI 306 for hot-weather protection during curing.
2. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions occur before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
3. Begin curing after finishing concrete, but not before free water has disappeared from concrete surface.
4. Cure high-early strength concrete by maintaining above 50°F and in a moist condition for at least three days after placement by one of the above methods.
5. Procedures for accelerated curing may be used with prior BNL approval.

I. Field Quality Control:

1. Testing Agency: BNL will engage a qualified independent testing and inspecting agency to sample materials, perform tests, and submit test reports during concrete placement. Tests will be performed according to ACI 301.
 - a. Testing Frequency: One composite sample for each day's pour of each concrete mix exceeding 5 cu. yd. (4 cu. m), but less than 25 cu. yd. (19 cu. m), plus one set for each additional 50 cu. yd. (38 cu. m) or fraction thereof.
 - b. Testing Frequency: At least one composite sample for each 100 cu. yd. (76 cu. m) or fraction thereof of each concrete mix placed each day.

END OF SECTION 033000

DIVISION 31 – EARTHWORK

SECTION 312000 – EARTH MOVING

A. General:

1. Furnish all labor, materials and equipment necessary for earthwork operations.
2. Materials Ownership:
 - a. Except for materials indicated to be stockpiled, respread, used for backfill, or to remain the property of BNL, excavated and cleared materials shall become Contractor's property and shall be removed from the BNL Site.
3. Traffic:
 - a. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from MPO.
 - b. Road closings require 48-hour prior notification and approval of MPO.

B. Codes and Standards:

1. OSHA 29 CFR 1926.
2. BNL Standards-Based Management System; ES&H Standards (SBMS).
3. ASTM D-2487 and D-698.

C. Summary:

1. This Section includes the following:
 - a. Preparing subgrades for slabs, walks, pavements and landscaping.
 - b. Excavating and backfilling for buildings and structures.
 - c. Drainage course for slabs-on-grade.
 - d. Subbase course for concrete walks and pavements.
 - e. Base courses for asphalt paving.
 - f. Excavation and backfill for utility trenches.

D. Definitions:

1. Backfill: Soil materials used to fill an excavation.
2. Base Course: Course placed between the subbase course and hot-mix asphalt paving.

3. Bedding Course: Course placed over the excavated subgrade in a trench before laying pipe.
 4. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.
 5. Drainage Course: Course supporting slab-on-grade that also minimizes upward capillary flow of pore water.
 6. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.
 - a. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by MPO. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
 - b. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by MPO. Unauthorized excavation, as well as remedial work directed by MPO, shall be without additional compensation.
 7. Fill: Soil materials used to raise existing grades.
 8. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.
 9. Subbase Course: Course placed between the subgrade and base course for hot-mix asphalt pavement, or course placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walk.
 10. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below subbase, drainage fill, or topsoil materials.
 11. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.
- E. Project Conditions:
1. Existing Utilities:
 - a. Locations for known existing underground utilities are approximate. Use extreme care to avoid damage to all utilities.
 - b. Should unanticipated utilities, that are not shown on the Drawings or noted in the Digging Permit, be discovered during earth moving activities, immediately stop work and notify MPO for instructions. Do not proceed with the work until so directed, in writing, by MPO.

- c. Do not interrupt utilities serving facilities occupied by BNL or others unless permitted in writing by MPO and then only after arranging to provide temporary utility services according to requirements indicated.

F. Products:

1. Soil Materials:

- a. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations on site.
- b. Satisfactory Soils: ASTM D 2487 Soil Classification Groups GW, GP, GM, SW, SP, and SM, or a combination of these groups; free of rock or gravel larger than 3 inches (75 mm) in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.
- c. Unsatisfactory Soils: ASTM D 2487 Soil Classification Groups GC, SC, ML, MH, CL, CH, OL, OH, AND PT or a combination of these groups.
 - 1) Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.
- d. Backfill and Fill: Satisfactory soil materials.
- e. Subbase Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, clean, blended, crushed, recycled concrete (RPCCA); 6NYCRR Part 360, blast furnace slag, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch (38-mm) sieve and not more than 12 percent passing a No. 200 (0.075-mm) sieve.
- f. Base Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, clean, blended, crushed, recycled concrete (RPCCA); 6NYCRR Part 360, blast furnace slag, and natural or crushed sand; ASTM D 2940; with at least 95 percent passing a 1-1/2-inch (38-mm) sieve and not more than 8 percent passing a No. 200 (0.075-mm) sieve.
- g. Engineered Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, clean, blended, crushed, recycled concrete (RPCCA); 6NYCRR Part 360, blast furnace slag, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch (37.5-mm) sieve and not more than 12 percent passing a No. 200 (0.075-mm) sieve.
- h. Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, clean, blended, crushed, recycled concrete (RPCCA); 6NYCRR Part 360, blast furnace slag, and natural or crushed sand; ASTM D 2940; except with 100 percent passing a 1-inch (25-mm) sieve and not more than 8 percent passing a No. 200 (0.075-mm) sieve.

