# TECHNICAL PROVISIONS

**JFSD 201710**

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1. SCOPE OF WORK:

1.1. Work to Be Done: The work consists of furnishing all plant, labor and materials to perform all work in strict accordance with these technical provisions and the project drawings.

1.2. Location: The site of the work is Grand Forks Air Force Base, ND.

2. PROJECT DESCRIPTION: The work to be performed includes but is not limited to the following:

2.1. Placing a hot bituminous pavement overlay with tack coat on streets and roads as directed.

2.2. Remove and replace existing concrete and asphalt pavement, including base course repair as directed.

2.3. Excavate and install new suitable subbase and base material and new asphalt or concrete pavement as directed. Construct new asphalt or concrete roads, parking lots, driveways and sidewalks.

2.4. Make minor patches as directed.

2.5. Make major patches as directed, including base course repair.

2.6. Remove and replace existing concrete sidewalks, brick paver sidewalks, curb and gutter as directed.

2.7. Raise or lower manholes and access covers as required to meet new or existing pavement surface.

2.8. Install or repair sewer inlets as directed.


2.10. Apply a slurry seal (Type 1) as directed.

2.11. Mill pavements as directed.

2.12. Remove driveway materials and replace with concrete or asphalt as directed.

2.13. Install new concrete curb and gutter, stamped colored concrete sidewalk and concrete sidewalk as directed.


2.15. Install new manholes as directed.
2.16. Stripe pavements as required, to include site development (i.e. parking plan).


2.18. Contractor shall provide surveying equipment and expertise to facilitate all work necessary, and associated with the accomplishment of all delivery orders issued under this contract. Surveying requirements may be, but not limited to establish roadway, curbs, gutters, storm sewer inlet elevations, drainage structures and flow slopes/lines, determine cuts and fills, general project layout, and for government and contractor recommend alterations and modifications to awarded delivery orders, and to provide as-built drawings to include cross sectional details for all work that requires as-builts.

2.19. Hydro-mulching/seeding or sodding shall be performed on all areas disturbed by the contractor activities, both existing and new work, and other areas as directed by the contracting officer’s representative. Access areas leading to and from project locations disturbed by contract operations shall also receive hydro-mulching/seeding and/or sodding

2.20. Perform lime stabilization of soil. Refer to UFC 3-250-11 Soil Stabilization for Pavements (latest dated addition).


2.22. Obtain permits, documentation, and apply/execute all other administrative and field requirements for compliance with the ND State rules and regulations, and the Environmental Protection Agency (EPA) rules and regulations as they apply to Storm Water Pollution Prevention for construction activities.

2.23. The contractor shall coordinate with the appropriate facility managers, housing tenants, Civil Engineering personnel and Security Forces personnel to the extent necessary to provide area access, develop required plans, traffic control, and to de-conflict mission requirements. This coordination shall be completed and approved by 319 CES, and/or the Contracting Officer (CO) 10 days prior to the start of on-site work. Preliminary site investigations to prepare required submittals and plans may have to be complete prior to the 10 day requirement of user coordination.

2.24. All work not specifically addressed in this specification or specifications there after shall be installed in strict accordance to the latest publications of the National Electric Code, Uniform Building Code, Uniform Mechanical Code, Uniform Plumbing Code, NFPA 101 Life Safety Code, and Grand Forks AFB Architectural Compatibility Guide. The GFAFB Architectural Compatibility Guide is not included in the specifications package, but will be provided upon request.

2.25. International Conference of Building Officials has established the basic building code standards for construction, renovation, repair, and maintenance. These standards, commonly referred to as the International Building Code (IBC), together with the Unified Facilities Criteria UFC 1-200-01 found at http://www.wbdg.org/cb/DOD/UFC/ufc_1_200_01.pdf shall constitute the minimum acceptable levels of construction, function, and safety for all projects.

2.26. All material selections, construction, renovation, repair, and maintenance shall comply with the latest edition of Unified Facilities Criteria UFC 3-600-1 Fire Protection Engineering for Facilities.

3. STANDARD TESTS, QUALITY, AND GUARANTEES:
3.1. Tests or trials to determine the effectiveness of performance of a completed assembly or fabricated system shall be made by the contractor, without cost to the Government.

3.2. All articles, supplies and equipment, parts, and assemblies thereof, of standard manufacturers or for which design requirements are not prescribed by these specifications shall be guaranteed against any failure in the proper use or operation caused by defective material, workmanship, or design for the full warranty time which is standard with the manufacturer and/or supplier.

3.3. The contractor shall provide a minimum one year warranty on all work performed. A copy of the warranty shall be submitted to the Contracting Officer before final inspection of the facility.

4. WORK CLEARANCE REQUEST AND OTHER PERMITS:

4.1. **AF Form 103, Base Civil Engineering Work Clearance Request, which is commonly referred to as a “Digging Permit”**. The contractor shall initiate, prepare, and walk-through an AF Form 103, *Work Clearance Request* 14-28 calendar days prior to any work (especially excavation) activities. Base Civil Engineering will assist the contractor by providing points of contact; however, the responsibility for executing and tracking status of the work clearance request, and coordinating utility markings with the Base Civil Engineer shops and/or other utility companies is solely that of the contractor. The contractor shall compose and provide sketches/drawings/ and dimensioning details showing the specific location of the intended area of work (especially excavation) when requesting an AF 103. The contractor shall physically stake, flag, or demarcate (in accordance with base civil engineer work clearance manager) to define the boundaries of all required utility locates at the location of proposed work. The contractor should allow 10-20 days for processing the work clearance request between the various activities that must coordinate on the request. The contractor shall submit to the CO and provide the Construction Representative with a copy of the completed AF Form 103 with all attached record utility drawings, and shall comply with all instructions for hand excavation and other methods of safeguarding the buried utilities prior to on-site work. The contractor shall take caution within the area 3 feet to either side of a utility pre-identified to the contractor. If the contractor damages any utility within this six-foot boundary, the contractor is responsible for restoring the utility to its original working condition. Work to repair the damaged utility will commence immediately and will continue uninterrupted until the utility is restored. If the damaged utility requires repair by an outside source or someone not in the contractors employ (e.g., someone to repair specialty lines) and the contractor is responsible for the damage; the contractor shall coordinate and schedule persons making repairs and shall furnish prompt payment for the work to such persons. If the contractor damages a utility that was not identified or is not within the 6-foot boundary of the utility marking, the contractor shall notify the CO and Construction Representative to determine the method of repair (i.e., in-house or by contract).

4.2. USAF Welding, Cutting, or Brazing Permit. Prior to any soldering, brazing, torch cutting, or welding, the contractor must obtain a signed AF Form 592, *Hot Work Permit*, from the base Fire Department, Technical Services element. When any of these activities take place in or near a combustible facility or materials, the contractor shall personally coordinate with the fire department for live fire watch provided by the fire department as they see fit. Contractors must attend Fire Department Task Certification prior to welding, cutting, brazing or open flame work. Contact the Base Fire Department for information. Contractor must submit a copy of the signed AF Form 592 to the Contracting Officer prior to performing any welding, cutting, brazing or open flame work. All fires are to be reported to the Base Fire Department. In the event of an emergency, call 911.

4.3. Air Permit Determination for New Emission Sources. Any new air emission source(s) (hoods, volatile substance storage tanks, spray booths, stationary equipment, boilers, furnaces, generators or other similar type items) that are to be constructed/installed are to be evaluated by the Air Program Manager at
319 CES/CEAN prior to commencement of construction for determination of air permitting requirements. In order to gain a determination, equipment specifications and designs shall be submitted to 319 CES/CEAN through the CO prior to start of work.

5. UTILITIES COORDINATION: Utility Interruptions/Outages. The contractor shall perform the work under this contract with a minimum of outage time for all utilities, for any facility or system. The contractor shall make every attempt to schedule any work that requires utility outages which will close down or limit normal activities in the building, construction area, or other affected areas (as determined by the contractor with coordination of engineering project management personnel) at a time other than regular work periods of the organization occupying the facility. Whenever outages occur on weekends, holidays or after normal duty hours, the contractor shall perform the work at such times as pre-coordinated with the user, and the CM/CO. Outage work during non-standard work hours shall be accomplished at no additional cost to the Government.

5.1. Wherever possible, portions of the work that can be accomplished without an outage shall be done prior to actual outage. All materials, equipment, and labor required to facilitate work during an outage shall be on hand before the utility service is interrupted.

5.2. A process has been established by 319 CES for scheduling and notifications regarding all utility outages. The contractor shall personally coordinate all utility outages with the affected facility users, and the Base Civil Engineering Operations Flight shops that oversees/controls the system(s.) The contractor shall provide all pertinent outage details to the Construction Representative (CR). Coordination information provided by the contractor is critical for the Government’s internal outage notifications. The contractor shall submit requests for utility outages a minimum of ten (10) working days prior to commencing work. The contractor must receive approval from the CO and/or CR before interrupting utilities. Any disruption of utilities service to the military family housing area shall include coordination with the base housing office. This coordination shall be the responsibility of the contractor. The contractor is responsible for shutting down the utility using his own workforce or by requesting the shutdown from the utility company (or Civil Engineer Shop) responsible for the service. Typically, the civil engineer shop having jurisdiction will shutdown the primary utility. Once work begins on an approved outage, work must continue without interruption until utility services to the affected line(s) and/or facility are restored. Exceptions require pre-approval from the CO/CR.

5.3. Procedure. Control of the base electrical system is the responsibility of the Base Utility Superintendent (Bldg 411). All switching of electrical equipment/circuits must be approved by the base Utility Superintendent or his authorized representative. Work on de-energized high voltage lines or equipment is not permitted until the Base Utility Superintendent or his authorized representative has issued a safe clearance procedure to the Contractor Superintendent in accordance with AFI 32-1064, 29 Dec 2016 (a copy is available upon request).

5.4. Communications Utilities (Telephone, Fiber Optic, Cable T.V.). The contractor shall not disturb communication wiring to base infrastructure. Where such work requires removal of existing, or reconfiguration of existing to accomplish the work involved; the contractor shall coordinate with the Communications Squadron prior to actual work, to determine the scope of effort and gain authority from the Communications Squadron to work on communications systems. The contractor shall allow for the accomplishment of such removals by the telephone company or communications personnel for the systems they service. If construction activities damage communication equipment or wiring, the contractor shall restore services as soon as possible, but no later than 24 hours, and at no cost to the government.
5.5. Excavating Around or Locating Existing Utilities. Prior to the start of work, the contractor shall identify and locate all valve or utility shut-off locations for use in the event of accidental damage. To preclude accidental damage, the contractor shall locate all known utilities (i.e., communication, natural gas, fuel supply, water, power, etc.) by hand digging or hydro-excavating prior to any excavation with other power equipment. The contractor shall note any utilities discovered during excavations that are missing or incorrectly represented on the AF Form 103 and it’s attachments, the contract drawings (including any erroneous dimensions on government record drawings), or those utilities staked by the user; and clearly identify those discoveries on project as-built drawings.

5.6. Existing Utilities/Job Site Verification. Record drawings (as-builts) showing existing facilities and underground utilities are available to the contractor through the Base Civil Engineer Drafting Office, and Operations Customer Service. The government does not guarantee the accuracy or adequacy of existing as-built/record drawings. The contractor is responsible for field verifying all dimensions and actual conditions when developing individual delivery order proposals. Failure to verify the dimensions and locations will be at the contractor’s risk and shall not relieve the contractor from accomplishing the work required by the contract at the price awarded by the government. The contractor shall immediately repair any utility lines shown on a record drawing (or made known to the contractor via ground marking) and damaged during construction work at no cost to the government. Prior to digging, the contractor shall review available drawings and located utilities to determine if all utilities on the drawings have been located. Should the drawings indicate the existence of an underground utility, but there are no markings to indicate the utility has been located, the contractor shall verify all locates are completed prior to below grade excavations.

6. FIRE REGULATIONS: Compliance with local, Air Force, and NFPA 241 (Safeguarding Building Construction and Building Operation) regulations are mandatory. Fire extinguishers rated and approved by the National Fire Protection Association; of sufficient size, type, and quantity to cope with all known hazards, will be available and provided by the contractor during the execution of this contract.

6.1 The primary contractor is responsible to have personnel properly trained in safe welding, cutting, open flame operations and specific requirements of AFOSH Standard 91-5 and CFR 1910 252. This individual shall be certified in writing, by the installation Fire Department to issue the AF Form 592 for the duration of the contract. It shall be the responsibility of the primary contractor to coordinate all certification training instruction with the installation Fire Department.

6.2. Fire Protection, Detection, or Suppression Systems: Established systems (below grade fire protection lines) in the work areas shall remain operational to the maximum extent possible. Systems in areas unaffected by this contract shall remain operational throughout contract duration. Interruption (disconnection) of systems shall be coordinated (7) seven days in advance with the Contracting Officer and the Base Fire Department.

7. CONTRACTOR USE OF PREMISES:

7.1. GENERAL: The government will not provide a lot on Grand Forks Air Force Base for contractor use.

7.1.1. Storage Area: All contractor storage shall be located in an area located inside the boundary of project site and will be properly screened and secured. Indoor storage areas are not guaranteed by the government, and there are no alternate storage areas on base. The contractor may store materials and trailers off base at his/her own expense.
7.1.2. A visually acceptable site at Grand Forks Air Force Base is an important construction standard. The storage sites made available on the work site shall be properly screened from the public view, kept clean, and secured by the contractor at his/her expense. A safe and visually acceptable (neat, clean, free of rubbish) construction or work site at Grand Forks AFB is an important construction standard and will be enforced. The contractor shall maintain trailers and portable storage containers in good condition or must remove them. The exterior appearance of such items shall be in accordance with base color standards (Light Brown SW6093, Linen White SW6119, Medium Brown SW 6067, and Dark Bronze SW 6006). The contractor is solely responsible for the security of his/her property and general housekeeping of the project area(s). This includes, but not limited to, vegetation (weed control) and height maintenance to base standards, daily trash and refuse debris collection and containerization, and construction materials stacked, neatly palletized or in enclosed trailers.

7.1.3. The government will provide utilities (water, and electricity) for project work areas when available. The government will NOT modify points of distribution to accommodate contractor project activities. The contractor may modify points of distribution at his/her expense with prior approval from the CO. The government will not provide utilities solely for construction heating purposes (example- heating of concrete for cold weather application). At remote project work areas where no utilities are available, the contractor shall furnish his/her own utility services.

7.1.4. When an onsite water source is required and the only reasonable option, the government will furnish water from a fire hydrant or an adjacent facilities point of distribution selected by the Base Civil Engineer with coordination through the Base Fire Dept and the Contracting Officer (CO). The contractor shall provide and install the proper backflow prevention device, valve and hydrant wrench. The contractor shall be liable for any damage caused to government property resulting from improper operation of the fire hydrant.

7.1.5. Contractor personnel may use existing toilet facilities if available on the premises and approved by the facility occupants (except in base housing) unless otherwise instructed by the CO or his/her designated representative. At construction sites where toilet facilities are not readily available, the contractor shall provide his/her own chemical sanitary toilets. The contractor shall service the chemical toilets regularly subject to government inspection by the base medical officer. The contractor shall correct all identified sanitary deficiencies within 24 hours of inspection.

7.1.6. Not Used

7.1.7. Powder-actuated tools: The contractor shall comply with the OSHA Standard 1926.302(e) when utilizing powder-actuated tools. On the installation, the contractor shall store explosive cartridges in metal containers and limit the quantity to one day’s supply. The contractor shall provide adequate controls to prevent loss/theft of cartridges used and stored on the installation.

7.1.8. Severe Weather. The contractor shall develop and be prepared to implement procedures to evacuate and/or protect people and facilities under his/her control in the event of severe weather. These procedures will include provisions for securing or repositioning of equipment. The contractor shall notify the CO of any evacuation procedures. Upon receipt of a severe weather warning, the following sequence of actions will occur.

7.1.8.1. The CO or his/her representative will instruct the contractor of the severe weather warning.

7.1.8.2. The contractor shall take immediate action to tie down, remove, protect, or secure his/her materials and equipment to the satisfaction of the Air Force construction representative providing reasonable assurance that the severe weather will not damage government property. If the contractor fails
to secure materials and equipment and it become a hazard, Air Force personnel may accomplish the work and potential charges to the contractor may result thereof.

7.1.9. To prevent outside intrusion into a work area, at the end of each day the contractor shall close up each and every exterior fence or security barrier (as applicable) resulting from work. Closure(s) shall remain in place when the contractor is not actively working on the site(s), including each and every day, night, weekends, and holidays to sustain in-place security. Temporary closure(s) shall be constructed of same material as originally removed and anchored in place if necessary, or similar construction as approved by the base civil engineer through the CO.

7.1.10. Access Roads. In accordance with Dirt and Dust Control contained herein, and as required (minimum at the end of each day), the contractor shall inspect for and clear all mud, dirt, debris, foreign objects, or spills of any kind from the contractor’s operations (including subcontractors and suppliers) on streets and parking lots used as access to the work or staging areas. The contractor shall ensure all taxiways, runways, parking aprons and hard surfaces in or around the airfield, used to access the work or staging areas, remain clean at all times.

7.1.11. Contractor Generated Refuse. Prior to completion of the work each day, the contractor shall handle, transport, store, and dispose of all waste materials and rubbish generated by any work under this contract. If the contractor temporarily stores waste material or rubbish in a dumpster controlled by the contractor, the contractor shall secure the dumpster in such a manner that prevents unauthorized use. Unsecured and unattended dumpsters collect stray refuse from other than contract operations. To avoid this, the contractor shall secure the dumpster during non-working times, and post signs (if necessary) on the dumpster(s) noting it as NOT FOR PUBLIC USE. On a regular (minimum weekly basis), the contractor shall remove and dispose of any waste or excess material, resulting from any contract requirement, off base at no expense to the government. The contractor shall dispose of such materials in accordance with applicable federal, state, or local laws, ordinance or regulations. Trucks for hauling refuse and waste materials shall have tight fitting covers to prevent spillage on roadways. The contractor shall use designated haul routes as agreed upon in pre-delivery order discussions for each project.

7.1.12. Excavations: The government will not allow piles of soil to reside in the work area for unreasonable amounts of time. The contractor shall backfill all excavations, for whatever purpose, within one week or gain approval to have excavations remain open longer by the CM through the CO. The contractor shall temporarily repair road cuts with cold patch asphalt to assure a smooth transition until accomplishing final patching. Fugitive materials that are being be carried by traffic away from the work site shall be clean on a daily basis. For all disturbances to grounds, the contractor shall complete final grading within one week of the disturbance/backfilling. The contractor shall complete final landscaping or seeding within acceptable recognized planting seasons of the GFAFB local area, and/or the nursery of origin written recommendations for subject plantings.

7.1.13. Screening: The contractor shall install visual screening outside the construction site to maintain a neat appearance as required by the individual task order.


7.1.15. Work requested of the contractor may include removal and/or dumping of contaminated soils. Contaminated soils are defined as “soils that contain non-hazardous materials such as aircraft fuel, heating fuel oil, solvents, and other materials as identified by the base environmental coordinator.” The contractor shall report any material suspected of containing contaminants to the CO or his/her designated representative. If contaminated soils are discovered the contractor shall NOT use the contaminated soil/debris for backfill or removed from the base without written approval from the CO, or his/her
designated representative. The contractor shall store this soil on an impervious liner, compatible with the contaminant, and covered with the same impervious material. These contaminants shall be tested by the contractor and coordinated with the applicable base environmental program manager (319 CEAN) as necessary. After determining the soil status, the contractor may move the soil as directed by the 319 CEAN through the CO or the appropriate agency (ND State Health Dept, EPA).

7.1.16. Excavation in areas designated as “wet lands” is strictly prohibited. 319 CES/CEAN has the most recent inventory and location of wet lands. Prior to planning work the contractor shall coordinate excavation activities with 319 CES/CEAN to avoid wet land conflicts. Should this type of excavation be required, the requirement will be identified in these contract documents and the contractor shall be required to coordinated to ensure the proper wet land excavation permits (Army Corp of Engineers Section 404) through 319 CES/CEAN are obtained prior to work. NOTE Section 404 process may take months to gain the proper permissions to proceed with wetlands associated work. Any contractor disturbance of a wetland prior to coordination and gaining permission shall be subject to penalties under the laws of the EPA, and State of ND. The contractor shall be liable for penalties and restoration actions imposed by the EPA, State of ND, or Grand Forks AFB through CO determination.

7.1.17. The contractor shall handle and store hazardous materials only in areas approved by the agency responsible for the specific material (i.e., fire department, environmental element, etc.), and comply with the contractor’s approved, and the bases Spill Prevention and Countermeasures Plan (319 CES/CEAN: POC). The contractor shall report any spill of oil or hazardous material to the civil engineer service call desk, and take every reasonable precaution to prevent/contain the spillage of oil or other hazardous substances.

7.1.18. The contractor shall control the disposal of fuels, oils, bitumen’s, calcium chloride, acids, or harmful materials, both on and off government premises and shall comply with applicable federal, state, county, and municipal laws concerning pollution of rivers and streams while per-forming work under this contract. The contractor shall NOT dispose of any waste or residual material on the ground or in any storm sewer or drainage system. The contractor shall take special measures to prevent chemicals, fuels, oils, greases, bituminous materials, herbicides, and insecticides from entering public waters. Do not allow water used in on-site material processing, concrete curing, foundation and concrete clean-up, and other waste waters to reenter a stream if an increase in the turbidity of the stream could result.

7.1.19. The contractor shall limit emissions of organic solvents into the atmosphere. This rule applies to use, clean-up, and disposal of organic, photo chemically reactive, and non-photo chemically reactive solvents and materials containing these solvents.

7.1.20. The contractor shall limit the quantity of volatile organic compounds in exterior paint coatings. This applies to any coatings applied to stationary structures and their appurtenances, pavements, and curbs.

7.1.21. The contractor shall NOT use paints or coatings containing lead in excess of 0.06 percent by weight of total non-volatile content in accordance with Title 16 of the Code of Federal Regulations, Part 1303. Pavement paints or coatings within reach of children in housing, recreation, and public areas shall have zero lead content.

7.1.22. The contractor shall deliver all items indicated on the drawings or in the specifications containing PCBs and all oil-cooled transformers removed from service for disposal to a storage area on base as directed by the environmental coordinator through the CO. If equipment labels or catalog data does not specify composition, the contractor shall have all electrical equipment cooling liquid tested by a certified laboratory to determine if PCB is present. Drain and properly contain oil from transformers, and flush the
system to the required level. Clean, seal, and label all drums. Include an original of the certified report to
the environmental coordinator. New electric equipment shall not contain PCBs, shall be certified to this
effect, and shall be stamped or labeled “NO PCB.”

7.1.23. Noise Control. The contractor shall comply with all applicable state and local laws, ordinances,
and regulations relative to noise control.

7.1.24. Recording and Preserving Historical and Archaeological Finds. The contractor shall instruct all
employees and subcontractors to carefully preserve all items having any apparent historical or
archaeological interest discovered in the course of any construction activities. The contractor shall leave
the archaeological find undisturbed and shall immediately report the find to the CO for reporting to the
proper authorities.

7.1.25. Vehicle Control. The contractor shall NOT park or run vehicles on grass areas for shortcuts, and
or convenience. Only equipment required in direct performance of work will be permitted to enter grass
areas. The contractor shall repair or replace any damage done to lawns or shrubs caused by construction
equipment or related project activities. Contractor personnel shall load all loose debris on trucks leaving
the site in a manner that will prevent dropping materials on streets, and conform to local ordinances.
Fasten suitable cover such as a tarpaulin over the load before entering surrounding streets. The contractor
shall promptly clean up any materials that falls from trucks. The use of cell phones is prohibited on
Grand Forks AFB while operating a motorized vehicle. Seat belts are required at all time while driving a
vehicle. Base speed limits are strictly enforced, and violation(s) may result in suspended base driving
privileges.

7.1.26. Equipment Condition. Equipment and vehicles used on base shall be safe and in good operating
condition. The contracting officer (CO), CM, Base Safety, or designated representative, reserves the right
to inspect any on-base equipment and reject such equipment if he/she considers it unsafe, in poor
operating condition, or inappropriate for the work being performed.

7.1.27. Government Furnished Equipment. As a rule, the government will NOT furnish
equipment/materials (GFE/GFM) except for equipment specified in the solicitation/RFP or elsewhere in
these specifications. However, the government reserves the right to provide GFE/GFM for use on any
delivery order. In such cases the delivery order shall contain, Schedule D, Schedule of Government
Furnished Property listing GFE/GFM that pertain to the project. The contractor shall transport all
GRE/GFM, if any, described on each delivery order from the government storage area to the work site
indicated on the delivery order. Once GFE/GFM is released to the contractor for transportation to the
project site, the contractor shall assume the risk and responsibility for the loss or damage to GFE/GFM.
The contractor shall follow the instructions of the CO or his/her authorized representative regarding the
disposition of GFE/GFM not consumed in performance of this contract.

7.2. PLANS

7.2.1. Project Site Plan: Prior to starting the work, the contractor shall submit an individual Site Plan
through CO to the Construction Manager for approval showing the layout and details of all pertinent
attributes used for the project. The base approval authority, normally the Construction Manager and/or
Base Civil Engineer, will approve the plan prior to on-site activities. The plan shall include the location
of the safety and construction fences, location of all site trailers, equipment and material storage area,
construction entrances, trash dumpster locations, temporary sanitary facilities, and worker/construction
vehicle parking areas. Overhead site diagrams, and or photographs prior to the start of work may be
included with the plan. The CM can provide overhead site photographs to assist the contractor in
completion of the project site plan. All areas which may have potential to the tracking of earthen
7.2.2. Dirt and Dust Control Plan: As part of the project site plan, or as an individual plan the contractor shall identify and submit for approval truck and material haul routes leading from the base entry point to the work site. This plan shall include details for controlling fugitive dust, dirt, debris, and rubbish generated on established base haul route/roadway caused by construction activities. As a minimum, the plan shall identify the contractor’s equipment utilized for cleaning along the haul route and measures to prevent and reduce dirt, dust, and debris from being deposited and dispersed along roadways. The plan shall also include frequency of maintenance/cleaning.

7.2.3. Health & Safety Plan: The contractor shall submit a complete health and safety plan for the proposed work. Plan/Program shall be in compliance with EM 385-1-1, OSHA, 29 CFR 1910, and other occupational health and safety requirements of the contract. Plan shall provide a detail description of procedures to comply with health and safety requirements.

7.3. CONTRACTOR’S TEMPORARY FACILITIES

7.3.1. Administrative Field Offices: Contractor's administrative field office shall be in good to new condition, and the exterior color must adhere to base standard color standards as stated previously in this section. Locations, if granted, shall be pre-approved by the CM/Base Civil Engineer through the CO. Storage of material/debris under the trailers is prohibited. Power and water will be provided by the government in reasonable quantities, and if they are reasonably available within proximity of the approved location. Connections to existing government utilities shall be made by the contractor at no expense to the government. Modification of existing points of distribution from existing government infrastructure shall be approved prior to, and performed by the contractor at no expense to the government. Communication lines and service will not be provided by the government. The contractor shall utilize available commercial services in the area as necessary. The duration of such field office presence will be determined by the government upon request of the contractor.

7.3.2. Dumpsters: Dumpsters shall be painted dark bronze SW6006 and equipped with secure covers. The cover shall be closed at all times, except when being loaded with trash and debris. Locate dumpsters behind the construction fence or out of the public view. Empty site dumpsters when they become 90% of full capacity, or as needed to allow full closure of the covers. All other exterior trash containers shall be dark bronze SW6006 utilized in the construct site area. Locate the trash containers behind the construction fence or out of the public view. Empty trash containers as required to prevent over filling. Large demolition normally requires a large dumpster without lids-these are acceptable but shall not have debris higher than the sides before emptying. Ensure mandated recyclable material (paper, glass, and cardboard, etc) is collected and taken to the recycling center at Bldg 672.

7.3.3. Temporary Sanitation Facilities: All temporary sewer and sanitation facilities shall be self-contained units with both urinals and stool capabilities. Ventilate the units to control odors and fumes and empty and clean them at least once a week or more often if required by the Contracting Officer. The doors shall be self-closing. The exterior of the unit will match the base standards (Ref 7.1.2 this section), unless the facility is behind the construction fence or out of the public view.

7.3.4. Construction Site Maintenance, Safety Fence, and Construction Fence:

7.3.4.1. The construction site must be kept neat, clean, and free of debris. Clean up shall be performed at the end of each work day in conjunction with a complete general clean up at the end of the project. Cut
grass (to include weeds) within the construction and storage sites to maintain a maximum height of 4 inch or less. Trim grass around fences and other obstructions where a mower cannot reach. Grass and/or weeds allowed to grow on stockpiled earth are not acceptable at any height. Contractor identification signs are not required, however if the contractor chooses to erect signs at construction sites, they will be in compliance with base requirements and color scheme and approved by the CM/Base Civil Engineer before being erected.

7.3.4.2. The contractor shall also provide a temporary safety fence (with gates as applicable) and warning signs at the construction site prior to the start of work to protect the public from construction activities. The contractor shall provide a site plan of all proposed fence, barrier, gate locations, and seek approval from CM/Base Civil Engineer before erection. The safety fence will match the base standard (dark brown) (or bright orange where it protects excavated areas), high density polyethylene grid or approved equal, a minimum of 42 inches high, supported and tightly secured to steel posts located on minimum 10 foot centers. The contractor must remove the fence from the work site upon completion of the contract. The fence shall be maintained to avoid sagging and a general state of disrepair while it is deployed on the construction site.

7.3.4.3. The contractor shall install fences to isolate construction sites as required by the task/delivery order. The construction fence shall be constructed of galvanized chain-link type metal or approved equal, a minimum of 2.13 m (7 feet) high, supported, and tightly secured to steel posts located on minimum 3 m (10 feet) centers. The construction fence shall be covered with dark brown fabric securely attached to the fence with 1”x2”x6’ wood batten strips on both sides five feet on center for the purpose of obscuring view of the site.

7.3.5. Barricades for Facility Access: The contractor shall furnish, install, and maintain adequate barricades and warning signs to isolate the construction area from other building entrances, and to block direct access to entrances where stoops and steps have been removed, areas with tripping and falling hazards, and/or areas with adjacent construction hazards.

7.3.6. Outdoor Barricades: The contractor shall furnish, install, and maintain adequate barricades, warning signs, and warning lights to isolate outdoor construction areas. The contractor shall identify and barricade all open trenches and excavations at the end of each work day. In the vicinity of traveled ways (pedestrian and vehicular), the contractor shall use flashing barricades with spacing not to exceed 25 feet. In other areas, the contractor may use unlit barricades, flagging, rope, fences or other suitable means. The contractor shall comply with all pertinent provisions of the Corps of Engineers EM 385-1-1, Safety and Health Requirements Manual, including any revisions.

8. GOVERNMENT FURNISHED SERVICES AND UTILITY AVAILABILITY: All reasonable quantities of utilities (water and electricity) will be made available to the contractor without charge. The Government may not be held responsible for interruptions of utility service and shall not be liable for contractor delays, damages, or increased costs occasioned by any such interruption of service.

8.1. A centrally located water filling station for contractors is located at Facility 537. This is the preferred location to fill water trucks/portable tanks. For more information regarding the filling station, contact the designated construction representative.

8.2. Refuse Collection: The contractor is responsible for disposing of construction debris and contractor-generated refuse at construction sites safely and properly in accordance with this section.

8.3. Insect and Rodent Control: When the contractor detects an insect or rodent problem, he/she shall notify the appropriate facility manager or construction representative for entomology services.
8.4. Security Police and Fire Protection: The government will provide security police and fire protection to the extent necessary to ensure a secure and safe construction site. In return for these services, the contractor shall adhere to the security and fire directives, instructions, and policies of Grand Forks AFB.

8.5. Emergency Medical Services. In the event of a severe emergency, the 319th Medical Facility, during hours of operation, will respond and transport, if necessary, a contractor employee to one of the local hospitals. The contractor shall reimburse the government for these services.

9. WORK SEQUENCE:

9.1. Commencement of Work. Notice To Proceed (NTP) letters for the individual awarded task orders under this basic contract shall be the instruction to commencement of work for said task orders. Work shall begin within the number of days specified on the contract.

9.2. Project Execution. The work performed under this contract will be adjacent to occupied and unoccupied facilities/areas. In occupied facilities/areas, the contractor shall accomplish all work in a manner that minimizes inconvenience to the using agencies and their mission. The contractor shall perform all work with continuous daily progress. The government will not accept or permit days of no work or times laps of inactivity by the contractor except for drying or curing of previous work or as directed by the CO. In some cases, the government will require the contractor to work around building entrances or make accommodations for facility access within the overall work area to facilitate the contractors work and safe access/egress from a facility. The contractor must, and shall protect all government facility exterior appurtenances, and landscaping within the work area from overspray, debris, and damage. The government will hold the contractor responsible for any damages caused by contractor operations as a result of lack of adequate protection of government property. NOTE: Once finishes become stained/damaged and it cannot be restored, the contractor shall be held responsible to replace such items at no cost to the government. The contractor shall maintain the work site, entry/egress, and vehicular exits free of debris, and safe at all times. Contractor personnel shall strictly adhere to safety standards (OSHA and AFOSH) and practices at all times during the term of the contract.

9.3. Forced Work Stoppage: In case of emergency the contractor shall call 911. The CO, base fire chief, and other base authorized emergency response personnel, or their representative(s), have the authority to order the contractor to terminate work and clear the area of personnel and equipment. The contractor shall comply to such an order with all possible speed. When the previously mentioned authority figures or their representative(s) interrupt the contractor’s operations, the contractor shall immediately notify the contracting officer of the delay.

9.4. Interruption of Utility Services: The contractor shall not hold the government responsible for interruptions of utility service. Nor will the government be liable for contractor delays, damages, or increased costs occasioned by any such interruption of service. The contractor always has the choice to provide backup power generation, and such in the event of base utility outages.

9.5. Work in Secure Areas: The contractor shall comply with security regulations imposed by the installation commander and/or the agency responsible for the project location. Rules of entry will be established and directed to the contractor at the preconstruction meeting for associated projects. For specifics, refer to Section 19 for Base Entry Procedures and Airfield Requirements.

10. ADMINISTRATION REQUIREMENTS:

10.1. CONTRACTOR PERSONNEL REQUIREMENTS
10.1.1. Subcontractors and Personnel: Furnish a list of key contact personnel of the contractor and subcontractors including addresses and telephone numbers for use in the event of an emergency. As changes occur and additional information becomes available, correct and change the information contained in previous lists.

10.1.2. Supervision: Have at least one qualifying supervisor capable of reading, writing, and conversing fluently in the English language on the job site during working hours. In addition, if a Quality Control (QC) representative is required on the contract, then that individual shall also have fluent English communication skills. Contractor shall submit a letter to the CO designating both site supervisor for task delivery orders, and a project manager for the duration of contract.

10.1.3. Project Management: The contractor shall have available a project construction manager to respond to the requirements of this contract. The contractor’s project manager shall have sufficient authority to effectively manage the contract from the project location or reasonable proximity. The contractor shall notify the CO and the CE Construction Representative when the project manager plans to be absent or and/or unavailable to include duration of such absence.

10.2. Records Management Requirements by the Contractor. The contractor shall make available in a timely manner, any permits, reports, or general performance data required in the PWS/SOW. The contractor shall also mark any/all proprietary information in the records submitted to the Air Force/government for Freedom of Information Act purposes. The contractor shall create, handle and maintain records for the Air Force, regardless of medium, (in a pre agreed medium that can be used by the Air Force) in accordance with the requirements established in AFRIMS Records Disposition Schedule (RDS), AFI 33-322, Records Management program, AFI 33-364, Records Disposition Procedures and Responsibilities, and AFMAN 33-363, Management of Records. Full text versions of these publications are available for download at http://www.epublishing.af.mil. The contractor’s records person should attend Records Management Orientation Training conducted by the Base Records Manager. Inquiries as to the specific actions necessary to meet the requirements established in the above referenced publication may be directed to the GFAFB Records Management Office at (701) 747-6143 or 319th CS/SCXK, Bldg 314, GFAFB, ND, 58205-6436.

10.3. PRECONSTRUCTION CONFERENCE: After award of the contract but prior to commencement of any work at the site, the contractor shall meet with the Contracting Officer to discuss and develop a mutual understanding relative to the administration of the value engineering and safety program, preparation of the schedule prices, shop drawings, and other submittals, scheduling programming, and prosecution of the work. Major subcontractors who will engage in the work shall also attend.

10.4. AVAILABILITY OF CADD DRAWING FILES: After award and upon request, the electronic “Computer Aided Drafting and Design (CADD)” drawings files will be made available to the contractor for use in preparation of construction data related to the referenced contract subject to the following terms and conditions. Data contained on these electronic files shall not be used for any purpose other than as a convenience in the preparation of construction data for the referenced project. Any other use or reuse shall be at the sole risk of the contractor and without liability or legal exposure to the Government. The contractor shall make no claim and waives to the fullest extent permitted by law, any claim or cause of action of any nature against the Government, its agents or sub consultants that may arise out of or in connection with the use of these electronic files. The contractor shall, to the fullest extent permitted by law, indemnify and hold the Government harmless against all damages, liabilities or costs, including reasonable attorney’s fees and defense costs, arising out of or resulting from the use of these electronic files. These electronic CADD drawing files are not construction documents. Differences may exist between the CADD files and the corresponding construction documents. The Government makes no
representation regarding the accuracy or completeness of the electronic CADD files and the corresponding construction documents. In the event that a conflict arises between the signed and sealed construction documents prepared by the Government and the furnished CADD files, the signed and sealed construction documents shall govern. The contractor is responsible for determining if any conflict exists. Use of these CADD files does not relieve the contractor of duty to fully comply with the contract documents, including and without limitation, the need to check, confirm and coordinate the work of all contractors for the project. If the contractor uses, duplicates and/or modifies these electronic CADD files for use in producing construction data related to this contract, all previous indicia of ownership (seals, logos, signatures, initials and dates) shall be removed.

10.5. ELECTRONIC MAIL (E-MAIL) ADDRESS: The contractor shall establish and maintain electronic mail (e-mail) capability along with the capability to open various electronic attachments in Microsoft, Adobe Acrobat, and other similar formats. Within 10 days after contract award, the contractor shall provide the Contracting Officer a single (only one) e-mail address for electronic communications from the Contracting Officer related to this contract including, but not limited to contract documents, invoice information, request for proposals, and other correspondence. The Contracting Officer may also use email to notify the contractor of base access condition when emergency conditions warrant, such as blizzards, terrorist threats, etc. Multiple email address will not be allowed. It is the contractor’s responsibility to make timely distribution of all Contracting Officer initiated e-mail with its own organization including field office(s). The contractor shall promptly notify the Contracting Officer, in writing, of any changes to this e-mail address.

11. NOTIFICATION TO THE CONSTRUCTION MANAGEMENT OFFICE (CMO) AND PROJECT COORDINATION: The contractor shall notify CMO (Designated Construction Representative) at least seven days in advance of starting all work. This shall include, but is not limited to, notification when the initial work shall begin; when work shall resume after stoppage exceeding five work days; and when work shall begin following all specified exclusion periods. The official Notice to Proceed does not constitute sufficient notification to CMO that work shall begin.

11.1. The contractor shall coordinate all work schedules with the contracting officer (CO) and with the designated Base Civil Engineer Construction Representative (CR) prior to the start of work. The contractor shall participate in progress meetings as directed by the CO and/or the CR. Attendance at these meetings may include the contractor’s corporate management representative(s) at the CO’s discretion.

11.2. Interruption of Activities to Base Personnel. If it becomes necessary to interrupt base activities in buildings and/or areas for construction purposes (except as otherwise described in the contract), the contractor shall request permission, in writing, from the CO five (5) working days in advance. The contractor shall submit written requests for approved street/parking lot closings ten (10) working days prior to closing of the street/parking lot.

11.3. Work Near Medical Facilities. The contractor shall coordinate all work in medical facilities through the CO with medical/dental treatment staff liaisons and the Construction Representative to minimize interruption of care services to their customers.
11.4. Contractor Furnished Equipment Data: Approximately ten days prior to project final inspection the contractor shall furnish the following data to the Contracting Officer.

11.4.1. Equipment List (If Required by Specification): An itemized equipment list, showing unit retail value and nameplate data including serial number, model number, size, manufacturer, etc., for all contractor furnished items of plumbing fixtures, mechanical equipment, and electrical equipment installed under this contract.

11.4.2. Warranty: Provide a list of all equipment items which are specified to be warranted accompanied by a copy of each specific warranty. For each specific warranted item, the list shall include the name, address, and telephone numbers of the subcontractor who installed the item, the supplier or distributor, and the manufacturer. The completion date of the warranty period shall correspond to the applicable specification requirements for each warranted item.