- i. Drainage Course: Washed, narrowly graded mixture of crushed stone, clean, blended, crushed, recycled concrete (RPCCA); 6NYCRR Part 360, blast furnace slag, or crushed or uncrushed gravel; ASTM D 448; coarse-aggregate grading Size 57; with 100 percent passing a 1-1/2-inch (38-mm) sieve and 0 to 5 percent passing a No. 8 (2.36-mm) sieve.
- j. Detectable Warning Tape: Polyethylene film warning tape encasing a metallic core, minimum 6 inches (150 mm) wide and 4 mils (0.1 mm) thick, continuously inscribed with a description of the utility.

G. Execution, General:

1. Preparation:

- a. Notify MPO two (2) weeks in advance of all earthwork.
- b. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, freezing temperatures or frost, and other hazards created by earthwork operations. Provide protective insulating materials as necessary.
- c. Do not stockpile materials or park equipment within 20 feet of trees and shrubs.
- d. Provide erosion-control measures such as hay bales, polyethylene sheeting and sediment ponds to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties, walkways, storm sewer systems, roads and other areas on or near the site.
- e. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.
- f. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.
- g. Line and Grade:
 - 1) One set of points (baseline) and a grade reference (benchmark) will be furnished by MPO. Furnish all other lines and grades. Protect and replace all survey stakes.
 - 2) Before grading is started, completely stake out areas to be graded.
 - 3) Set grade stakes where spot elevations are shown, along center lines, at breaks in grade, along drainage swales, and as otherwise required to rough grade the area.
- h. Within limits of required areas of grading and excavation, strip topsoil to whatever depth it occurs, and stockpile where directed.

- i. In areas where no grading change is called for and unless areas are established grass lawns or landscaped, remove loose rock, stones and debris from surface, and fill all irregularities.
 - j. Respread topsoil in areas indicated after all other work completed, prior to seeding and planting. If sufficient stockpiled topsoil is not available, provide additional quantities to enable spreading to depth of four (4") inches over stripped areas.
 - k. See Section 329300 Landscape Work for seeding and planting unless work is NIC.
2. Shoring and Bracing:
- a. Provide sheeting, shoring, and bracing as and where required to maintain sides and to protect adjacent structures from settlement in order to safely execute the work. Sloped excavation method may be used if space allows.
 - b. Shoring arrangement shall not interfere with the required construction. Maintain sheeting and shoring until excavations are backfilled and bracing until adjacent construction completed.
 - c. Submit method of the proposed excavation protection, shoring, and bracing for approval. Do not proceed until approved. Approval of submission shall not relieve Contractor of responsibility for the satisfactory completion of all shoring and bracing work.
3. Excavation:
- a. Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered, including rock, soil materials, and obstructions.
 - 1) If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.
 - b. Excavate for structures, pavements, and walks to indicated elevations and dimensions. Extend excavations for placing and removing concrete formwork, for installing services and other construction, and for inspections. Trim bottoms to required lines and grades to leave solid base to receive other work.
 - c. Excavate utility trenches to indicated gradients, lines, depths, and invert elevations of uniform widths to provide a working clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches (300 mm) higher than top of pipe or conduit.
 - 1) Excavate trenches deeper than bottom of pipe elevation, 6 inches (150 mm) deeper in rock, 4 inches (100 mm) deeper elsewhere, to allow for bedding course. Hand excavate for bell of pipe.

- d. Proof roll subgrades, before filling or placing aggregate courses, with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof roll wet or saturated subgrades.
 - e. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities.
 - f. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill may be used when approved by MPO.
 - 1) Fill unauthorized excavations under other construction or utility pipe as directed by MPO.
 - g. Stockpile borrow materials and satisfactory soil materials, without intermixing, in shaped, graded, drained, and covered stockpiles. Stockpile soil materials away from edge of excavations and outside drip line of remaining trees.
4. Backfills and Fills:
- a. Utility Trench Backfill: Place, compact, and shape bedding course to provide continuous support for pipes and conduits over rock and other unyielding bearing surfaces and to fill unauthorized excavations.
 - 1) Place and compact initial backfill of satisfactory soil material or subbase material, free of particles larger than 1 inch (25 mm), to a height of 12 inches (300 mm) over the utility pipe or conduit. Place and compact final backfill of satisfactory soil material to final subgrade.
 - 2) Install conductive-type warning tape directly above utilities, 12 inches (300 mm) below finished grade, except 6 inches (150 mm) below subgrade under pavements and slabs.
 - b. Fill: Place and compact fill material in layers to required elevations.
 - c. Uniformly moisten or aerate subgrade and each subsequent fill or backfill layer before compaction to within 2 percent of optimum moisture content.
 - 1) Remove and replace, or scarify and air dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.
 - d. Compaction: Place backfill and fill materials in layers not more than 8 inches (200 mm) in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches (100 mm) in loose depth for material compacted by hand-operated tampers.