11.4.2.1. Warranty Service Calls: The contractor shall furnish to the Contracting Officer the names of local service representatives and/or contractors that are available for warranty service calls and who will respond to a call within the time periods as follows: 4 hours for emergency calls and within 7 days of written notice for all other service calls. The names, addresses, and telephone numbers for day, night, weekend, and holiday service responses shall be furnished to the Contracting Officer and also posted at a conspicuous location in each mechanical and electrical room or close to the unit.

11.5. Work Schedule: The standard hours of work on Grand Forks Air Force Base are from 0800 to 1630 hours; Monday through Friday, excluding Federal holidays. Working hours for the contractor will normally align with the base standard hours. If the contractor desires to work during periods other than the base standard work hours, additional Government inspection forces may be required. Therefore, to gain approval to work non-standard hours/days the contractor shall make his/her request in writing to the Contracting Officer three work days (minimum) in advance of his/her intention to work during periods other than standard work hours/days. If inspectors are required to perform in excess of their normal duty hours/days solely for the benefit of the contractor, the actual cost of inspection at overtime rates may be charged to the contractor. These adjustments to the contract price may be made as directed by the Contracting Officer. Requests submitted to work during non-standard work times not meeting the three day notification rule as stated previously will be highly scrutinized, and probably disapproved.

12. SUBMITTALS:

12.1. Material Submittals: After acknowledgment of Notice to Proceed, the contractor shall submit to the Contracting Officer for approval four hard copies of manufacturer's data, catalog cuts, samples, or other information as required for the items on the Material Submittal Schedule and the Technical Provisions and one electronic copy of the same information. No progress payments will be made until all material submittals are received or other arrangements have been made through the Contracting Officer.

12.2. Submittal Preparation: In preparing submittals it shall be incumbent upon the contractor to clearly and fully demonstrate that proposed materials, systems, or methods meet or exceed all applicable specific
requirements of the Technical Provisions. Whenever possible, parameters such as units of measurement, testing protocols and technical vernacular specified in the text will be those employed or referenced by the contractor or his agent in demonstrating compliance. When not possible, the contractor will clearly and fully demonstrate, by written notation, how other parameters, employed or referenced, compare with those specified.

12.3. Shop Drawing Submittals: Shop drawings, when required, shall consist of a complete list of equipment and materials, including manufacturer's descriptive and technical literature; performance charts and curves; catalog cuts and installation instructions. Shop drawings shall be prepared to graphically demonstrate proposed layout and anchorage of materials, equipment and appurtenances; and material/equipment relationships to other parts of the work including clearances for maintenance and operation. They shall also contain complete wiring and schematic diagrams; and any other details to graphically demonstrate that a system has been fully coordinated and will properly function as a unit. See Material Submittal Schedule.

12.3.1. Manufacturer’s instructions pertaining to the use or installation of submitted and approved products, materials, or equipment used or installed in the execution of work under this contract form a part of these specifications as though specifically set forth herein. These instructions apply whether furnished as a normal, usual, or customary practice of the manufacturer or if furnished in response to a requirement stipulated herein. In the event of conflict between the specification of drawings and manufacturers’ instructions, the contractor shall bring such conflict to the attention of the CO for resolution before proceeding with the work involved.

12.4. Test Submittals: See Material Submittal Schedule for tests required.

12.5. Photographs: Photographically document site conditions prior to start of construction operations. Include aerial photographs if applicable, and/or available. Provide monthly, and within one month of the completion of work, digital photographs, 1600x1200x24 bit true color minimum resolution in JPEG file format showing the sequence and progress of work. Take a minimum of 20 digital photographs each week throughout the entire project from a minimum of ten views from points located by the Contracting Officer’s Representative. Submit a view location sketch indicating points of view. Submit with the monthly invoice two sets of digital photographs each set on a separate CD-R, cumulative of all photos to date. Indicate photographs demonstrating environmental procedures. Photographs for each month shall be in a separate monthly directory and each file shall be named to indicate its location on the view location sketch. The view location sketch shall also be provided on the CD as digital file. All file names shall include a date designator. Cross reference submittals in the appropriate daily report. Photographs shall be provided for unrestricted use by the Government.

12.6. Project Schedule: Prepare for approval a Project Schedule, as specified herein, pursuant to the Contract Clause, SCHEDULE FOR CONSTRUCTION CONTRACTS. Show in the schedule the sequence in which the contractor proposes to perform the work and dates on which the contractor contemplates starting and completing all schedule activities. The scheduling of the entire project, including the design and construction sequences, is required. The scheduling of design and construction is the responsibility of the contractor. Contractor management personnel shall actively participate in its development. Subcontractors and suppliers working on the project shall also contribute in developing and maintaining an accurate Project Schedule. The schedule must be a forward planning as well as a project monitoring tool. Use the approved Project Schedule to measure the progress of the work and to aid in evaluating time extensions. Make the schedule cost loaded and activity coded. The schedule will provide the basis for all progress payments. If the contractor fails to submit any schedule within the time prescribed, the Contracting Officer may withhold approval of progress payments until the contractor submits the required schedule.
12.6.1. Construction Schedule: In addition to the requirements of paragraph 12.6, prepare and submit to the Contracting Officer for acceptance prior to start of work a construction schedule.

12.6.2. Equipment Delivery Schedule:

12.6.2.1. Initial Schedule: Within 30 calendar days after acceptance of the proposed construction schedule, submit for Contracting Officer acceptance a schedule showing procurement plans for materials and equipment. Submit in the format and content as prescribed by the Contracting Officer, and include as a minimum the following information:

12.6.2.1.1. Description
12.6.2.1.2. Date of the purchasing order
12.6.2.1.3. Promised shipping date
12.6.2.1.4. Name of the manufacturer or supplier
12.6.2.1.5. Date delivery is expected
12.6.2.1.6. Date the material or equipment is required, according to the current construction schedule

12.6.2.2. Updated Schedules: Update the construction schedule and equipment delivery schedule at monthly intervals or when the schedule has been revised. Reflect any changes occurring since the last update. Submit copies of the purchase orders and confirmation or the delivery dates as directed.

12.7. As-Built Drawings:

12.7.1. All exterior work shall be documented with survey grade GPS in accordance with the latest version of the Spatial Data Standards for Facility, Infrastructure, and Environment (SDSFIE) and be provided in the GIS data format. The coordinate system shall be the North Dakota State Plan Coordinate System (North). The features shall be captured with survey grade GPS.

12.7.2. All interior work shall be documented with AutoCAD in accordance with the A/E/C CAD Standard adopted by the Department of Defense. https://cadbim.usace.army.mil/default.aspx?p=a&t=1&i=7

12.7.3. Redline Markup Drawings: The contractor shall revise 2 sets of paper drawings by red-line process to show the as-built conditions during the duration of the project. These working as-built marked drawings shall be kept current on a weekly basis and at least one set shall be available on the jobsite at all times. Changes from the contract plans which are made in the work or additional information which might be uncovered in the course of construction shall be accurately and neatly recorded as they occur by means of details and notes. Final as-built drawings shall be prepared after the completion of each definable feature of work (Foundations, Utilities, Structural Steel, etc., as appropriate for the project). The working as-built marked prints and final as-built drawings will be jointly reviewed for accuracy and completeness by the Contracting Officer and the contractor prior to submission of each monthly pay estimate. If the contractor fails to maintain the working and final as-built drawings as specified herein, the Contracting Officer will deduct from the monthly progress payment an amount representing the estimated cost of maintaining the as-built drawings. This monthly deduction will continue until an
agreement can be reached between the Contracting Officer and the contractor regarding the accuracy and completeness of updated drawings. The working and final as-built drawings shall show, but shall not be limited to, the following information:

12.7.3.1. Utilities: In addition to record drawings provide for each exterior utility system a set of reproducible utility drawings, stamped and signed by a registered professional civil engineer or professional land surveyor, and two copies. Submit within ten working days after each system is in place, but no later than five working days before final inspection. Indicate exterior utilities from the building to the termination point or point of connection to existing system. Include the following:

12.7.3.1.1. Horizontal and vertical controls for new utilities and existing utilities exposed during construction. Reference to station's horizontal and vertical control system.
12.7.3.1.2. Sufficient dimensional control for all important features such as beginning and termination points, points of connection, inverts for sewer lines and drainage collection systems, top of pipe or conduit runs, manholes, cathodic protection appurtenances, valves, valve stem tops, backflow preventers, and other significant features.
12.7.3.1.3. Indicate type and size of all materials used in the construction of the system.
12.7.3.1.4. Indicate bearing and distance on tangent lines. On curves, indicate delta and radius of the curve, also provide X, Y, and Z coordinates at all BC and EC angle points. Indicate horizontal and vertical control for all intersecting and tangent points where utility alignment changes. Indicate X, Y, and Z coordinates at building line and point of connection for straight building laterals or services under 40 feet.
12.7.3.2. The location and dimensions of any changes within the building structure. Correct grade, elevations, cross section, or alignment of roads, earthwork, structures or utilities if any changes were made from contract plans. Changes in details of design or additional information obtained from working drawings specified to be prepared and/or furnished by the contractor; including but not limited to fabrication, erection, installation plans and placing details, pipe sizes, insulation material, dimensions of equipment foundations, etc.
12.7.3.3. The topography, invert elevations and grades of drainage installed or affected as part of the project construction.
12.7.3.4. Changes or modifications which result from the final inspection.
12.7.3.5. Where contract drawings or specifications present options, only the option selected for construction shall be shown on the final as-built prints.
12.7.3.6. If borrow material for this project is from sources on Government property, or if Government property is used as a spoil area, the contractor shall furnish a contour map of the final borrow pit/spoil area elevations.
12.7.3.7. Systems designed or enhanced by the contractor, such as, fire sprinkler lines servicing facilities, and exterior irrigation systems.
12.7.3.8. Modifications (change order price shall include the contractor's cost to change working and final as-built drawings to reflect modifications) and compliance with the following procedures.
12.7.3.8.1. Directions in the modification for posting descriptive changes shall be followed.
12.7.3.8.2. A Modification Circle shall be placed at the location of each deletion.

12.7.3.8.3. For new details or sections which are added to a drawing, a Modification Circle shall be placed by the detail or section title.

12.7.3.8.4. For minor changes, a Modification Circle shall be placed by the area changed on the drawing (each location).

12.7.3.8.5. For major changes to a drawing, a Modification Circle shall be placed by the title of the affected plan, section, or detail at each location.

12.7.3.8.6. For changes to schedules or drawings, a Modification Circle shall be placed either by the schedule heading or by the change in the schedule.

12.7.3.8.7. The Modification Circle size shall be 1/2 inch diameter unless the area where the circle is to be placed is crowded. Smaller size circle shall be used for crowded areas.

12.8. Final As-Built Drawing Preparation:

12.8.1. The redline markups drawings shall be submitted 10 days before the final inspection for approval by the Contracting Officer and/or his/her representative. Upon approval the redline markup drawings shall be returned to the contractor.

12.8.2. Preparer Qualifications: The contractor shall, at his own expense, provide a qualified individual or firm to transfer all revisions from the redline markup drawings to the awarded drawings to create the as-built drawings. Upon completion of the transfer both the redline markup drawings and the as-built drawings shall be submitted to the Contracting Officer for approval. The contractor has 20 calendar days to create the as-built drawings beginning from the day the approved redline markup drawings are returned to the contractor. Work shall be accomplished in a professional manner and the quality standards set forth in the following paragraphs.

12.8.3. Drawing Requirement: One complete set of full-size paper as-built drawings and one electronic set (AutoCAD .dwg format) of as-built drawings on a CD or DVD shall be provided by the contractor for each submittal requirement. Drawings, paper or electronic, shall comply with the latest version of the A/E/C CADD Standard available at: https://cadbim.usace.army.mil/ and the Grand Forks Air Force Base North Dakota Supplement to A/E/C CAD Standard. Electronic drawings shall be created in model space at a scale of one to one (1 to 1). A paper space layout will be set-up for each drawing. All X-references shall be attached and bound to each affected sheet. Drawings must open in the specified Auto Cad format and be ready to plot without manipulation of files, directories, or other encumbrances. No securities or safeguards that would prevent full control of any drawing will be installed. Changes made or inserted shall be completely drawn in Auto Cad to depict changes. Clouding, notation, or photo insertion to indicate changes are not acceptable unless approved in advance and can only be used on rare occasions. Electronic as-built drawings are to be delivered in AutoCAD 2014 compatible format. The contractor shall provide one CD or DVD containing all drawings properly labeled including awarded original drawings that were not changed. All drawings in the set must be clearly distinguishable from construction drawings. The words “AS-BUILT” or “RECORD DRAWING” must be prominently displayed in the drawing area or inside the revisions block of the border. The CD/DVD must also contain a second drawing set electronically plotted to a raster media such as .TIFF, .PDF, or JPEG for fast viewing.
12.9. REAL PROPERTY RECORD: Near the completion of Project, but a minimum of 15 days prior to
final acceptance of the work, complete, update draft attached to this section, and submit an accounting of
all installed property on Form DD1354 "Transfer and Acceptance of Military Real Property." Contact the
Contracting Officer for any project specific information necessary to complete the DD Form 1354. For
information purposes, a blank DD Form 1354 (fill-able) in ADOBE (PDF) may be obtained at the
following web site: http://www.dtic.mil/whs/directives/infomgt/forms/eforms/dd1354.pdf. Submit the
completed Checklist for Form DD1354 of Government-Furnished and contractor-Furnished/contractor
Installed items. Attach this list to the updated DD Form 1354. Instructions for completing the form and a
blank checklist (fill-able) in ADOBE (PDF) may be obtained at the following web site:

13. ENVIRONMENT PROTECTION: The contractor shall perform all work in such manner as to
prevent the polluting of air, water, or land, and shall follow all applicable federal, state, and local
regulations and guidelines. The use of hazardous materials (i.e., lead-based paints, asbestos containing
materials and other materials without permission to use) is prohibited. The contractor shall protect
against the emission of any hazardous substance(s) that cause or contribute to air pollution and may
reasonably be anticipated to endanger health, welfare and the environment.

13.1. The publication listed below form a part of this specification to the extent referenced. The
publications are referred to in the text by the basic designation only:

13.1.1. United States Environmental Protection Agency, EPA 832-R-92-005 Storm Water Management
for Construction Activities, and the ND State Dept of Health Storm Water rules.

13.1.2. Green Procurement Requirements of Section 319002 of Resource Conservation and Recovery Act
and Executive Order 13423 Strengthening Federal Environmental Energy and Transportation
Management through Environmental Management Systems.

13.2. Implementation. After Notice to Proceed and prior to commencement of any work as required
under this contract, the contractor shall submit in writing to the CO the required plans (stated herein) for
implementing the requirements for environmental protection and pollution control. 319 CES/CEAN
(Environmental Compliance) and CM must review and approve all plans submitted by the contractor
before site work may begin.

13.3. The contractor shall follow North Dakota and EPA guidance 832-R-92-005 Storm Water
Management for Construction Activities. Copies are available for review at the Environmental
Compliance Office (319 CES/CEAN), Base Civil Engineering, 525 Tuskegee Airmen Blvd., Grand Forks
AFB, ND. ND State Dept of Health rules and forms are available online at

13.3.1. Prior to on site work on all projects (as applicable) the contractor shall accomplish the appropriate
action from the options listed below. In addition to fulfilling the submission requirements to the State of
North Dakota, the contractor shall also submit duplicate copies of everything sent, to and received by the
State of ND to the CO for approval by 319 CES/CEAN and CM. Information regarding the permit can be
found at http://www.ndhealth.gov/WQ/Storm/Construction/NDR10per20091001F.pdf.

13.3.1.1. If Construction Activity (see permit definitions) area is under 1 acre total; contact 319
CES/CEAN for a copy of the Grand Forks AFB Storm Water Pollution Prevention Plan (SWPPP) and
permit. Any deviations from these documents must have prior approval from this office.
13.3.1.2. Small Site: If Construction Activity area is between one and five acres; contact 319 CES/CEAN or visit the North Dakota Department of Health (NDDH) web site to obtain the general small site construction permit, SWPPP forms, and Notice of Intent (NOI) for construction activity. The SWPPP Must be completed and approved by this office prior to beginning any site activity. Allow time for this review and approval process. The NOI must be completed by the contractor as 'operator', then submitted to this office for review. This office will submit to NDDH. Please allow time for the State approval process described in the permit.

13.3.1.3. Large Site: If the Construction Activity area will total more than five acres but less than 50, the contractor will follow the above process using the 'large site' permit. If the Construction Activity is greater than 50 acres, the SWPPP will need review by this office and the State Health Dept., otherwise same as Large site instructions above.

13.3.2. Certain items not required to be submitted by the State of North Dakota to obtain and comply with the NDPDES general permits shall be also be submitted to the CO for approval by 319 CES/CEAN and the CM. These following items are required at a minimum:

13.3.2.1. Application – Notice of Intent
13.3.2.2. Coverage Letter from the State of North Dakota citing permit number and conditions
13.3.2.3. General Permit
13.3.2.4. Storm Water Pollution Prevention Plan (SWPPP). See http://www.ndhealth.gov/WQ/Storm/Construction/ConstructionHome.htm. Also see paragraph 14.5 this section
13.3.2.5. Self Monitoring and Reporting Documents (Self Inspection Records) at 30 day intervals after start of work
13.3.2.6. Amendments to the original SWPPP as they are developed and deployed
13.3.2.7. Transfer of Ownership or Control – permit transfer/modification (if applicable)
13.3.2.8. Notice of Termination (NOT)
13.3.2.9. Noncompliance Notifications to the State of North Dakota
13.3.2.10. Locations of Records Storage if the project site does not have reasonable on-site location
13.3.2.11. Location of Record Retention location for three years

13.3.3. The contractor shall sign and certify (if applicable) all required documents as the operator.

13.3.4. Certain SWPPP requirement may not be readily available to the contractor, such as soil types on base, name of surface waters, name of municipal storm sewer systems at or near disturbed work area, wetland acreage, locations where storm water is discharged to surface waters, etc. These features shall be obtained from Attachment Three and/or 319 CES/CEAN prior to completing the SWPPP as necessary.
13.3.5. The base approval authority, 319 CES/CEAN, has particular preferences for storm water protection on Grand Forks AFB. It is highly recommended that the contractor coordinates and obtains such information prior to submitting the SWPPP for approval.

13.4. Preconstruction Survey: Prior to start of any on-site construction activities, the contractor and the Contracting Officer’s representative shall make a joint condition survey after which the contractor shall prepare a brief report indicating on a layout plan the condition of trees, shrubs, and grassed areas immediately adjacent to the site of the work and adjacent to his assigned storage area and access route(s) as applicable. This report will be signed by both the Contracting Officer’s designated representative and contractor upon mutual agreement as to its accuracy and completeness. This product will be used for the determination of restoration of the work sites and for dispute of damaged areas. This report is designed to protect the contractor, and not a convenience to the government. This requirement may be waived by the CO upon request and justification from the contractor.

13.5. Storm Water Protection Plan: Grand Forks Air Force Base has been issued a National Pollutant Discharge Elimination System (NPDES) permit for storm water runoff, permit number NDR02-0314. The contractor shall be responsible for strict adherence to the Grand Forks AFB NPDES permit, in addition to the contractor’s permit. The NPDES permit is available for contractor review at 319 CES/CEAN, 525 Tuskegee Airmen Blvd., Grand Forks AFB, ND. The Contractor shall comply with applicable Federal, State, County, and Municipal laws concerning pollution of rivers and streams while performing work under this contract. Special measures shall be taken to prevent pollutants including rock, sand, sediment, dirt, chemicals, fuels, oils, greases, bituminous materials, herbicides, and insecticides from entering public waters (this includes eliminating sediment from entering the storm drain inlets). Water used in on-site material processing, concrete curing, foundation and concrete cleanup, and other waste waters shall not be allowed to reenter a stream if an increase in the turbidity of stream could result.

13.6. Waste Disposal Plan. Prior to on-site construction, the contractor shall submit a Waste Disposal Plan and gain plan approval by the Contracting Officer and 319 CES/CEAN for disposing of waste materials resulting from the work under his contract. This plan must include, but not limited to collection methods, securing the load, transportation, disposal site identification, recycling procedures, and proof of disposal.

13.6.1. All hazardous waste generated on GFAFB must be managed in accordance with large generator standards as specified in 40 CFR 262.

13.6.2. Hazardous wastes are hazardous substances as defined in 40 CFR 261, or as defined by applicable State and local regulations. Examples of wastes commonly generated in construction activities include, but not limited to, lead containing materials, spent solvents, paints, adhesives, lead-based paint abatement wastes, and fluorescent light tubes. Other wastes may also be hazardous, and if in doubt, obtain guidance from 319 CES/CEAN. Air Force policy requires all hazardous waste to be disposed through DRMO IAW AFI 32-7042 (2.6.2). Contractor shall coordinate all hazardous waste disposals through 319 CES/CEAN, (701) 747-4655.

13.6.3. The contractor shall comply with all applicable requirements in the GFAFB Hazardous Waste Management Plan (HWMP), 319 ARW 7204-97-09. The GFAFB HWMP can be reviewed at the GFAFB Environmental Flight 319 CES/CEAN office. The HWMP covers the procedures that must be followed to properly accumulate, store, and turn-in hazardous waste at GAFB.

13.6.4. The contractor shall coordinate accumulation, storage, and disposal of all hazardous wastes with 319 CES/CEAN. Contact 319 CES/CEAN at 747-4655 prior to accumulating any waste.
13.6.5. Containers used to accumulate, store, or transport hazardous waste will be new/unused performance oriented tested containers that are marked with appropriate information showing they conform to UN standards.

13.6.6. Contractor shall accumulate no more than 55 gallons of any one hazardous waste stream at a time. Once the 55 gallon limit has been reached, the container shall be labeled with the date the container was filled. The container must be moved to a 180-day accumulation site, turned in to DRMO, or shipped for disposal within three days of the date the container was filled.

13.6.7. Containers used to accumulate hazardous waste must be labeled with the contents of the container. 319 CES/CEAN must be notified of all hazardous waste accumulation to arrange for periodic inspection.

13.6.8. Used fluorescent tubes and high pressure sodium and metal halide bulbs are hazardous waste and must be turned in to the HAZWASTE Office at Bldg 408 for recycling. Broken bulbs will be individually double bagged in plastic bags and taped shut (contact 747-6052 to schedule a turn-in. If large quantities of bulbs are going to be disposed of contact HAZWASTE Office to pick up boxes prior to turn-in

13.6.9. Hazardous waste shall not be dumped onto the ground, into storm sewers, open water courses, or into the sanitary sewer system.

13.6.10. All debris, waste, and excess construction material shall be disposed of off-base by the Contractor. See instruction for hazardous waste disposal in this and the list of items that can be recycled at Attachment One. If it is found that the contractor dumped any material/waste in unauthorized areas, the Contractor shall remove the material, dispose of the material in accordance with applicable technical provisions, and restore the area to the condition of the adjacent undisturbed areas. Where directed, contaminated ground shall be excavated, disposed of as approved, and replaced with suitable fill material, all at the expense of the contractor.

13.6.11. All removed/abated asbestos waste shall be disposed of at a disposal facility permitted for asbestos. An Asbestos Waste Manifest Form (NDDH form 58174) [http://www.ndhealth.gov/wm/Publications/AsbestosWasteManifestForm.pdf](http://www.ndhealth.gov/wm/Publications/AsbestosWasteManifestForm.pdf), shall be completed and submitted to the North Dakota Dept of Health, the Contracting Officer, and 319 CES/CEAN within 3 days of disposal.

13.6.12. Salvageable Materials. All salvageable materials will become property of the contractor unless specified differently in the individual task orders. If required, turn-in of salvageable materials as identified in the RFP shall be coordinated by the contractor with the appropriate base agency. Materials required for turn in shall be loaded, transported, and unloaded by the contractor unless otherwise specified. Material turn-in shall require contractor-preparation of any associated AF forms.

13.6.13. The Contractor shall identify and separate out PCB containing ballasts and dispose all PCB ballasts in accordance with 40 CFR 761.

13.7. Dust Control Plan. The Contractor shall comply with NDAC 33-15-17-03, Reasonable Precautions for Abating and Preventing Fugitive Particulate Emissions, and maintain all excavations, stockpiles, access roads, waste areas, and all other work areas free from excess dust to such reasonable degree as to avoid causing a hazard or nuisance to the Using Service or to others. Approved temporary methods consisting of sprinkling or similar methods will be permitted to control dust. Dust control shall be permitted as the work proceeds and whenever dust nuisance or hazard occurs. The contractor shall be
responsible for performing all dust control work in accordance with EPA 832-R-92-005, Chapter 3. The
methods the Contractor will use to control dust in any areas affected by the project will be addressed in
the Dust Control Plan. The Dust Control Plan must be submitted to the CO for review and approval by
319 CES/CEAN.

13.8 Corrective Action. The Contractor shall, upon receipt of a notice in writing of any noncompliance
with the foregoing provisions, take immediate corrective action. If the Contractor fails or refuses to
comply promptly, the Contracting Officer may issue an order stopping all or part of the work until
satisfactory corrective action has been taken. No part of the time lost due to any such stop orders shall be
made the subject of a claim for extension of time or for excess costs of damages by the Contractor unless
it was later determined that the Contractor was in compliance.

13.9. Materials. No lead-based paint or asbestos-containing materials shall be used. The materials which
the Contractor delivers to the government shall be in compliance with applicable Federal, State, County,
and Municipal laws governing pollution of rivers and streams, and waste handling.

13.10. Radioactive Materials. Contractors bringing radioactive materials or devices containing
radioactive sources onto Grand Forks AFB must have prior approval from the Wing Radiation Safety
Officer (RSO), at Bioenvironmental Engineering (701) 747-5596. In addition, the contractor must submit
the following documentation to the Wing RSO for review 30 days prior to bringing materials on base:

13.10.1. Copy of the Nuclear Regulatory Commission License Agreement State License, along with any
amendments, covering the radioactive material to be used.

13.10.2. Copy of the user’s qualification and radiation safety training.

13.10.3. Radiation dosimetry results from the prior calendar year.

13.10.4. Statement of expected use (use rate) of radioactive materials or devices for the length of the
contract.

13.10.5. Statement of storage and security requirements.

13.10.6. Copies of the last two leak checks (if applicable).

13.11. Under no circumstances will a contractor use an unlicensed radioactive source/device on Grand
Forks AFB. Contractors bringing radioactive materials on Air Force installations or conduct operations
using radioactive materials on Air Force installations must receive written approval by the installation
commander or their appointee. To get this approval, the contractor must send a request to the installation
RSO at least 30 calendar days before bringing the materials onto the installation. For contractors these
requirements must be included in the statement of work. The contractor should direct any questions
regarding his responsibility on this issue to the Wing RSO prior to the starting of any work. Because the
Air Force considers contracts involving radioactive materials a hazardous items contract, the provisions of
AFI40-201, chapter 3 will also apply.

13.12. Spill Control Plan. All hazardous material/waste spills must be reported to the Contracting
Officer. Any release of a hazardous material/waste which is beyond the capability of the contractor must
be reported to 911 immediately. The Contractor will notify and provide complete documentation of spills
to 319 CES/CEAN. Documentation will include the date and time of spill, location, quantity, and an
MSDS of the spilled material. 319 CES/CEAN will file any required reports with Federal, State, and
local agencies. The Spill Control Plan must be submitted to the CO for review and approval by the CO
and 319 CES/CEAN. The plan must include, but limited to, identifying potential spill sources, control measures, contaminated soil removal, site restoration, disposal, notifications. Petroleum-contaminated soil generated by the contractor can be removed and hauled by the contractor to the base Land Treatment Facility (POC: Mr. Larry Olderbak @ 747-4183 for access) and spread to a maximum thickness of 4 inches. All costs associated with a contractor generated spill shall be the contractor’s responsibility.

13.13. Erosion and Sediment Control Plan. Project activities that include digging, scraping, stockpiling, or re-grading have the potential to be eroded and create sediment problems at the project site as well as areas adjacent to the site. An Erosion and Sediment Control Plan must be submitted to the CO for review and approval by the CO and 319 CES/CEAN. The plan must include, but not limited to, stockpile location, control methods to eliminate erosion of stockpile, identify exposed natural areas and appropriate control methods.

13.14. Disposal of Construction Debris. All debris and excess construction material shall be disposed of off base daily by the Contractor at no cost to the Government. All sediment shall be disposed of off-base (including cleaning ready-mix concrete delivery trucks) in an environmentally sound manner by the Contractor and proof of proper disposal shall be furnished by the Contractor to 319 CONS and 319 CES/CEAN, if requested. The contractor should make an effort to recycle construction materials where feasible.

13.15. Hazardous Materials. The contractor shall supply all information that is needed for the installation to fully comply with the Emergency Planning and Community Right-to-Know Act (EPCRA), and Executive Orders 13184 (Greening the Government Through leadership In Environmental Management), EO 13101 (Greening the Government Through Waste Prevention, Recycling, and Federal Acquisition, and RCRA 6002 (Federal Procurement). The contractor shall accomplish the following:

13.15.1. Affirmative Procurement (AP)/Environmentally Preferable Products (EPP)

13.15.1.1 Use products with post-consumer recycled and or bio-based content.

13.15.1.2 Use products that can be recycled.

13.15.1.3 Use low toxicity or non-toxic products.

13.15.1.4 Use and install low-maintenance products.

13.15.2. The contractor will be required to utilize the Affirmative Procurement and Bio-Based Product Forms to document purchases of mandated products. If a preference product is available that is made from recycle or bio-based material the contractor is to purchase that item unless an exemption can be made. The contractor will use the forms to record the purchases and to justify a non-purchase of a product that is made from bio-based or recycled material by using one or more of the exemptions on the form. The forms will be turned into the CO and 319 CEAN monthly to allow tracking and reporting requirements to be fulfilled. The contractor will turn the forms in within 10 days of the previous month’s purchases. See Attachment One of the specification section 1000.

13.15.3. The contractor will participate in the base recycling program. Drop off containers for recyclables are located at bldg 672 and the hours are M-W-F form 0900 to 1400. The Recycling Center is at the north end of Eielson. See Attachment Two of these technical specifications for a list of Items Recycled on GFAFB.

13.15.4. Emergency Planning and Community Right-to-Know (EPCRA).
13.15.4.1. EPCRA Requirements.

13.15.4.1.1. The contractor shall inform workers, subcontractor workers, and 319 CES/CEAN of all hazardous materials that will be used during the contract.

13.15.4.1.2. The contractor shall secure all hazardous materials from the elements, leakage, and entry by unauthorized individuals.

13.15.4.1.3. The contractor shall maintain active current inventories of all hazardous material and hazardous waste that they manage on-site.

13.15.4.1.4. The contractor shall maintain a current Material Safety Data Sheet (MSDS) file for each and every hazardous material used on-site during this contract.

13.15.4.2. EPCRA Reporting.

13.15.4.2.1. The contractor shall be required to participate in the tracking of hazardous materials and shall cooperate with the 319 CES/CEAN office and other contractors responsible for managing the hazardous material database. The contractor shall be required to fill out all forms to have hazardous material approved prior to bringing on the installation for the duration of the contract and not just a the initial award time frame and ensure 319 CES/CEAN barcodes are adhered to products requiring barcodes and shall report the consumption of material monthly to 319 CES/CEAN at 701-747-6052 to clear out the barcodes.

13.15.4.2.2. The contractor shall complete the Contractor Hazardous Material Tracking Log and AF Form 3952 Hazardous Material Request form provided at the time the contractor “requests” to bring hazardous material on the installation and provide Material Safety Data Sheets for each material. The tracking log requires the contractor to provide chemical/brand name, approximate quantity that will be used and size of containers. The contractor will continually keep 319 CES/CEAN advised of what products are needed to be brought upon the installation and will obtain authorizations prior to bringing on the installation. The contractor shall use the least hazardous material necessary to accomplish the tasking as long as the less hazardous product meets the job specification and produces a quality and safe finish.

13.15.4.2.3. The following specifications and restrictions apply to all architectural and architectural anti-corrosive paints used during the course of this contract.

13.15.4.2.3.1. Paint, Latex (Architectural and Architectural Anti- Corrosive). Paint volatile organic compound (VOC) restrictions. Due to the documented health risks associated with high VOC levels. List of VOC limits for (table 1).

<table>
<thead>
<tr>
<th>Table 1. GFAFB VOC Limits for Paints</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Paint</td>
</tr>
<tr>
<td>Interior architectural</td>
</tr>
<tr>
<td>Flat</td>
</tr>
<tr>
<td>Non-Flat</td>
</tr>
<tr>
<td>Exterior architectural</td>
</tr>
<tr>
<td>Flat</td>
</tr>
</tbody>
</table>
13.15.4.2.3.2. Paint Inorganic Component Restrictions. Paints often contain inorganic and organo-metallic components used as preservatives, additives, and pigments. Table 2 lists the base inorganic components prohibited by GFAFB standards.

Table 2. Inorganic Components Prohibited by Standards for Paints

<table>
<thead>
<tr>
<th>Component</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antimony</td>
<td>200 g/l</td>
</tr>
<tr>
<td>Cadmium</td>
<td>250 g/l</td>
</tr>
<tr>
<td>Hexavalent chromium</td>
<td>250 g/l</td>
</tr>
<tr>
<td>Lead</td>
<td>250 g/l</td>
</tr>
<tr>
<td>Mercury</td>
<td>250 g/l</td>
</tr>
</tbody>
</table>

13.15.4.2.3.3. Paint Organic Component Restrictions. Organic chemical compounds in paint affect a number of paint characteristics from how smoothly the paint flows to its freeze resistance. Table 3 lists all compounds prohibited for this contract.

Table 3. Prohibited Organic Compounds.

<table>
<thead>
<tr>
<th>Compound</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methylene chloride</td>
<td></td>
</tr>
<tr>
<td>1,1,1-Trichloroethane</td>
<td></td>
</tr>
<tr>
<td>Benzene</td>
<td></td>
</tr>
<tr>
<td>Toluene (methylbenzene)</td>
<td></td>
</tr>
<tr>
<td>Ethylbenzene</td>
<td></td>
</tr>
<tr>
<td>Vinyl chloride</td>
<td></td>
</tr>
<tr>
<td>Naphthalene</td>
<td></td>
</tr>
<tr>
<td>1,2-Dichlorobenzene</td>
<td></td>
</tr>
<tr>
<td>Di (2-ethylhexyl) phthalate</td>
<td></td>
</tr>
<tr>
<td>Butyl benzyl phthalate</td>
<td></td>
</tr>
<tr>
<td>Di-n-butyl phthalate</td>
<td></td>
</tr>
<tr>
<td>Di-n-octyl phthalate</td>
<td></td>
</tr>
<tr>
<td>Diethyl phthalate</td>
<td></td>
</tr>
<tr>
<td>Dimethyl phthalate</td>
<td></td>
</tr>
<tr>
<td>Isophorone</td>
<td></td>
</tr>
<tr>
<td>Formaldehyde</td>
<td></td>
</tr>
<tr>
<td>Methyl ethyl ketone</td>
<td></td>
</tr>
<tr>
<td>Methyl isobutyl ketone</td>
<td></td>
</tr>
<tr>
<td>Acrolein</td>
<td></td>
</tr>
<tr>
<td>Acrylonitrile</td>
<td></td>
</tr>
</tbody>
</table>

13.15.4.2.3.4. Environmental Management System Awareness Training (add). The contractor shall ensure all personnel within 30 days of Notice to Proceed contact 319 CES/CEAN at 747-4655 to take the AF Environmental Management Systems Awareness Training. The training will be taken on line or via a CD and takes approximately 15 minutes.

13.16. The contractor shall be responsible for complying with the EPA’s buy recycled program. Information on this program can be found at [www.epa.gov/cpg](http://www.epa.gov/cpg). Should the contractor be unable to meet EPA recommendations due to design or other considerations they shall notify the CO and request approval of an alternative approach.
13.17 Protection of Natural and Cultural Resources

13.17.1. Wetlands Protection. Excavation and/or filling in areas designated as “wetlands” are strictly prohibited. 319 CES/CEAN has the most recent inventory and location of wetlands. Prior to planning work the contractor shall coordinate excavation and/or filling activities with 319 CES/CEAN to avoid wetland conflicts following EO 11990. Type of work may include but is not limited to any trenching/boring, demolition, building of access roads temporary or permanent, and/or installing culverts as required infrastructure for the project that would impact adjacent wetlands. Any work that would disturb wetlands requires Clean Water Act Section 404 permits (through the Army Corp of Engineers), and these are obtained through 319 CES/CEAN prior to work. The application process will require a plan for wetlands restoration and best management practices. The contractor is responsible for completing planned wetland restoration work. The section 404 process may take a few months to gain the proper permissions to proceed with dredging/filling/trenching of wetlands. It is strongly suggested this effort take place, prior to scheduling work. Any contractor disturbance of a wetland prior to coordination and gaining permission shall be subject to penalties under the laws of the EPA, Army Corps of Engineers, and the state of ND. The contractor shall be liable for penalties and restoration actions imposed by the EPA, State of ND, or Grand Forks AFB through CO determination.

13.17.2. Protection of Endangered, Threatened Plants, Animals and Migratory Birds. Contractor shall obtain approval from the Contracting Officer before removing or relocating any threatened or endangered plants or animals within the construction boundaries. Migratory Birds are protected by the Migratory Bird Treaty Act and EO 13186, “Responsibilities of Federal Agencies to Protect Migratory Birds.” As such, the contractor is not allowed to take any birds listed in 50 CFR 10.13. Take is defined as “to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or any attempt to carry out these activities.” A take does not include habitat destruction or alteration, as long as there is not a direct taking of birds, nests, eggs, or parts thereof. Protected migratory birds include such species as common songbirds, waterfowl, shorebirds, hawks, owls, eagles, ravens, crows, mourning doves, swifts, martins, swallows and others. A permit is required to take a migratory bird including its nest, eggs, and feathers.

13.17.3. Cultural Resource Protection. Historical or cultural artifacts exposed during excavation or grading activities will be preserved and all work will immediately be halted until the proper authorities have been notified and the artifacts have been evaluated as to their nature and relevance. Any borrow fill involved in the acts of excavation, construction, demolition, and filling must come from an approved source, that is a source surveyed by an archaeologist and found to contain no significant cultural resources. Prior to any building modification and/or demolition ensure the building is not a historic resource. If the structure is a historic resource, coordinate with 319 CES/CEAN to ensure planned modifications and demolition activities are approved by the State Historical Society.

13.17.4. Trees and other natural vegetation. Trees, shrubs and other vegetation are natural resources owned by Grand Forks AFB. Removal of trees as DoD property must comply with 10 USC 2665, DODI 4715.03, and AFI 32-7064. The AF cannot give away, abandon or destroy forest products with marketable value. Marketable value must be appraised by the AF and is a complex decision based on value, demand, ease of access, and other local factors. Sale of forest products must be compatible with the base INRMP. If any trees, shrubs, or plants need removal, they should first be evaluated for potential relocation. If the tree can be relocated, please coordinate this work effort with CE. If the vegetation must be removed, it should be replaced with a like kind. If any vegetation (trees, shrubs, or plants) are damaged during the course of construction activities, they should be replaced with a like kind. Do not tie any materials to trees, use trees as supports, cut the root-ball structure, or remove branches/heavily prune during the construction period. These activities can degrade the quality of the tree, and can cause eventual kill. Should any trees that are contained in a fenced area under the control and maintenance of
the contractor become infected with Dutch elm disease or infested with emerald ash borer, the contractor is required to report and allow immediate removal of the tree. The trees must be disposed by chipping or burial in an approved landfill. Noxious Weeds: Public law 93-629 mandates control of noxious weeds. Limit possible weed seed transport from infested areas to non-infested sites. Avoid activities in or adjacent to heavily infested areas or remove seed sources and propagules from site prior to conducting activities, or limit operations to non-seed producing seasons. Wash or otherwise remove all vegetation and soil from equipment before transporting to a new site. Following activities which expose the soil, mitigate by covering the area with mulch and/or seed the area. Seed must be approved by 319 CES, and must be similar to surrounding area. In improved landscapes use a Kentucky Blue grass mixture for example, and in unimproved areas use a native prairie grass mixture. Covering the soil will reduce the germination of weed seeds, maintain soil moisture, and minimize erosion. Should noxious weeds be allowed to grow in fenced and/or contained areas under control of the contractor, the contractor shall be liable for penalties and restoration actions imposed by the EPA, State of ND, County Weed Board, or Grand Forks AFB through CO determination. Prairie land disturbed/destroyed must be reclaimed to original condition to include the replanting of native grasses and forbs.

14. CONTRACTOR QUALITY CONTROL (CQC): The contractor shall establish and maintain an effective Quality Control Program as follows:

14.1. General: The contractor is responsible for quality control and shall establish and maintain an effective quality control system in compliance with the Contract Clause entitled “Inspection of Construction.” The quality control system shall consist of plans, procedures, and organization necessary to manage all delivery orders to produce end products, which comply with the contract requirements. The system shall cover all construction operations, both on site and off site, and shall be keyed to the proposed construction sequence. The government will hold the project manager responsible for the quality of work on the job and is subject to removal by the contracting officer (CO) for non-compliance with quality requirements specified in the contract.