- e. Compact soil to not less than the following percentages of maximum dry density according to ASTM D 698.
 - 1) Under structures, building slabs, and pavements, scarify and recompact top 12 inches (300 mm) of existing subgrade and each layer of backfill or fill material at 95 percent.
 - 2) Under walkways, scarify and recompact to 6 inches (150 mm) below subgrade and compact each layer of backfill or fill material at 92 percent.
 - 3) Under lawn or unpaved areas, scarify and recompact top 6 inches (150 mm) below subgrade and compact each layer of backfill or fill material at 85 percent.
 - f. Grading: Uniformly grade areas to a smooth surface, free from irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated. Slope grades to direct water away from buildings. Grade lawns, walks, and unpaved subgrades to tolerances of plus or minus 1 inch (25 mm) and pavements and areas within building lines to plus or minus 1/2 inch (13 mm).
 - g. Subbase and Base Courses Under Pavements and Walks: Under pavements and walks, place subbase course on prepared subgrade. Place base course material over subbase. Compact to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D 1557.
 - h. Drainage Course Under Concrete Slabs-On-Grade: Under slabs-on-grade, place drainage course on prepared subgrade. Compact to required cross sections and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D 698.
5. Field Quality Control:
- a. Testing Agency: BNL will engage a qualified independent testing and inspecting agency to perform field tests and inspections and to prepare test reports, in accordance with ASTM D 1556, D 2167, D 2922, and D 2937, as applicable.
 - b. Allow testing agency to test and inspect subgrades and each fill or backfill layer. Proceed with subsequent earthwork only after results for previously completed work comply with requirements.
 - c. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil to depth required; recompact and retest until specified compaction is obtained.
 - d. BNL will perform field tests as and where required. Replace and recompact until specified compaction is obtained.

6. Protection and Disposal:
 - a. Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.
 - b. Repair and re-establish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction.
 - c. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
 - d. Disposal: Remove surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off BNL site.

END OF SECTION 312000

DIVISION 32 – EXTERIOR IMPROVEMENTS

SECTION 321216 – ASPHALT PAVING

A. General:

1. Furnish all labor, materials and equipment necessary to install hot-mixed asphalt paving, patching, paving overlay, and curbs over prepared subbase.
2. Prepared subbase is specified in another Division 31 section.
3. Proof rolling of prepared subbase is included in this Section.
4. Saw-cutting of edges of existing pavement shall be included, where shown or required.

B. Submittals:

1. General: Submit the following in accordance with the Supplementary Conditions.
 - a. Product Data: For each type of product indicated. Include technical data and tested physical and performance properties.
 - b. Job-Mix Designs: Certification, by authorities having jurisdiction, of approval of each job mix proposed for the Work.
 - c. Material certificates and Material Safety Data Sheets (MSDS).

C. Quality Assurance:

1. Manufacturer Qualifications: Manufacturer shall be registered with, and approved by, the New York State DOT.
2. Regulatory Requirements: Comply with New York State DOT and 6 NYCRR Part 241 for asphalt paving work.
3. Asphalt-Paving Publication: Comply with AI MS-22, "Construction of Hot Mix Asphalt Pavements," unless more stringent requirements are indicated.

D. Project Conditions:

1. Environmental Limitations: Do not apply asphalt materials if subgrade is wet or excessively damp or if the following conditions are not met:
2. Weather Limitations: Apply prime and tack coats when ambient temperature is above 60°F (15.5°C) and when temperature has not been below 35°F (1°C) for 12 hours immediately prior to application. Do not apply when base is wet or contains an excess of moisture.
3. Asphalt Base Course (Binder): Minimum surface temperature of 40°F (4°C) and rising at time of placement.
4. Asphalt Surface Course: Minimum surface temperature of 60°F (15.5°C) at time of placement.

E. Grade Control:

1. Establish and maintain required lines and elevations.

F. Materials:

1. General: Use locally available materials and gradations that exhibit a satisfactory record of previous installations.
2. Course Aggregate: Sound, angular crushed stone, crushed gravel, properly cured, crushed blast-furnace slag, or properly cleaned, blended, crushed, recycled concrete, complying with ASTM D 692.
3. Fine Aggregate: Sharp-edged natural sand or sand prepared from stone, gravel, properly cured blast-furnace slag, or combinations thereof, complying with ASTM D 1073.
4. Mineral Filler: Rock or slag dust, hydraulic cement, or other inert material passing the No. 200 sieve and complying with ASTM D 242.
5. Asphalt Binder: AASHTO MP 1, performance grade as recommended by NYSDOT.
6. Tack Coat: Emulsified asphalt; ASTM D 977 or D 2397, complying with 6 NYCRR 241.3, slow setting, diluted in water, of suitable grade and consistency for application.