14.2. Payment. Separate payment will not be made for providing and maintaining an effective Quality Control program, and all costs associated therewith shall be included in contractor’s price.

14.3. Preconstruction Planning: Prior to starting onsite construction, the contractor shall submit for approval the written QC plan.

14.4. Submittal of CQC Plan: Acceptance of the contractor’s quality control plan is required prior to the start of construction. Acceptance is conditional and will be predicated on satisfactory performance during the construction. The Government reserves the right to require the contractor to make changes in his CQC plan and operations as necessary to obtain the quality specified.

14.5. Contractor’s Proposed (QC) Plan: The contractor’s proposed written quality control plan shall include as a minimum:

14.5.1. Weekly Construction Meetings

14.5.1.1. Weekly Minutes

14.5.1.2. Designated Meeting Location

14.5.2. The quality control organization including a chart showing lines of authority.
14.5.3. Names, number, and qualification of personnel to be used for this purpose

14.5.4. Authority and responsibilities of all quality control personnel

14.5.5. Schedule use of inspection personnel by types and phase of work

14.5.6. A list of tests specified to be performed with proposed test methods including specification paragraph number and names of technicians or qualified testing laboratory to be used

14.5.7. Location and availability of test facilities and equipment

14.5.8. Procedures for advance notice and coordination of special inspections and tests where required

14.5.9 Procedures for reviewing all shop drawings, samples, certificates, or other submittals for contract compliance and certifying these for submission to the Government

14.5.10. Method of performing, documenting, and enforcing quality control operations of both prime and subcontract work including inspection and testing both onsite and offsite. Include the proposed forms for approval, and indicate who will prepare, sign, and submit the reports.

14.5.11. Responsibilities and procedures for correcting deficiencies and corrective actions

14.5.12. A copy of a letter of direction to the contractor’s representative responsible for quality control, outlining his duties and responsibilities, and signed by a responsible officer of the firm

14.5.13. Method of documenting and tracking deficiencies and corrective actions

15. FOLLOW UP INSPECTIONS: Inspections shall be performed continuously as any particular feature of work progresses, to assure compliance with contract requirements including control testing, until completion of that feature of the work.

15.1. Safety Inspections: The contractor shall perform daily safety inspections of the jobsite and the work in progress to assure compliance with EM 385-1-1 and other occupational health and safety requirements of the contract. Daily Quality Control reports as required under paragraph: REPORTING shall be used to document the inspection and shall include a notation of the safety deficiencies observed and the corrective actions taken. The contractor shall use his designated Quality Control Staff to perform the required inspections and shall supplement the staff with additional personnel as required.

15.2. Quality Control Staff: The contractor’s job supervisory staff may be used for quality control supplemented as necessary by additional personnel for the controls required by the specifications. The contractor’s staff member designated as the QC Supervisory Engineer for the contract must be a qualified engineer or technician and be able to demonstrate ability to perform correctly the duties required to the satisfaction of the Contracting Officer and must be available whenever contract work is in progress.

15.3. Testing Procedure: The contractor shall perform tests specified or required to verify that control measures are adequate to provide a product which conforms to contract requirements. The contractor shall procure the services of an industry recognized testing laboratory approved by the Contracting Officer, or may establish an approved testing laboratory at the project site. The contractor shall perform the following activities and record and provide the following data:

15.3.1. Verify that testing procedures comply with contract requirements.
15.3.2. Check test instrument calibration data against certified standards.

15.3.3. Verify that recording forms, including all of the test documentation requirements, have been prepared.

15.4. Reporting: All inspections and test results shall be recorded daily.

15.4.1. Daily Submittals: The attached sample “Quality Control Daily Report” form or other approved form shall be reproduced and fully executed to show all inspections and tests and submitted in duplicate to the Contracting Officer’s representative on the first work day following the date covered by the report.

15.4.2. Acceptance of the contractor’s daily Control Report does not indicate or imply agreement with the contents.

16. OPERATING MANUALS: See the Material Submittal Schedule for operating manuals required. All operating manuals and test report contained therein shall be submitted on CD in portable document format (PDF). The contractor shall provide system operating manual(s) to include the following elements:

16.1. Introduction: Includes a general process or system description for each HVAC, refrigeration, plumbing, fire protection, electrical, or other system(s).

16.2. Flow Diagram: Indicates in a single line flow diagram all major components affecting the system performance in operation.

16.3. System Operation: Provides a sequence of operation describing the individual function of each system component, its set point, and resulting action during different conditions or operating cycles. The sequences of operation shall explain manual and automatic start and stop procedures.

16.4. Identified Areas Serviced: Identifies the type of system which is serving a respective area, and enables the operating staff to troubleshoot the system and respond to a complaint in as short a time as possible.

16.5. Troubleshooting Procedures: Shall outline normal troubleshooting procedures as well as troubleshooting efforts that should be followed in response to an alarm.

16.6. Emergency Procedures: Shall outline what action shall be taken on a system under emergency condition in order to assure life safety and prevent physical damage to system components.

17. BASE ENTRY PROCEDURES AND AIRFIELD SECURITY REQUIREMENTS:

17.1. Base Entry Procedures. Security requirements for Air Force facilities under control of Grand Forks Air Force Base are specific and rigidly enforced. Levels of security include Restricted and Controlled areas. Differing degrees of security are enforced at each area. Minimum security requirements, common not only to each of these secure areas, are also required for entry onto Grand Forks AFB. Questions of clarification on locations or procedures for controlled/restricted areas contact Security Forces at 701 747-5351. These minimum requirements are outlined below.

17.1.1. Restricted areas are identified in GFAFBI 31-101and include the Command Post (CP) and Mass Parking Area (MPA). Each area is fenced or conspicuously identified by posted signs.
17.1.2. Controlled areas include more than forty four user-controlled base facilities; only a few of which include all hangars, buildings, and communications facilities located within the base aircraft flight-line controlled area. Each of these areas is identified in GFAFB 31-101 and each is conspicuously identified by posted signs.

17.2. Special Provisions For Working On or Near the Airfield. By basic definition, all areas within the airfield fence are considered on the airfield. This is a restricted area, and entry can be gained by escort only or obtaining a flight line badge. Projects requiring airfield access will have special provisions in the individual RFPs, in addition to what is contained in this section.

17.2.1. Coordination of work. The contractor shall coordinate airfield work (design and construction) through the base operations, Security Forces, CM and the contracting officer (CO). The contractor shall contact Base Operations for daily construction restrictions involving the flight line, taxiway, and runway areas, and shall comply with DOD FAR SUP 252.236-7005, Airfield Safety Precautions, AFI 13-213, Airfield Management and Base Operations, Grand Forks AFBI 24-101.

17.2.2. Closures. All runway or taxiway closures will require the coordination of Base Operations through the CO not less than fourteen (14) calendar days prior to the requested closure, unless otherwise provided for in these specifications. The contractor will make the maximum utilization of time during the requested closure period, and schedule his/her operations in phases if necessary so as to minimize the effect of construction closures on normal base operations. Upon completing the work requiring the closure, the contractor shall immediately notify the CO so normal operations may resume.

17.2.3. Personnel Safety Precautions. Jet aircraft operating on the runways, taxiways, and aprons make the area of construction a zone of high level noise. The contractor shall take the necessary precautions, such as the use of ear plugs or muffs to prevent injury to the auditory systems of all personnel working in the area.

17.2.4. Vehicles. The government does not allow personal use vehicles inside the flight line fence. The contractor’s employees and subcontractors shall park their personal vehicles in authorized parking lots outside the flight line fence. Personnel requiring entry to the flight line shall be escorted or possess a line badge. Contractor vehicles required in the performance of the work shall have a company sign (minimum size 6 inches by 18 inches) on both front doors. No contractor vehicles, equipment, or personnel shall be on or crossing any active runway or taxiway, except during construction period closures as outlined herein, or when the escort requests and gains clearance from the control tower. Prior to entering the airfield, vehicle operators shall perform a Foreign Object Debris (FOD) check by 1) placing the vehicle in park or neutral and setting the parking brake; 2) exiting the vehicle; 3) inspecting the vehicle tires and undercarriage for objects which may become dislodged (e.g., rocks stuck in tire tread); 4) removing said objects; and 5) reentering the vehicle and proceeding. This inspection must be performed each time the vehicle enters the airfield regardless of prior FOD Checks.

17.2.5. Cleanliness of Work Area. The contractor shall maintain the cleanliness of taxiway, runway, and apron pavements at all times in order to prevent foreign object damage (FOD). The contractor shall remove all materials and equipment to a safe distance from the runway as required by base operations.

17.2.6. Emergencies. There may be periods when the government, due to declared aircraft emergencies, will require the contractor to vacate the work site and move his/her personnel and equipment a distance of several hundred feet away from the work site. Such removals, when ordered, will come on short notice and require expeditious action.
17.2.7. Airfield Security Restrictions. The government will not grant access to restricted areas for the contractor and/or subcontractors without a proper escort. Five (5) work days prior to commencing work, the contractor shall submit, in writing, a list of all personnel who will perform work in the restricted area.

17.2.8. Restricted Areas. The government will not grant access to restricted areas for the contractor and/or subcontractors without a proper escort. Five (5) work days prior to commencing work, the contractor shall submit, in writing, a list of all personnel who will perform work in the restricted area.

17.2.9. Security forces will be included in all contract related issues.

17.2.10. Excavation. The contractor shall NOT open a trench unless material is on hand and ready for placing in the trench. As soon as practicable after placing material and obtaining approval for the work, the contractor shall backfill and compact trenches as required by the contract.

17.3. Work in Controlled areas.

17.3.1. Controlled Areas: Contractor’s personnel must be escorted when in the controlled area. Work in this area will require the creation of a free zone so the contractor’s personnel can work in the area without security escorts. The contractor shall work with the Security Forces to establish this area. Contractor personnel may need to be escorted from the perimeter of the controlled area to the free zone and back out.

17.3.1.1. Contractor shall provide plastic channelizer drums with base, spaced no more than 75 feet apart and connected with 5/8 inch nylon rope to delineate the free zone. Warning lights are required where drums are near aircraft traffic.

17.4. Minimum Security Requirements (All Areas Including Base Entry).

17.4.1. Visitor Passes: The Commercial Visitor Control Center will issue a SFMIS AF Form 75 (Visitor Pass) to the contractor and his/her employees upon completion of screening process for the duration of the contact. The screening process takes time, and the contractor shall visit the Commercial Visitor Control Center prior to expecting base entry to receive required forms and instruction on the application process, to include estimated time of receiving the visitor pass.

17.4.2. Although contractors will not be issued vehicles passes vehicles are subject to search while on the installation. Employee privately owned vehicles will not be allowed access to restricted/controlled areas without a free zone being established. Company vehicles will be allowed access to restricted/controlled areas.

17.4.3. All Contractor vehicles shall have markings with the company name for quick identification of ownership and notification if they are involved in an incident.

17.4.4. Conduct Requirements. The contractor shall ensure that his/her employees comply with all base traffic regulations and properly conduct themselves while on the base.

17.5. Antiterrorism Requirements

17.5.1 Eagle Eyes. Contractor will post OSI Eagle Eyes posters in the work area. Posters will be made available by the Installation AT Officer.

17.5.2 Training. Shift supervisors and/or Forman will be required to attend Antiterrorism Level 1 training. Training will be provided by the Installation AT Officer or the Contracting Office.
18. **SITE VISITS:** A contractor site visit will be arranged. It shall be scheduled by 319 CONF/LGC between 12 to 15 working days prior to the established bid opening date.
19. CONSTRUCTION QUALITY CONTROL DAILY REPORT FORM:

CONSTRUCTION QUALITY CONTROL DAILY REPORT

COMPANY/QC Representative:

REPORT NO:            CONTRACT NO:                   DATE:
LOCATION OF WORK:
DESCRIPTION:
WEATHER:       RAINFALL:           TEMP MIN:       TEMP MAX:

1. Work Performed Today by Prime Contractor:

2. Work Performed Today by Subcontractors:

3. Type and Results of Inspection (Follow-up and Include Satisfactory Work Completed or Deficiencies with Action to be Taken.):

4. List Type and Location of Tests Performed and Results of These Tests:
5. Verbal Instructions Received from Government Personnel on Construction Deficiencies or Re-testing Required:

6. Safety Violations Observed and Actions Taken:

7. Remarks:

8. CERTIFICATION: I certify that the above report is complete and correct and that I, or my authorized representative, have inspected all work performed this day by the prime contractor and each subcontractor and have determined that all materials, equipment, and workmanship are in strict compliance with the plans and specifications, except as may be noted above.
Designated Quality Control Representative Signature/Date
### Bio-based Products Report Form

**Date:**

<table>
<thead>
<tr>
<th>GPC Holder</th>
<th>Contact Person</th>
<th>Phone</th>
<th>Email Address</th>
</tr>
</thead>
</table>

**Call Number**

<table>
<thead>
<tr>
<th>Reporting Period</th>
<th>Purchase Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monthly</td>
<td>Quarterly</td>
</tr>
</tbody>
</table>

**Bio-based Materials**

<table>
<thead>
<tr>
<th>Material Description</th>
<th>Total Amount Meets Minimum Bio-based Content Requirements</th>
<th>Purchase Amount ($)</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete and asphalt release fluids – 87%</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Wood &amp; Concrete Sealers – 79%</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Membrane Concrete Sealers – 11%</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Hydraulic Fluid – Mobile Equipment – 24%</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Hydraulic Fluid-Stationary Equipment – 4%</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Metal Working Fluids</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Penetrating Lubricants – 71%</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>2 cycle engine oils – 34%</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>General Purpose De-icers – 93%</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Urethane Roof Coatings – 62%</td>
<td>Yes</td>
<td>No</td>
<td></td>
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<tr>
<td>Water Tank Coatings – 62%</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Adhesive and mastic removers – 58%</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Plastic Insulating Foam – 7%</td>
<td>Yes</td>
<td>No</td>
<td></td>
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<tr>
<td>Plastic Lumber Composite Panel – 23%</td>
<td>Yes</td>
<td>No</td>
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<tr>
<td>Acoustical Composite Panel I – 37%</td>
<td>Yes</td>
<td>No</td>
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<tr>
<td>Interior Panel – 55%</td>
<td>Yes</td>
<td>No</td>
<td></td>
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<tr>
<td>Structural Interior Panels – 89%</td>
<td>Yes</td>
<td>No</td>
<td></td>
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<tr>
<td>Structural Wall – 94%</td>
<td>Yes</td>
<td>No</td>
<td></td>
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<tr>
<td>Filled Transformer/Ester / Vegetable Oil- 66 &amp; 95%</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Firearm Lubricants – 49%</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Disposable Containers – 72%</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Disposable Cutlery – 48%</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Glass Cleaners – 49%</td>
<td>Yes</td>
<td>No</td>
<td></td>
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<tr>
<td>Greases-Food Grade – 42%</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Greases-Multipurpose – 72%</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Greases -Rail Track – 30%</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Greases -Truck – 71%</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Greases - Not specified elsewhere – 75%</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Dust Suppressants – 85%</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Carpets – 7%</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Carpet and Upholstery cleaners – 54%</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>General Purpose Spot Cleaners – 7%</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Bathroom and Spa Cleaners – 74%</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Laundry Products Pretreatment/ Spot Remover – 46%</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>General Purpose Laundry Products – 34%</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Floor Stripper – 78%</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Removers, Grease and Graffiti – 34%</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Fertilizers – 71%</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Sorbents – 89%</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Films, Semi and Non-durable – 45% &amp; 85% (Trashbags)</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Lip care products – 82%</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>

Definitions and information for products and their qualifying bio-based content are listed at: [http://www.biobased.cce.uga.edu/public/index.cfm](http://www.biobased.cce.uga.edu/public/index.cfm)
# Affirmative Procurement Report Form

<table>
<thead>
<tr>
<th>Recycled Materials</th>
<th>Total Amount Meets Minimum Recycled Content Requirements</th>
<th>Purchase Amount $</th>
<th>Quantity/Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Concrete and Cement</strong> – must contain fly ash*</td>
<td>Yes ☐ No ☐</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Flowable Fill</strong> – must contain fly ash</td>
<td>Yes ☐ No ☐</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Building Insulation</strong></td>
<td></td>
<td></td>
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<tr>
<td>Fiberglass-Glass Cullet -20%</td>
<td>Yes ☐ No ☐</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rock Wool- Slag-75%</td>
<td>Yes ☐ No ☐</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cellulose (loose fill/spray-on)-Paper 75%</td>
<td>Yes ☐ No ☐</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Glass Fiber Reinforced Foam- Plastic Resin -6%</td>
<td>Yes ☐ No ☐</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phenolic Rigid Foam- Plastic Resin -5%</td>
<td>Yes ☐ No ☐</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rigid Foam- Plastic Resin 9%</td>
<td>Yes ☐ No ☐</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Latex Paint</strong></td>
<td>Yes ☐ No ☐</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Non Pressure Pipe</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Steel -25% to 100%</td>
<td>Yes ☐ No ☐</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HDPE-Plastic- 100%</td>
<td>Yes ☐ No ☐</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PVC-Plastic-25%</td>
<td>Yes ☐ No ☐</td>
<td></td>
<td></td>
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<tr>
<td>Concrete-Must contain fly ash</td>
<td>Yes ☐ No ☐</td>
<td></td>
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</tr>
<tr>
<td><strong>Floor Tiles- Plastic or Rubber- 90%</strong></td>
<td></td>
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<tr>
<td><strong>Shower Restroom Dividers</strong></td>
<td>Yes ☐ No ☐</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plastic -20%</td>
<td>Yes ☐ No ☐</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Steel-25-100%</td>
<td>Yes ☐ No ☐</td>
<td></td>
<td></td>
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<tr>
<td><strong>Mats/Walkways Pads</strong></td>
<td>Yes ☐ No ☐</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rubber-85%</td>
<td>Yes ☐ No ☐</td>
<td></td>
<td></td>
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<tr>
<td>Plastic-100%</td>
<td>Yes ☐ No ☐</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rubber/Plastic-100%</td>
<td>Yes ☐ No ☐</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Carpet Cushion/Backign-Synthetic-100%</strong></td>
<td>Yes ☐ No ☐</td>
<td></td>
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</tr>
<tr>
<td><strong>Roofing Materials</strong></td>
<td>Yes ☐ No ☐</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Steel -25%-100%</td>
<td>Yes ☐ No ☐</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aluminum-20%</td>
<td>Yes ☐ No ☐</td>
<td></td>
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<tr>
<td>Felt or Fiber Compostite-50%</td>
<td>Yes ☐ No ☐</td>
<td></td>
<td></td>
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<tr>
<td>Rubber-100%</td>
<td>Yes ☐ No ☐</td>
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<td></td>
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<tr>
<td>Plastic or Rubber Composite-100%</td>
<td>Yes ☐ No ☐</td>
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<tr>
<td><strong>Industrials Drums</strong></td>
<td>Yes ☐ No ☐</td>
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<tr>
<td>Steel -25-100%</td>
<td>Yes ☐ No ☐</td>
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<tr>
<td>Plastic- 30%</td>
<td>Yes ☐ No ☐</td>
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<tr>
<td>Fiber-Paper-100%</td>
<td>Yes ☐ No ☐</td>
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<tr>
<td>Material Type</td>
<td>Yes</td>
<td>No</td>
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</tr>
<tr>
<td><strong>Mulch</strong></td>
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<tr>
<td>Paper-based-Paper-100%</td>
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<tr>
<td>Wood-Wood/Paper-100%</td>
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</tr>
<tr>
<td>Compost Yard Trimmings and Food Waste-any%</td>
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</tr>
<tr>
<td><strong>Modular Threshold Ramps</strong></td>
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<tr>
<td>Steel-25% to 100%</td>
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</tr>
<tr>
<td>Aluminum-10%</td>
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<tr>
<td>Rubber-100%</td>
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<tr>
<td><strong>Bike Racks</strong></td>
<td></td>
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<tr>
<td>Steel-25% to 100%</td>
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<td></td>
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<tr>
<td>HDPE-Plastic-100%</td>
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<tr>
<td><strong>Signage</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Plastic-80%</td>
<td></td>
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<tr>
<td>Aluminum-25%</td>
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<tr>
<td>Sign Posts - Plastic 80%</td>
<td></td>
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<tr>
<td>Sign Posts - Steel-25% to 100%</td>
<td></td>
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<tr>
<td><strong>Strapping</strong></td>
<td></td>
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<tr>
<td>Polyester-Plastic-50%</td>
<td></td>
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<tr>
<td>Polypropylene-Plastic-10%</td>
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<tr>
<td>Steel-25 to 100%</td>
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<tr>
<td><strong>Office Furniture</strong></td>
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<tr>
<td>Steel Structure - 25%</td>
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<tr>
<td>Aluminum Structure - 75%</td>
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<tr>
<td>Particleboard/Fiberboard-Wood-80%</td>
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<tr>
<td>Particleboard/Fiberboard-Agricultural Fiber-100%</td>
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<tr>
<td><strong>Park Benches/Picnic Tables</strong></td>
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<tr>
<td>Plastic -100%</td>
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<tr>
<td>Plastic Composite-100%</td>
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<tr>
<td>Aluminum-25%</td>
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<tr>
<td>Steel-25-100%</td>
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<tr>
<td>Concrete-Must contain fly ash</td>
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<tr>
<td><strong>Plastic Fences-Plastic-90%</strong></td>
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<tr>
<td><strong>Structural Fiberboard-Paper-100%</strong></td>
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<tr>
<td><strong>Laminated Fiberboard-Paper-100%</strong></td>
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<tr>
<td><strong>Traffic Control Devices</strong></td>
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<tr>
<td>Channelizers - Plastic-25%</td>
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<tr>
<td>Channelizers-Rubber-100%</td>
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<tr>
<td>Delineators- (Base Only)-Steel-25 to 50%</td>
<td></td>
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<tr>
<td>Delineators- (Base Only)-Rubber-100%</td>
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<tr>
<td>Traffic Cones- Plastic-50%</td>
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<tr>
<td>Crumb Traffic Cones- Rubber-50%</td>
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<tr>
<td>Barricades- Fiberglass-100%</td>
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<tr>
<td>Barricades- Plastic-100%</td>
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<tr>
<td>Barricades- Steel-25-100%</td>
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<tr>
<td>Parking Stops- Plastic/Rubber-100%</td>
<td></td>
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<tr>
<td>Parking Stops- Concrete must contain fly ash</td>
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</tbody>
</table>
Instructions for completing Bio-based/Affirmative Procurement Forms

1. Determine if you purchased any of the materials in column 1 this reporting period. You must report any purchases of this material, whether or not the material contains recycled content.
2. Determine if the material contains the minimum recycled content. Follow the link to the EPA website with more information about that material.
3. Point at desired box with cursor and click to fill in box.
4. Enter the total purchase amount for the material. Enter the cumulative total for this material for this project.
6. If you buy two or more lots of the same material and one contains recycled content and one does not, please go to the Alternate Reporting Section at the bottom of the page.

This report must be filled out prior to submitting invoices for payment. If it is not included with invoice, payment may be delayed.

Definitions

Call Number  The request number

Minimum Recycled Content: The minimum amount of a recycled material that must be included in the item purchased. This can be determined from manufacturer’s information on spec sheets or web sites.

Steel: The Environmental Protection Agency assumes that all steel contains a minimum amount of 25% total recovered material due to market conditions. As this is accomplished at the smelter, product manufacturers may be unaware. Only be concerned if the manufacturer makes a point of stating that their product contains 100% virgin materials.

Cumulative Total to Date: The cumulative total should reflect the total purchases for the project, whether or not they have recycled content.

Alternate Reporting Section

If some but not all of a material meets recycled content requirements, list the amount that met the requirements on the front pages and list non-recycled content items here. For example, if you bought $20,000 of insulation, but only $10,000 contained the minimum recycled content, you would enter $10,000 on Page One and $10,000 here. This ONLY applies if some of the purchased material contains recycled content and some does not. (GPC Cardholders disregard see page 5)

<table>
<thead>
<tr>
<th>Material Not Meeting Requirements</th>
<th>Purchase Amount ($) this Period (Cost to Sandia)</th>
<th>Reason Material was Not Purchased with Recycled Content.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td>See Page 5</td>
</tr>
<tr>
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<td>See Page 5</td>
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<td>See Page 5</td>
</tr>
<tr>
<td></td>
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<td>See Page 5</td>
</tr>
</tbody>
</table>

Other Material: If you purchase recycled content material that is not included in the table, well done! Please report it here.

<table>
<thead>
<tr>
<th>Material</th>
<th>Recycled Content</th>
<th>Total Dollar Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Questions concerning the completion of this form can be directed to CEAN at 701-747-4655.
1. I have determined that the above item was considered under the Green Procurement Program but will not be purchased for the following reasons:

2. *Item is not available within a reasonable period of time.

   Date Needed: ___________  Date Item would be available: ___________

3. *Item fails to meet a performance standard in the specifications.

   Specifically,

4. *Item Cost More than the Green Procurement Item

   Price of Green Procurement Item ________________

   Price of non Green Procurement Item ________________

5. *Not available from three sources (if applicable)

   List sources of supply where you checked.

   ________________________________________________
   ________________________________________________

Cardholder or Contactor Name  Signature  Date

If item is over $2,500 and not “purchased green” need signature: (military only)

   Commanders Name ________________

   Commanders Signature ________________
ATTACHMENT TWO

RECYCLING OPPORTUNITIES FOR INDUSTRIAL FACILITIES

1. Materials must be delivered to the drop-off center behind bldg. 408, north of DRMO. Material will not be placed alongside the roll-offs.

2. Paper: Newspaper, magazines, junk mail, bond paper, thermal paper, computer paper, phone books, wrapping paper, bills, construction paper, greeting cards, text books with covers removed, routing slips, phone message slips, blueprints etc.
   Unacceptable: Carbon paper, wrappers with food stains, wax paper, drinking glasses, paper towels and tissues, food waste rubber bands, any other non paper item.

3. Metal Cans: Tin food cans, screw on lids, paint cans, aerosol cans (e.g. hair spray cans, shaving cream cans etc.) empty cans only. Paint cans must be empty- only a thin skin of dry paint is allowed on the sides and bottom. All metal lids are recyclable, however they must be removed from the can. Aerosol cans must be empty. Remove all plastic snap-off lids. Aluminum cans, foil, and pie plates should be rinsed clean. Unacceptable: Scrap metal currently accepted by DRMO (all metals other than what is listed above). This metal will be dropped off at DRMO.

4. Plastic: Types 1-7 plastic narrow neck bottles only, rinsed without caps or mylar.
   Unacceptable: Plastic tubs (i.e. ice cream or margarine), toys, hard plastic, pails, bags, hose, oil containers, pipes, styrofoam, etc.

5. Glass: Brown, green, clear, blue bottles and jars. Rinse thoroughly and remove caps or lids. Metal caps and lids can be recycled with metal cans.
   Unacceptable: Light bulbs, mirrors, dishes, drinking glasses, and window glass.

6. Cardboard: Any type of cardboard box. Examples are corrugated boxes, cereal, pizza, facial tissue boxes, toilet/paper towel rolls, paper bags, shooting range paper. FLATTEN AND CRUSH ALL BOXES. Empty and discard all contents from boxes (i.e. food, packaging material, and styrofoam). Remove all metal and plastic parts (metal spouts, razor edges, plastic handles).
   Unacceptable: Wax coated milk cartons and cardboard with styrofoam or soft foam glued onto it.

7. Laser jet printer cartridges: Cartridges can be taken to hazardous waste contractor bldg 408, Monday-Friday 0730-1600.

8. Oil/air/fuel filters: All shops should accumulate filters in contractor provided 55 gallon drums for recycling. Barrels can be obtained by contacting 319 CES/CEA.

9. Fluorescent light tubes: All fluorescent light tubes are collected by the waste contractor for recycling.

10. Nicad/Mercury batteries: Deliver nicad and mercury batteries to the waste contractor (408) for recycling.

11. Compost Program: Wood pallets, used lumber from Self Help products, grass clippings, bushes, tree branches, etc. Materials must be delivered to the compost dumpster behind bldg 408.

12. Light Ballasts (PCB): Contact 319 CES/CEAN at 7-6153.
COMPREHENSIVE PROCUREMENT GUIDELINES

As part of its continuing program to promote the use of recovered materials, the Environmental Protection Agency (EPA) issued the “Comprehensive Guideline for Procurement of Products containing Recovered Materials” (CPG) and its companion piece, the “Recovered Materials Advisory Notice” (RMAN). The CPG designates 55 recycled-content products in eight product categories for which the federal procuring agencies need to develop affirmative procurement programs. The RMAN provides recommendations for purchasing the products designated in the CPG. Through the use of these guidelines, the federal government hopes to expand its use of products with recovered materials and to help develop markets for them in other sectors of the economy. The currently designated products and categories are as follows:

1. Paper and Paper Products
   Commercial/Industrial Sanitary Tissue Products
   Paperboard and Packaging Products
   Printing and Writing Papers
   Newsprint

2. Vehicular Products
   Engine Coolants
   Re-refined Lubrication Oils
   Retread Tires

3. Construction Products
   Building Insulation
   Carpet
   Carpet Cushion
   Cement and Concrete containing Coal Fly Ash
   Cement and Concrete containing Granulated Blast Furnace Slag
   Latex Paint
   Floor Tiles
   Flowable Fill
   Laminated Paperboard
   Patio Blocks
   Railroad Grade Crossing Surfaces
   Shower and Restroom Dividers/Partitions
   Structural Fiberboard

4. Transportation Products
   Channelizers
   Delineators
   Flexible Delineators
   Parking Stops
   Traffic Barricades
   Traffic Cones

5. Park and Recreation Products
   Park and Recreation Furniture
   Plastic Fencing
   Playground Equipment
   Playground Surfaces
   Running Tracks
6. Landscaping Products
   Garden and Soaker Hoses
   Hydraulic Mulch
   Landscaping Timbers and Posts (plastic lumber)
   Lawn and Garden Edging
   Compost from Yard Trimmings

7. Non-paper Office Products
   Binders (paper, solid plastic, or plastic covered)
   Office Recycling Containers
   Office Waste Receptacles
   Plastic clip portfolios
   Plastic clipboards
   Plastic Desktop accessories
   Plastic Envelopes
   Plastic File Folders
   Plastic Presentation Folders
   Plastic Trash Bags
   Printer Ribbons
   Toner Cartridges

8. Miscellaneous Products
   Awards and Plaques
   Industrial Drums
   Mats
   Pallets
   Signage
   Sorbents
   Strapping and Stretch Wrap
1. SCOPE OF WORK:

All work shall be performed in accordance with the North Dakota Highway Department Standard Specifications for Road and Bridge Construction, October 2014 sections 201, 202, 203, 210, 216, 230, 302, 306, 401, 411, 420, 430 422, 550, 570, 612, 702, 704, 709, 714, 722, 724, 748, 750, 802, 808, 810 812, 816, 817, 818, 820, 826, 830, 836, 858, and 880, sections referenced therein, as modified below.

1.1. "Engineer" shall be interpreted to mean "Contracting Officer or his Technical Representative."
1.2. "State" or "Department" shall be interpreted to mean "Government."
1.3. The following subsections and their sub-paragraphs from the North Dakota Highway Department Standard Specifications for Road and Bridge Construction, October 2014 DO NOT APPLY and are deleted from this specification: All sub-sections titled “Method of Measurement”, and “Basis of Payment”, and 724.03C through 724.03E.

2. MATERIALS:

2.1. Aggregates:

2.1.1. Coarse aggregate for the concrete curbing shall conform to coarse aggregate gradation 3 (Section 816.02 North Dakota Highway Department Standard Specifications for Road and Bridge Construction, October 2014).
2.1.2. Coarse aggregate for manhole raising concrete shall conform to coarse aggregate gradation 5 (Section 816.02 North Dakota Highway Department Standard Specifications for Road and Bridge Construction, October 2014).
2.1.3. Aggregate for the bituminous pavement surface coarse shall conform to class 13 (Section 816.02 North Dakota Highway Department Standard Specifications for Road and Bridge Construction, October 2014).
2.1.4. Aggregate for sub base course shall conform to class 4 (Section 816.02 North Dakota Highway Department Standard Specifications for Road and Bridge Construction, October 2014).
2.1.5. Aggregate for base course shall conform to class 5 (Section 816.02 North Dakota Highway Department Standard Specifications for Road and Bridge Construction, October 2014).
2.1.6. Aggregate for sand sealing shall conform to class 45 (Section 816.03 North Dakota Highway Department Standard Specifications for Road and Bridge Construction, October 2014).

2.2. Bituminous:
Bituminous pavement surface course shall be asphalt cement penetration grade 120-150. A Job Mix Formula (JMF) shall be developed by an independent testing laboratory at the expense of the contractor. The JMF shall meet the following requirements:

The job mix formula shall be submitted and approved prior to the placement of any bituminous materials and shall include as a minimum:

2.2.1. Percent passing each sieve size.
2.2.2. Percent of asphalt cement.
2.2.3. Percent of each aggregate and mineral filler to be used.
2.2.4. Asphalt penetration grade.
2.2.5. Number of blows of hammer per side of molded specimen.
2.2.6. Laboratory mixing temperature.
2.2.7. Lab compaction temperature.
2.2.8. Temperature-viscosity relationship of the asphalt cement.
2.2.9. Plot of the combined gradation on the 0.45 power gradation chart, stating the nominal maximum size.
2.2.10. Graphical plots of stability, flow, air voids, voids in the mineral aggregate, and unit weight versus asphalt content as shown in Asphalt Institute Mix Design Methods, AI MS-2.
2.2.11. Specific gravity and absorption of each aggregate.
2.2.12. Percent natural sand.
2.2.13. Percent particles with 2 or more fractured faces (in coarse aggregate – aggregate retained on the No. 4 sieve).
2.2.14. Fine aggregate angularity.
2.2.15. Percent flat or elongated particles (in coarse aggregate).
2.2.16. Tensile Strength Ratio(TSR).
2.2.17. Antistrip agent (if required) and amount.
2.2.18. List of all modifiers and amount.

**Marshall Design Criteria**

<table>
<thead>
<tr>
<th>Test Property</th>
<th>50 Blow Mix</th>
</tr>
</thead>
</table>

**02551-2**
<table>
<thead>
<tr>
<th>Stability, pounds minimum</th>
<th>*1000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow, 0.01 inch</td>
<td>8-18</td>
</tr>
<tr>
<td>Air voids, percent</td>
<td>3-5</td>
</tr>
</tbody>
</table>

Hot-mix asphalt shall not be placed upon a wet surface or when the surface temperature of the underlying course is less than 45°F.

2.3. Concrete:

All concrete will be class AE with minimum 3500 psi compressive strength, and a minimum flexural strength of 650 psi at 28 days. A slump test and air test shall be performed on each truck, or as specified in the delivery order if it varies from each truck. The maximum nominal size for aggregate used in concrete mixtures is not to exceed 19mm. Also Target Air Content shall be 6%, using an air entraining admixture at the batch plant. The Water/Cement ratio shall not exceed a maximum value of 0.45.

2.3.1 Submittal. A concrete mix design, showing all aggregate proportions, add mixtures and design characteristics will be submitted to the contracting officer prior to beginning any concrete work.

2.4 Welded Wire Fabric:

All welded wire fabric for use in concrete shall conform to ASTM A 185 or ASTM A 497. Wire mesh shall be 6 X 6 – W2.9 X W2.9, except as otherwise specified or indicated. Mesh shall be supplied in flat sheets, use of rolled mesh is specifically prohibited. Welded wire mesh shall be clean, free of rust, oil or other surface contaminants.

2.5 Geotextile:

Geotextile for use in pavement construction soil reinforcement applications shall be a woven polypropylene fabric. Geotextiles proposed for use shall be certified by the manufacturer as suitable for the intended application. Geotextiles shall be suitable for use in reinforcement and stabilization/separation applications for pavement construction on weak subgrades. An AOS of .425mm (U.S. sieve 40) or smaller as determined by ASTM D 4491-87. A Permittivity of at least 81 l/min/square meter (2 gpm per square foot) as determined by ASTM D 4491-92. Puncture resistance of 0.53kN (120 pounds as determined by ASTM D 4833-88. A Mullen Burst of at least 4.134 kPa (600 psi) as determined by ASTM D 3786-87. A Trapezoidal Tear Strength of at least 0.53 kN (120 pounds) as determined by ASTM D 4533-91. A Grab Tensile Elongation of 1.34 kN (300 pounds) / 15% as determined by ASTM D 4632-91. A Wide Width Tensile Elongation of 31kN/m (175 pounds/inch) / 15% as determined by ASTM D 4595-86. Geotextiles shall be handled, protected, and installed in accordance with the manufacturer’s recommendations and the North Dakota Highway Department Standard Specifications for Road and Bridge Construction, October 2014, section 709.

2.5.1 Submittal. Manufacturer’s letter of certification of suitability and list of engineering properties clearly demonstrating that the proposed fabric conforms to the material specification shall be submitted for approval. The manufacturer’s instructions and recommendation for handling, protection, and installation shall be submitted for information. All submittals shall be received at least 72 hours prior to delivery of the material to the project site. Materials shall not be included in the work until required approvals are obtained.
2.6 Joint Sealant:

Joint sealant shall be either two component or single component cold applied elastomeric materials conforming to Fed Spec SS-S-200 or ASTM D 5893. SS-S-200 sealant shall be used where fuel resistance is required. ASTM D 5893 sealant shall be used where fuel resistance is not required.

2.6.1 Submittal. Manufacturer’s letter of certification of suitability, and list of engineering properties clearly demonstrating that the proposed sealant conforms to the material specification shall be submitted for approval. The manufacturer’s instructions and recommendation for handling, protection, surface preparation and sealant application shall be submitted for information. All submittals shall be received at least 72 hours prior to delivery of the material to the project site. Materials shall not be included in the work until required approvals are obtained.

3. SAMPLING AND TESTING:

Sampling and testing shall be done by an approved testing laboratory at no additional cost to the Government. A minimum of one concrete compressive strength test and two flexural beam tests will be performed for each 50 cubic yards or fraction thereof poured each day. A minimum of one density test per 50 ton of asphalt material or fraction thereof will be performed each day. A minimum of one density test will be performed for every 150 cubic yards of aggregate fill or fraction thereof for every 12 inch lift. Additional sampling and testing will be done when deemed necessary by the contracting officer. Copies of test results shall be furnished to the Contracting Officer.

4. CORRELATION AND WORK CONDUCTANCE:

The Contractor shall conduct all work in an orderly manner with a minimum disturbance and inconvenience to traffic operation of the base. Contractor shall maintain one lane of traffic open to travel at all times. The Contractor shall confine and limit his personnel to only those areas required for performance of work. All work shall be performed in a neat, orderly fashion by each type of work performed. Extreme care shall be exercised to avoid damage to the walks, landscaping, buildings, vehicles, streets, etc., in and around the project areas.

5. PATCHING:

The patch work shall consist of two types of patches, the type and extent of which shall be designated in the field by the Contracting Officer's representative. The types of patches are described as follows:

5.1. Minor Patch:

Minor patch shall be an overlayment on the existing surface course. Prior to placing overlayment type patch, the area shall be cleaned of loose material with power brooms or power blowers supplemented with hand brooms. Care shall be taken to remove all dirt, clay, and other foreign matter. After the cleaning operation has been completed and prior to the tack coat application, the area to be patched will be inspected by the Contracting Officer or his Technical Representative.

5.2. Major Patch:

Major patch shall consist of removal of existing surface course, removal of unsuitable base course, recompaction of suitable base course, placing and compacting of new base course and placing and
compacting new surface course. Surface course material may be substituted for base course material. Maximum compacted lift thickness shall be limited to 3 inches or less.

5.2.1. Removal of surface course. In areas designated for removal of surface course, the boundary of the area shall be saw cut 2" deep and the pavement removed, and disposed of off base. No material removed shall be stockpiled at the site but shall be loaded directly into trucks or other equipment for disposal off base.

6. CRACK SEALING:

Cracks shall be sealed in accordance with UFC 3-250-08FA (16 January 2004).

7. SLURRY SEAL (TYPE 1):

Slurry seals (Type 1) shall be applied in accordance with UFC 3-270-01 Chapter 6(15 March 2001).

8. COMPACATION:

All compaction of subbase and base coarse material will be 95% of American Society for Testing and Materials (ASTM) D 698. Test results will be provided to the Contracting Officer.

9. CONCRETE PLACEMENT:

9.1. Remove/Replace Sidewalk:

Sidewalk work shall be done in a manner to remove only sidewalk which is in a non-serviceable condition. If this requires saw cutting, then saw cutting must be accomplished.

9.2. Remove/Replace Curb:

Curb work shall be done in a manner to remove only curb which is in a non-serviceable condition. If this requires saw cutting, then saw cutting must be accomplished.

9.2.1. Removal of curb shall be done in a fashion to protect the adjacent pavement. If this can't be done without saw cutting between pavement and curb then saw cutting must be done.