G. Asphalt-Aggregate Mixture:

1. Provide plant-mixed, hot-laid asphalt-aggregate mixture complying with ASTM D 3515 and NYSDOT.

H. Surface Preparation:

1. General: Remove loose material from compacted subbase surface immediately before applying prime coat.
2. See Site Plan and details for extent of paving which includes but is not limited to the following:
 - a. Roads, service drives and receiving areas - 6" aggregate base plus 6" asphaltic concrete wearing surface. 4" binder plus 2" wearing course.
3. Proof-roll prepared subbase surface to check for unstable areas and areas requiring additional compaction.
4. Notify Contractor of unsatisfactory conditions. Do not begin paving work until deficient subbase areas have been corrected and are ready to receive paving.
5. Saw cut perimeter of patches and/or edges where new paving meets existing for smooth and even edged transitions.

6. Tack Coat:

- a. Apply to contact surfaces of previously constructed asphalt or Portland cement concrete and surfaces abutting or projecting into hot-mixed asphalt pavement. Distribute at rate of 0.05 to 0.15 gal. per sq. yd. of surface.
- b. Allow to dry until at proper condition to receive paving.
- c. Exercise care in applying bituminous materials to avoid smearing of adjoining concrete surfaces. Remove and clean damaged surfaces.

I. Hot-Mix Asphalt Placing:

1. General:

- a. Machine place hot-mixed asphalt mixture on prepared surface, spread uniformly, and strike off. Spread mixture at minimum temperature of 250°F (121°C).
- b. Place areas inaccessible to equipment by hand. Place each course to required grade, cross-section, and compacted thickness. Regulate paver machine speed to obtain smooth, continuous surface free of pulls and tears in asphalt-paving mat.

2. Paving Placing:

- a. Place in strips not less than 10 feet wide, unless otherwise acceptable to BNL. After first strip has been placed and rolled, place succeeding strips and extend rolling to overlap previous strips. Complete base course for section before placing surface course.
- b. Immediately correct surface irregularities in paving course behind paver. Remove excess material forming high spots with shovel or lute.

3. Joints: Make joints between old and new pavements, or between successive days' work, to ensure continuous bond between adjoining work. Construct joints to have same texture, density, and smoothness as other sections of hot-mixed asphalt course. Clean contact surfaces and apply tack coat.

J. Rolling:

1. General:

- a. Begin rolling when mixture will bear roller weight without excessive displacement. Complete compaction before mix temperature cools to 185°F (85°C).
- b. Compact mixture with hot hand tampers or vibrating plate compactors in areas inaccessible to rollers.

2. Breakdown Rolling: Complete breakdown or initial rolling immediately following rolling of joints and outside edge. Check surface after breakdown rolling and repair displaced areas by loosening and filling, if required, with hot material.
 3. Intermediate Rolling: Follow breakdown rolling as soon as possible, while mixture is hot. Continue rolling until mixture has been evenly compacted to average density of 92 percent of reference maximum theoretical density, ASTM D 2041.
 4. Finish Rolling: Perform finish rolling while mixture is still warm enough for removal of roller marks. Continue rolling until roller marks are eliminated and course has attained 95% laboratory density.
 5. Patching: Remove and replace paving areas mixed with foreign materials and defective areas. Cut out such areas and fill with fresh, hot hot-mixed asphalt. Compact by rolling to specified surface density and smoothness.
 6. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.
 7. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.
- K. Field Quality Control:
1. General: Testing in-place hot-mixed asphalt courses for compliance with requirements for thickness and surface smoothness will be done by BNL. Repair or remove and replace unacceptable paving as directed by BNL.
 2. Thickness: In-place compacted thickness tested in accordance with ASTM D 3549 will not be acceptable if exceeding following allowable variations:
 - a. Binder: Plus or minus 1/2 inch (13 mm).
 - b. Surface Course: Plus or minus 1/4 inch (6 mm).
 3. Surface Smoothness: Test finished surface of each hot-mixed asphalt course for smoothness, using 10-foot straightedge applied parallel with and at right angles to centerline of paved area. Surfaces will not be acceptable if exceeding the following tolerances for smoothness.
 - a. Binder Surface: 1/4 inch (6 mm).
 - b. Surface Course: 1/8 inch (3 mm).
 - c. Check surface areas at intervals as directed by BNL.

END OF SECTION 321216

ATTACHMENT 1



WOODEN STAIR