9.2.2. All new curbing shall be constructed to the exact dimensions as detailed in the project plans. Also all sewer inlets shall as of the same quality of a NINA, Model R-3065 Curb Inlet Frame with Type DR Grate or better. The contracting officer will notify the contractor of those curbing sections that will be removed and replaced in the same style/dimensions of their original form.

9.2.3. A complete survey establishing the elevations of the roadway, curb, storm sewer inlets, drainage flow lines, cross sectional area details illustrating systems/work within the context of the new project, and providing as-built drawings will be required if removal of curb exceeds 1000 continuous LF, or if there was no previously existing pavement at the site (new construction).

9.3. Concrete Slab Placement:

During this operation expansion material shall be placed between existing and new concrete placement.

9.4 Joint Sealing:
Concrete pavements shall be constructed with joints as indicated or directed. Joints in concrete pavements shall be 1/2 to 3/4 inches wide as indicated or directed. The installed sealant shall have a Width/Depth ratio of at least 1, except as otherwise specified or recommended by the sealant manufacturer. The joint sealant reservoir shall have vertical sides and a flat bottom. The sealant shall be recessed 1/4 inch below the pavement surface. The sealant reservoir shall have sufficient depth to allow installation of a non-reactive closed cell compressible foam backer rod. The backer rod shall be 25 percent larger in diameter than the width of the sealant reservoir. The backer rod material shall conform to the sealant manufacturer’s recommendations. The backer rod shall be installed and the depth of the remaining sealant reservoir measured continuously along the length of the joint. The depth measurement shall be accomplished to ensure that the sealant will have the required depth, and the required sealant recess will be 1/4 inch. Joint surfaces shall be cleaned and prepared in accordance with the sealant manufacturer’s recommendations. Joint sealant shall be prepared and applied in accordance with the sealant manufacturer’s recommendations.

10. RECYCLED MATERIALS:

10.1 In accordance with EPA’s guideline for Affirmative Procurement, use of recycled bituminous asphalt material is recommended. If recycled materials are used they should conform to the North Dakota Highway Department Standard Specifications for Road and Bridge Construction, October 2014 section 430.

10.2 In accordance with EPA’s guideline for Affirmative Procurement, use of recycled Portland Cement Concrete Pavement as base course material is recommended. If recycled materials are used they should conform to the North Dakota Highway Department Standard Specifications for Road and Bridge Construction, October 2014 section 817.


END OF SECTION
1. GENERAL:

1.1. REFERENCES

1.1.1. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)


AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM E 28(1999) Softening Point of Resins by Ring and Ball Apparatus

U.S. GENERAL SERVICES ADMINISTRATION (GSA)

FS TT-B-1325 (Rev C; Notice 1; Canc. Notice 2) Beads (Glass Spheres) Retro-Reflective (Metric)

FS TT-P-1952 (Rev D; Canc. Notice 1) Paint, Traffic and Airfield Marking, Waterborne (Metric)


1.2. SUBMITTALS:

1.2.1. Submit lists of proposed equipment, including descriptive data, and notifications of proposed contractor actions as specified in this section. List of removal equipment shall include descriptive data indicating area of coverage per pass, pressure adjustment range, tank and flow capacities, and safety precautions required for the equipment operation.

1.2.2. Submit manufacturer's current printed product description and Material Safety Data Sheets (MSDS) for each type paint/color proposed for use.

1.2.3. Submit document certifying that personnel are qualified for equipment operation and handling of chemicals.

1.3. DELIVERY AND STORAGE. ALL MATERIALS SHALL BE DELIVERED AND STORED IN SEALED CONTAINERS THAT PLA INLY SHOW THE DESIGNATED NAME, FORMULA OR SPECIFICATION NUMBER, BATCH NUMBER, COLOR, DATE OF MANUFACTURE, MANUFACTURER'S NAME, AND DIRECTIONS, ALL OF WHICH SHALL BE PLAINLY
1.4. EQUIPMENT AND TRAFFIC CONTROL. ALL MACHINES, TOOLS AND EQUIPMENT USED IN THE PERFORMANCE OF THE WORK SHALL BE APPROVED AND MAINTAINED IN SATISFACTORY OPERATING CONDITION. EQUIPMENT OPERATING ON ROADS AND RUNWAYS SHALL DISPLAY LOW SPEED TRAFFIC MARKINGS AND TRAFFIC WARNING LIGHTS.

1.4.1. Paint Application Equipment. The equipment to apply paint to pavements shall be a self-propelled or mobile-drawn pneumatic spraying machine with suitable arrangements of atomizing nozzles and controls to obtain the specified results. The machine shall have a speed during application not less than 5 mph, and shall be capable of applying the stripe widths indicated, at the paint coverage rate specified in paragraph APPLICATION, and of even uniform thickness with clear-cut edges. Equipment used for marking streets and highways shall be capable of placing the prescribed number of lines at a single pass as solid lines, intermittent lines or a combination of solid and intermittent lines using a maximum of two different colors of paint as specified. The paint applicator shall have paint reservoirs or tanks of sufficient capacity and suitable gauges to apply paint in accordance with requirements specified. Tanks shall be equipped with suitable air-driven mechanical agitators. The spray mechanism shall be equipped with quick-action valves conveniently located, and shall include necessary pressure regulators and gauges in full view and reach of the operator. Paint strainers shall be installed in paint supply lines to ensure freedom from residue and foreign matter that may cause malfunction of the spray guns. The paint applicator shall be readily adaptable for attachment of an air-actuated dispenser for the reflective media approved for use. Pneumatic spray guns shall be provided for hand application of paint in areas where the mobile paint applicator cannot be used.

1.4.2. Traffic Controls. Suitable warning signs shall be placed near the beginning of the worksite and well ahead of the worksite for alerting approaching traffic from both directions. Small markers shall be placed along newly painted lines or freshly placed raised markers to control traffic and prevent damage to newly painted surfaces or displacement of raised pavement markers. Painting equipment shall be marked with large warning signs indicating slow-moving painting equipment in operation.

1.5. HAND-OPERATED, PUSH-TYPE MACHINES

1.5.1. All machines, tools, and equipment used in performance of the work shall be approved and maintained in satisfactory operating condition. Hand-operated push-type machines of a type commonly used for application of paint to pavement surfaces will be acceptable for marking small streets and parking areas. Applicator machine shall be equipped with the necessary paint tanks and spraying nozzles, and shall be capable of applying paint uniformly at coverage specified. Sandblasting equipment shall be provided as required for cleaning surfaces to be painted. Hand-operated spray guns shall be provided for use in areas where push-type machines cannot be used.

1.6. MAINTENANCE OF TRAFFIC FOR ROADS, STREETS, AND PARKING AREAS

1.6.1. When traffic must be rerouted or controlled to accomplish the work, the necessary warning signs, flag persons, and related equipment for the safe passage of vehicles shall be provided.

1.7. WEATHER LIMITATIONS FOR REMOVAL

1.7.1. Pavement surface shall be free of snow, ice, or slush. Surface temperature shall be at least 40 degrees F and rising at the beginning of operations, except those
involving shot or sand blasting. Operation shall cease during thunderstorms. Operation shall cease during rainfall, except for water blasting and removal of previously applied chemicals. Water blasting shall cease where surface water accumulation alters the effectiveness of material removal.

2. PRODUCTS:

2.1. PAINT

2.1.1. The paint shall be homogeneous, easily stirred to smooth consistency, and shall show no hard settlement or other objectionable characteristics during a storage period of 6 months. Paints for airfields, roads, streets, and parking lots shall conform to FS TT-P-1952, color as indicated. Pavement marking paints shall comply with applicable state and local laws enacted to ensure compliance with Federal Clean Air Standards. Paint materials shall conform to the restrictions of the local Air Pollution Control District.

2.2. THERMOPLASTIC COMPOUNDS Not used.

2.3. PREFORMED TAPE Not used.

2.4. RAISED REFLECTIVE MARKERS Not used.

2.5. REFLECTIVE MEDIA Not used.

2.6. SAMPLING AND TESTING

2.6.1. Materials proposed for use shall be stored on the project site in sealed and labeled containers, or segregated at source of supply, sufficiently in advance of needs to allow 60 days for testing. Upon notification by the Contractor that the material is at the site or source of supply, a sample shall be taken by random selection from sealed containers by the Contractor in the presence of a representative of the Contracting Officer. Samples shall be clearly identified by designated name, specification number, batch number, manufacturer's formulation number, project contract number, intended use, and quantity involved. Testing shall be performed in an approved independent laboratory. If materials are approved based on reports furnished by the Contractor, samples will be retained by the Government for possible future testing should the material appear defective during or after application.

2.7. SIGN BACKING MATERIAL

2.7.1. Sign backing material for sign panels shall be sheet aluminum conforming to the material requirements of North Dakota Highway Department Standard Specifications for Road and Bridge Construction, October 2014 section 894.01.

2.8. SIGN FACE MATERIAL

2.8.1. Sign face material for sign panels shall be high intensity reflective sheeting conforming to the material requirements of North Dakota Highway Department Standard Specifications for Road and Bridge Construction, October 2014 section 894.02.

2.8.2. The Color of the panels shall conform to requirements of the Manual of Uniform Traffic Control Devices (MUTCD) and conform to the Color Tolerance Charts provided by the Federal Highway Administration (FHWA).
2.9 STANDARD REGULATORY SIGNS


2.10. FABRICATION OF SIGNS, LETTERS, NUMERALS, SYMBOLS AND BORDER FOR PANEL SIGNS.

2.10.1. Fabricate signs to comply with sign details and approved shop drawings, and conforming to the requirements of North Dakota Highway Department Standard Specifications for Road and Bridge Construction, October 2014 section 894.

2.10.2. Allow for thermal expansion and contraction associated with exterior installation.

2.11. POSTS AND HARDWARE FOR SIGNS

2.11.1. The contractor shall fabricate and install steel sign posts for all signs per NDDOT Section 894 and the details in the drawings. Materials will include the sign post, anchor, sleeve plates, shims, bolts, washers and other miscellaneous hardware required to perform the work.

3. EXECUTION:

3.1. SURFACE PREPARATION

3.1.1. Surfaces to be marked shall be thoroughly cleaned before application of the pavement marking material. Dust, dirt, and other granular surface deposits shall be removed by sweeping, blowing with compressed air, rinsing with water or a combination of these methods as required. Rubber deposits, surface laitance, existing paint markings, and other coatings adhering to the pavement shall be completely removed with scrapers, wire brushes, sandblasting, approved chemicals, or mechanical abrasion as directed. Areas of old pavement affected with oil or grease shall be scrubbed with several applications of trisodium phosphate solution or other approved detergent or degreaser, and rinsed thoroughly after each application. After cleaning, oil-soaked areas shall be sealed with cut shellac to prevent bleeding through the new paint. Pavement surfaces shall be allowed to dry, when water is used for cleaning, prior to striping or marking. Surfaces shall be re-cleaned, when work has been stopped due to rain.

3.2. APPLICATION

3.2.1. All pavement markings and patterns shall be placed as shown on the plans in the basic contract and as shown on individual delivery order plans.

3.2.2. Paint. Paint shall be applied to clean, dry surfaces, and only when air and pavement temperatures are above 40 degrees F and less than 95 degrees F. Paint temperature shall be maintained within these same limits. New asphalt pavement surfaces shall be allowed to cure for a period of not less than 30 days before applications of paint. Paint shall be applied pneumatically with approved equipment at rate of coverage specified. The contractor shall provide guide lines and templates as necessary to control paint application. Edges of markings shall be sharply outlined.

3.2.2.1. Rate of Application. Apply pavement markings at a coverage rate of 100-110 square feet per gallon with a 0.015-inch minimum film thickness.
3.2.2.2. Drying. The maximum drying time requirements of the paint specifications will be strictly enforced to prevent undue softening of bitumen, and pickup, displacement or discoloration by tires of traffic. If there is a delay in drying of the markings, painting operations shall be discontinued until cause of the slow drying is determined and corrected.

3.3. MARKING REMOVAL Not Used.

3.4. INSTALLATION OF SIGNS

3.4.1. Install signs without waves, warps, buckles, or fastening stress. Install signs straight and level. Balance signs as required. Provide all hardware required.

END OF SECTION
TECHNICAL PROVISIONS
SECTION 02831
CHAIN LINK FENCE

1. GENERAL:

1.1. REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only. For discrepancies, the most stringent standard or practice shall apply.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 121 (1992a) Zinc-Coated (Galvanized) Steel Barbed Wire
ASTM A 153 (1996) Zinc-Coated (Hot Dip) on Iron and Steel Hardware
ASTM A 176 (1994) Stainless and Heat-Resisting Chromium Steel Plate, Sheet, and Strip
ASTM A 392 (1996) Zinc-Coated Steel Chain-Link Fence Fabric
ASTM A 491 (1996) Aluminum-Coated Steel Chain-Link Fence Fabric
ASTM A 585 (1992) Aluminum-Coated Steel Barbed Wire
ASTM A 666 (1994) Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar
ASTM A 780 (1993a) Repair of Damaged and Uncoated Areas of Hot-Dipped Galvanized Coatings
ASTM A 824 (1992) Metallic-Coated Steel Marcelled Tension Wire for Use With Chain Link Fence
ASTM C 94 (1996) Ready-Mixed Concrete
ASTM F 626 (1996) Fence Fittings
ASTM F 668 Fabric (1996) Poly Vinyl Chloride (PVC)-Coated Steel Chain-Link Fence Fabric

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ASTM F 883  (1990) Padlocks
ASTM F 900  (1994) Industrial and Commercial Swing Gates
ASTM F 1083  (1996) Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures
ASTM F 1184  (1994) Industrial and Commercial Horizontal Slide Gates

FEDERAL SPECIFICATIONS

RRF 191/1D  (1990) Fencing, Wire and Post Metal (Chain Link Fence Fabric)
RRF 191/3D  (1990) Fencing, Wire and Post Metal (Chain Link Fence Posts, Top Rails, and Braces)
RRF 191/4D  (1990) Fencing, Wire and Post Metal (Chain Link Fence Accessories)

2. PRODUCTS:

2.1. MATERIALS. Materials shall conform to the following:

2.1.1. Chain Link Fence Fabric

All fabric shall be made of 9 gauge (.148 inch dia.) wire woven in 2 inch mesh fabricated according to RRF-191/1D. Fence fabric height shall be 6’ or 7’ for galvanized fence and approximately 9.5’ for curved post fence (contractor verify from detail). Fabric shall be twisted and barbed on the top selvage and knuckled on the bottom selvage.

2.1.1.1. PVC Coated Fabric

Class 2b polyvinyl chloride (PVC) coated steel fabric with 0.3 ounces per sq. foot shall be dark brown in color and manufactured to comply with ASTM F 668.

2.1.1.2. Galvanized Fabric

Type 1 zinc-coated (galvanized) steel wire with minimum coating weight of 1.2 ounces per square foot of coated surface shall be manufactured to comply with ASTM A 392.

2.1.2. Supporting Framework

All framework (including fence posts, gate frames, rails, braces, etc.) shall be either galvanized or color coated galvanized steel. Color of framework shall match that of the affixed chain link fence fabric. Fence posts, rails, and braces shall be manufactured according to RRF 191/3D.

2.1.2.1. Gates
ASTM F 900 and/or ASTM F 1184. Gates shall be the type shown. Gate frames shall conform to strength and coating requirements of ASTM F 1083 for Group IA, steel pipe, with external coating Type A, nominal pipe size (NPS) 1-1/2. Gate frames shall conform to strength and coating requirements of ASTM F 1043, for Group IC, steel pipe with external coating Type A or Type B, nominal pipe size (NPS) 1-1/2. Gate fabric shall be as specified for chain-link fabric. Gate frame shall match color and finish of surrounding fabric. Color coated gate frames shall be galvanized prior to application of color coat. Where applicable, each end member of gate frames shall be extended sufficiently above the top member to carry three strands of barbed wire in horizontal alignment with barbed wire strands on the fence.

2.1.2.1.1. Swing Gates

Gate leaves more than 8 feet wide shall have either intermediate members and diagonal truss rods or shall have tubular members as necessary to provide rigid construction, free from sag or twist. Gate leaves less than 8 feet wide shall have truss rods or intermediate braces. Gate fabric shall be attached to the gate frame by method standard with the manufacturer except that welding will not be permitted. Latches, hinges, rollers and other hardware items shall be furnished as required for the operation of the gate. Gate keepers shall be installed at approximately the 135 degree point, unless otherwise directed. Latches shall be arranged for padlocking so that the padlock will be accessible from both sides of the gate. Latch assembly shall conform to that shown in plans or approved equal. All color coated gates will have a latch assembly.

2.1.2.1.2. Cantilever Slide Gates

Cantilever slide gates shall be fabricated in accordance with ASTM F 1184, Type II, Class 2. Cantilever slide sealed bearing type gates shall be furnished.

2.1.2.2. Posts

All posts shall conform to one of the following classes per RRF 191/3D: Class 1 Grade A hot-dip zinc-coated steel pipe, Class 3 formed steel sections, Class 4 steel H-sections, Class 6 steel square sections. All posts shall have a minimum of 1.8 ounces of zinc per square foot of coated surface area. Sizes shall be as shown on the drawings. Line posts and terminal (corner, gate, and pull) posts selected shall be of the same designation throughout the galvanized fence sections and color coated fence sections. All gate posts and posts without barbed wire outriggers shall have domed tops. Contractor shall use fabric height of 96" when sizing posts for 8" high brown vinyl coated fence.

2.1.2.3. Braces and Rails

Top rails shall conform to ASTM F 1083, zinc-coated, Group IA, steel pipe, size NPS 1-1/4. Group IC steel pipe, zinc-coated, shall meet the strength and coating requirements of ASTM F 1043. Group II, formed steel sections, size 1.66 inch, conforming to ASTM F 1043, may be used as braces and rails if Group II line posts are furnished.

2.1.3. Electric Gate Operators

Electric gate operator shall at the least meet the minimum requirements recommended by the gate manufacturer. Single phase power will be available. Keyed cylinder, three button (open, stop, close) control able to be remotely mounted (i.e. in guard shack) shall be furnished. Gate
shall have an audible warning system that sounds during and prior to operation. Operator shall be designed so that any opening control overrides the close circuit. Gate operator shall have the means to be disconnected from the gate, without the use of tools, to allow for manual operation in the event of power failure. Operator housing shall match the fence color and be weather and corrosion resistant to completely protect the operating mechanism. Operator shall have built in master/slave capability for single or dual gate operation as well as built in obstruction sensing system.

2.1.4. Accessories

ASTM F 626. All accessories shall be coated to match the surrounding fence fabric color and manufactured according to RRF 191/4D unless specified otherwise. Accessories shall be galvanized prior to application of PVC color coating. Tension wire shall be installed with all straight post fence and comply with ASTM A 824. Truss rods shall be furnished for each terminal post. Truss rods shall be provided with turnbuckles or other equivalent provisions for adjustment. Barbed wire shall be 2 strand, 12-1/2 gauge wire, zinc-coated, Class 3 in accordance with ASTM A 121 or aluminum coated Type I in accordance with ASTM A 585. Barbed wire support arms shall be able to support three barbed wire strands for each support arm and of the design required for the post furnished. Tie wire for attaching fabric to rails, braces, and posts shall be 9 gauge steel wire and match the coating and color of the fence fabric. Miscellaneous hardware coatings shall conform to ASTM A 153.

2.1.5. Concrete

ASTM C 94, using 3/4 inch maximum size aggregate, and having minimum compressive strength of 3000 psi at 28 days. Grout shall consist of one part Portland cement to three parts clean, well-graded sand and the minimum amount of water to produce a workable mix.

2.1.6. Padlocks

Padlocks shall be keyed and each lock (one lock per gate) shall be furnished with two keys. BEST brand padlocks or approved equal shall be furnished.

3. EXECUTION:

3.1 GENERAL

Perimeter fencing shall be installed 1.5 feet inside government property line. All fences shall be installed as recommended by the manufacturer to the lines and grades indicated. Line posts shall be spaced equidistant at intervals not exceeding 10 feet. Terminal (corner, gate, and pull) posts shall be set at abrupt changes in vertical and horizontal alignment. Fabric shall be continuous between terminal posts; however, runs between terminal posts shall not exceed 500 feet. Any damage to galvanized surfaces, including welding, shall be repaired with paint containing zinc dust in accordance with ASTM A 780. Any damage to color coated surfaces shall be coated to match. Areas disturbed by construction of this project shall be restored to original condition at no cost to the Government. All signage mounted on the existing perimeter fence shall be detached during fence removal and reattached to the new fence in the same relative location along the fence, at eye level.

3.1.1. Crossing Drainage Channel
Any fencing crossing drainage channels shall have a terminal post on either side of the channel with fence fabric spanning the channel so as not to interfere with flow or cause backup of debris.

3.2. EXCAVATION

Post holes shall be cleared of loose material. Waste material shall be spread where directed. The ground surface irregularities along the fence line shall be eliminated to the extent necessary to maintain a 50.8 mm (2 inch) maximum clearance between the bottom of the fabric and finish grade. Hydro mulching shall be performed on turfed areas disturbed by fence installation.

3.3. POSTS

Posts shall be set plumb and in alignment. Except where solid rock is encountered, posts shall be driven to a depth of 5 feet. All terminal posts (corner, gate, and pull) shall be set in concrete to the depth indicated on the drawings. Where solid rock is encountered with no overburden, posts shall be set to a minimum depth of 18 inches in rock. Where solid rock is covered with an overburden of soil or loose rock, posts shall be set to the minimum depth indicated on the drawing unless a penetration of 18 inches in solid rock is achieved before reaching the indicated depth, in which case depth of penetration shall terminate. All portions of posts set in rock shall be grouted. Portions of posts not set in rock shall be set in concrete from the rock to ground level. Posts set in concrete shall be set in holes not less than the diameter shown on the drawings. Diameters of holes in solid rock shall be at least 1 inch greater than the largest cross section of the post. Concrete and grout shall be thoroughly consolidated around each post, shall be free of voids and finished to form a dome. Concrete and grout shall be allowed to cure for 72 hours prior to attachment of any item to the posts. Fence post rigidity shall be tested by applying a 50 pound force on the post, perpendicular to the fabric, at 5 feet above ground. Post movement measured at the point where the force is applied shall be less than or equal to 3/4 inch from the relaxed position. Every tenth post shall be tested for rigidity. When a post fails this test, further tests on the next four posts on either side of the failed post shall be made. All failed posts shall be removed, replaced, and retested at the Contractor's expense.

3.3.1. Post Removal

Any posts that are to be removed must be disposed of off base. The resultant hole in the existing asphalt shall be trimmed and filled with 4" (minimum) of Asphalt Pavement.

3.4. RAILS

3.4.1. Top Rail

Top rail shall be supported at each post to form a continuous brace between terminal posts. Where required, sections of top rail shall be joined using sleeves or couplings that will allow expansion or contraction of the rail.

3.5. BRACES AND TRUSS RODS

Braces and truss rods shall be installed as indicated and in conformance with the standard practice for the fence furnished. Horizontal (compression) braces and diagonal truss (tension) rods shall be installed on fences over 6 feet in height. A center brace or 2 diagonal truss rods shall be installed on 12-foot fences. Braces and truss rods shall extend from terminal posts to line posts. Diagonal braces shall form an angle of approximately 40 to 50 degrees with the horizontal. No bracing is required on fences 6 feet high or less if a top rail is installed.
3.6. TENSION WIRES

Tension wires shall be installed along the bottom of the fence line and attached to the terminal posts of each stretch of the fence. Bottom tension wire shall be installed within the bottom 6 inches of the installed fabric. Tension wire shall be pulled taut and shall be free of sag.

3.7. CHAIN LINK FABRIC

Chain link fabric shall be installed on the outward facing side of the post. Fabric shall be attached to terminal posts with stretcher bars and tension bands. Stretcher bars shall be made of steel not less than 3/16 inch by 3/4 inch in cross section, and not less than 1 inch shorter than the fabric height. Tension bands shall be fabricated from 3/4 inch by 1/10 inch nominal thickness steel spaced at approximately 15 inch intervals. The fabric shall be installed and pulled taut to provide a smooth and uniform appearance free from sag, without permanently distorting the fabric diamond or reducing the fabric height. Fabric shall be fastened to line posts at approximately 15 inch intervals and fastened to all rails and tension wires at approximately 24 inch intervals. Fabric shall be cut by untwisting and removing pickets. Splicing shall be accomplished by weaving a single picket into the ends of the rolls to be joined. The bottom of the installed fabric shall not exceed 2 inches above the ground. After the fabric installation is complete, the fabric shall be exercised by applying a 50 pound push-pull force at the center of the fabric between posts. The use of a 30 pound pull at the center of the panel shall cause fabric deflection of not more than 2.5 inches when pulling fabric from the post side of the fence. Every second fence panel shall meet this requirement. All failed panels shall be re-secured and retested at the Contractor's expense.

3.8. BARBED WIRE SUPPORTING ARMS AND BARBED WIRE

Barbed wire supporting arms and barbed wire shall be installed as indicated and as recommended by the manufacturer. Supporting arms shall be anchored to the posts in a manner to prevent easy removal with hand tools. Barbed wire shall be pulled taut and attached to the arms with clips or other means that will prevent easy removal.

3.9. GATES

Hinged gates shall be mounted to swing as indicated. Slide gates shall be installed as recommended by the manufacturer. Padlocks shall be attached to galvanized finish gates or gate posts with chains. Padlocks shall be attached to color coated gates on a latch. Hinge pins, and hardware shall be welded or otherwise secured to prevent removal. Electric gate operators shall be furnished for sliding gates where directed by the Government.

END OF SECTION
1. APPLICABLE PUBLICATIONS: The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

American Society for Testing and Materials (ASTM):

D 2607-69 Peats, Mosses, Humus, and Related Products

American Sod Producers Association, Inc. (ASTM): ASPA-01 Guidelines Specifications to Sodding

Federal Specification (FS):

O-F-241D Fertilizers, Mixed, Commercial

U.S. Department of Agriculture:

USDA-01 Federal Seed Act of August 9, 1939 (53 Stat. 1275) Rules and Regulations

2. SUBMITTALS: The following shall be submitted in accordance with Section 01000, Statement of Work.

2.1. Manufacturer's Catalog Data: Manufacturer's literature discussing physical characteristics, application and installation instructions for erosion control material, and for chemical treatment material shall be submitted.

2.2. Work Plan: Submittal of the delivery schedule shall be at least 10 days before delivery. Chemical Treatment Plan shall be submitted with proposed sequence of chemical treatment work. The common name, chemical composition, formulation, concentration, rate and method of application for all materials furnished; and the name and license of the state certified applicator(s) shall be included.

2.3. Certificates of Compliance: Prior to the delivery of materials, certificates of compliance shall be submitted certifying that materials meet the requirements specified. Certified copies of the reports for the following materials shall be submitted.

2.3.1. Sod: For species, mixture percentage, percent purity.

2.3.2. Fertilizer: For chemical analysis composition percent.

2.3.3. Peat: For compliance with ASTM D 2607.
2.3.4. Chemical Treatment Material: For EPA registration and uses.

3. **SOURCE INSPECTIONS:** Sod representative material will be subject to inspection by the Contracting Officer representative at the growing site.

4. **DELIVERY, STORAGE, AND HANDLING:**

4.1. Delivery:

4.1.1. Inspection: Turf material shall be inspected upon arrival at the jobsite, and unacceptable material shall be removed from the jobsite.

4.1.2. Protection: Sod shall be protected from drying out and from contamination during delivery.

4.1.3. Fertilizer: Delivery of fertilizer to the site shall be in original, unopened containers bearing manufacturer's chemical analysis. Instead of containers, fertilizer may be furnished in bulk. A chemical analysis shall be provided for bulk deliveries.

4.1.4. Soil Amendments: Soil amendments shall be delivered to the site in the original, unopened containers bearing the manufacturer's chemical analysis. In lieu of containers, soil amendments may be furnished in bulk; a chemical analysis shall be provided for bulk deliveries.

4.1.5. Chemical Treatment: Chemical treatment materials shall be delivered to the site in the original unopened containers with legible labels indicating the Environmental Protection Agency (EPA) registration number and the manufacturer's registered uses.

4.2. Storage: Materials shall be stored in areas designated by the Contracting Officer representative.

4.2.1. Sod shall be lightly sprinkled with water, covered with moist burlap, straw, or other covering; and protected from exposure to wind and direct sunlight until planted. Covering for sod shall allow air to circulate and prevent internal heat from building up.

4.2.2. Seed and fertilizer shall be stored in cool, dry locations away from contaminants. Chemical treatment materials shall not be stored with other landscape materials.

4.3. Handling:

4.3.1. Materials: Except for bulk deliveries, materials shall not be dropped or dumped from vehicles.

4.3.2. Time Limitation for Sod: Limitation of the time between harvesting and placing of sod shall be as specified in paragraph "SODDING."
5. MATERIALS:

5.1. Sod:

5.1.1. Sod Classification: Sod shall be grown in natural mineral soils. Sod grown in peat will not be acceptable. Sod shall be ASPA Certified Nursery grown and include a minimum of the top 1-inch of well established cultured sod with a strong fibrous root system. Sod shall consist in the major part of a minimum of two varieties of Kentuck Bluegrass and be free from noxious weeds and relatively free from all other weeds, and free from burned or bare spots, roots, stones and other objectionable materials. Sod shall resist normal handling without undue breaking or tearing. Sod shall be cut in uniform strips, 18 inches wide and not less than 72 inches long and shall be cut to a uniform thickness so a dense root system will be retained, but be exposed on the bottom side of the sod.

5.1.2. Sod shall conform to the requirements of Mn/DOT Spec 3878 Type D – “Mineral Sod.”

5.1.3. Broken Sections: Irregularly shaped pieces of sod and torn or uneven ends will be rejected.

5.1.4. Anchors: Sod anchors shall be as recommended by the sod supplier.

5.2. Soil Amendments: Soil amendments shall consist of fertilizer and soil conditioners meeting the following requirements.

5.2.1. Fertilizer: Commercial grade, free flowing, uniform in composition and conforming to FS O-F-241.

5.2.1.1. Granular Fertilizer: Consists of nitrogen-phosphorus-potassium ratio: 22 percent nitrogen, 3 percent phosphorus, and 3 percent potassium.

5.2.1.2. Controlled-Release Fertilizer: Consists of nitrogen-phosphorus-potassium ratio: 22 percent nitrogen, 3 percent phosphorus, and 3 percent potassium.

5.2.2. Soil Conditioner: For single use or in combination to meet requirements for topsoil.

5.2.2.1. Organic Soil Conditioner shall be Peat: Hypnum moss peat derived from a bog, swampland or marsh shall conform to ASTM D 2607.

5.3. Mulches: Mulches shall be free from weeds, mold, and other deleterious materials.

5.3.1. Straw: Straw shall be stalks from oats, wheat, rye, barley, or rice furnished in air-dry condition and with a consistency for placing with commercial mulch blowing equipment.

5.4. Water: Water shall be of a quality suitable for irrigation.
5.5. Chemical Treatment Material: Chemical treatment material shall be EPA registered and approved soil fumigant herbicide insecticide and fungicide.

6. SODDING TIMES:

6.1. Sodding Time: Sod shall be sown from April 15 to June 15 for spring planting and from August 15 to September 15 for fall planting.

7. SITE PREPARATION:

7.1. Preparation of Sodding Areas:

7.1.1. Grading: The Contracting Officer representative shall verify the finished grades are as indicated on drawings, and the placing of topsoil and the smooth grading has been completed.

7.1.2. Unsatisfactory Environmental Conditions: Site preparation work shall be performed only during periods when beneficial results can be obtained. When drought, excessive moisture or other unsatisfactory condition prevails, the work shall be stopped when directed.

7.2. Application of Soil Amendments:

7.2.1. Fertilizer: Fertilizer shall be applied at the rate of 1 pound per 1000 square feet. Fertilizer shall be incorporated into the soil to a minimum depth of 4 inches or may be incorporated as part of the tillage operation.

7.2.2. Soil Conditioner: Soil conditioner shall be spread uniformly over the soil and thoroughly incorporated by tillage into the soil to a minimum depth of 4 inches.

7.2.3. Deviations: Deviations in the ground surface in relation to the grades indicated shall be corrected prior to turfing.

7.3. Tillage:

7.3.1. Minimum Depth: Soil shall be tilled to a minimum depth of 4 inches by plowing, diskign, harrowing, rototilling or other method. On slopes 2 horizontal to 1 vertical and steeper, the soil shall be tilled to minimum depth of 2 inches by scarifying with heavy rakes, or other method. Rototillers shall be used where soil conditions and length of slope permit.

7.3.2. Applying Fertilizer: Fertilizer, as specified, may be applied during tillage.

7.4. Finished Grading:
7.4.1. Preparation: Turf areas shall be filled as needed or have surplus soil removed to attain the finished grade with positive drainage away from buildings and slabs. Drainage patterns shall be maintained. Turf areas compacted by construction operations shall be completely pulverized by tillage. Finished grade shall be 1 inch below the adjoining grade of any surfaced area. New surface shall be blended to existing areas.

7.4.2. Debris, 1 Inch: Lawn areas shall have debris and stones larger than 1 inch in any dimension removed from the surface.

7.4.3. Protection: Finished graded areas shall be protected from damaged by vehicular or pedestrian traffic and erosion.

7.5. Application of Soil Treatment Chemicals: When soil treatment becomes necessary to remove a pest, a state certified applicator shall apply required chemicals in accordance with EPA label restrictions and recommendations. Hydraulic equipment shall be provided for the liquid application of chemicals with a leak-proof tank, positive agitation methods, controlled application pressure and metering gauges.

8. SODDING:

8.1. General: Areas shall be sodded where grass is damaged by excavation or grade change. Sod shall be placed in accordance with the ASPA-01 in the areas indicated. The time limitation between harvesting and placing sod is 36 hours. Sod that has become dry, moldy, or yellow from heating will be rejected.

8.2. Placing Sod: Adequate soil moisture shall be ensured prior to sodding by spraying water on the area to be sodded and wetting the soil to a minimum depth of 2 inches. Sod shall be placed grass (or green) side up. On long slopes sod shall be placed at right angles to slopes. When required, the sod shall be anchored by placing anchors a minimum distance of 2 feet on center with a minimum of 2 anchors per sod section.

8.3. Finishing: Air pockets shall be eliminated and a true and even surface shall be provided by tamping or rolling the sod in place. Displacement of the sod shall be assured by knitting of sod to the soil. Frayed edges shall be trimmed and holes or missing corners shall be patched in the sod.

8.4. Watering Sod: Watering shall be started immediately after completing each day of sodding. Water shall be applied at the rate sufficient to ensure moist soil conditions to a minimum depth of 2 inches. Run-off and puddling shall be prevented.

9. RESTORATION AND CLEAN UP: Excess and waste material shall be removed and disposed of off the site. Adjacent paved areas shall be cleaned. Existing turf areas which have been damaged during the contract operations shall be restored to original conditions.
10. **PROTECTION OF TURFED AREAS:** Immediately after turfing, the area shall be protected against traffic or other use by erecting barricades and providing signage as required or as directed by the Contracting Officer representative.

11. **TURF ESTABLISHMENT PERIOD:**

11.1. **Length of Period:** On completion of the last day of the turfing operation, a Turf Establishment Period will be in effect for a minimum of 28 days.

11.2. **Stand of Turf:**

11.2.1. **Sodding Operation:** A stand of turf from the sodding operation is defined as living sod uniform in color and leaf texture. Bare spots shall be no longer than 6 inches square. The total bare spots shall not exceed 2 percent of the total sodded area.

11.3. **Maintenance During Establish Period:**

11.3.1. **General:** Maintenance of the turfed areas shall include eradicating weeds, and protecting turfed areas from traffic.

11.3.2. **Repair:** Turf condition shall be reestablished as specified herein for eroded areas, damaged or barren areas. Mulch shall be repaired or replaced as required.

11.3.3. **Mowing:** Turfed areas shall be mowed to a minimum height of 2 inches when the average height of the turf becomes 3 inches. Clippings shall be removed when the amount of cut turf is heavy enough to damage the turfed areas.

11.3.4. **Watering:** Watering shall be at intervals to obtain a moist soil condition to a minimum depth of 2 inches. Frequency of watering and quantity of water shall be adjusted in accordance with the growth of the turf. Run-off, puddling, and wilting shall be prevented.

11.3.5. **Chemical Treatment:** When a pest or disease becomes apparent during the Turf Establishment Period, a state certified applicator shall apply required chemicals in accordance with EPA label restrictions and recommendations. Hydraulic equipment for the liquid application of chemicals shall be provided with a leak-proof tank, positive agitation methods, controlled application pressure and metering gauges. Pre-emergent herbicides will not be used.

12. **FINAL ACCEPTANCE:** At the end of the Turf Establishment Period, a final inspection will be made. Final acceptance of the turf will be based upon a satisfactory stand of turf as defined in the paragraph TURF ESTABLISHMENT PERIOD. Rejected areas shall be replanted or repaired as directed by the Contracting Officer representative.

**END OF SECTION**
1. GENERAL

1.1 REFERENCES

ASTM A500/A500M (2013) Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes

NATIONAL ASSOCIATION OF ARCHITECTURAL METAL MANUFACTURERS (NAAMM)


1.2 Compliance

All handrails shall comply with the Architectural Barriers Act (1968), Section 505.

1.3 Products
Use materials of size and thicknesses indicated or, if not indicated, of required size and thickness to produce adequate strength and durability in finished product for intended use.

Provide anchorage of the type indicated and coordinated with the supporting structure. Fabricate anchoring devices and space as indicated and as required to provide adequate support for the intended use of the work.

For the fabrication of work exposed to view, use only materials that are smooth and free of surface blemishes, including pitting, seam marks, roller marks, rolled trade names, and roughness. Remove blemishes by grinding, or by welding and grinding, prior to cleaning, treating, and application of surface finishes, including zinc coatings.

2. EXECUTION

Adjust stair railings and handrails prior to securing in place to ensure proper matching at butting joints and correct alignment throughout their length. Space posts not more than 8-feet on center. Plumb posts in each direction. Secure posts and rail ends to building construction as follows:

3.1 Anchor posts in concrete by means of pipe sleeves set and anchored into concrete. Provide sleeves of galvanized, standard weight, steel pipe, not less than 150 millimeter 6-inches long, and having an inside diameter not less than 13 millimeter 1/2-inch greater than the outside diameter of the inserted pipe post. Provide steel plate closure secured to the bottom of the sleeve, with closure width and length not less than 25 millimeter 1-inch greater than the outside diameter of the sleeve. After posts have been inserted into sleeves, fill the annular space between post and sleeve with molten lead, sulfur, or a quick-setting hydraulic cement. Cover anchorage joint with a round steel flange welded to the post.

3.1.1 Anchor posts to steel with steel oval flanges, angle type or floor type as required by conditions, welded to posts and bolted to the steel supporting members.

3.1.2 Anchor rail ends into concrete and masonry with steel round flanges welded to rail ends and anchored into the wall construction with lead expansion shields and bolts.

3.1.3 Anchor rail ends to steel with steel oval or round flanges welded to tail ends and bolted to the structural steel members.

3.2 Installation

Provide complete, detailed fabrication and installation drawings for all iron and steel hardware, and for all steel shapes, plates, bars and strips used in accordance with the design specifications referenced in this section.

Secure handrails to walls by means of wall brackets and wall return fitting at handrail ends. Provide brackets of malleable iron castings, with not less than 75 millimeter 3-inch projection from the finish wall surface to the center of the pipe drilled to receive one M10 3/8-inch bolt. Locate brackets not more than 1525 millimeter 60-inches on center. Provide wall return fittings of cast iron castings, flush-type, with the same projection as that specified for wall brackets. Secure wall brackets and wall return fittings to building construction as follows:

3.2.1 For concrete and solid masonry anchorage, use bolt anchor expansion shields and lag bolts.
3.2.2 For hollow masonry and stud partition anchorage, use toggle bolts having square heads.

3.2.3 Install toe boards and brackets where indicated. Make splices, where required, at expansion joints. Install removable sections as indicated.

3.3 Steel Handrail

Install in pipe sleeves embedded in concrete and filled with non-shrink grout or quick setting anchoring cement with anchorage covered with standard pipe collar pinned to post. Secure rail ends by steel pipe flanges anchored by expansion shields and bolts or through-bolted to a back plate or by 6 mm 1/4 inch lag bolts to studs or solid backing.

3.4 Aluminum Handrail

Affix to base structure by flanges anchored to concrete or other existing masonry by expansion shields. Provide Series 300 stainless steel bolts to anchor aluminum alloy flanges, of a size appropriate to the standard product of the manufacturer. Where aluminum or alloy fittings or extrusions are to be in contact with dissimilar metals or concrete, coat the contact surface a heavy coating of bituminous paint.

3.2.3 Touchup Painting

If needed immediately after installation, clean field welds, bolted connections, abraded areas of the shop paint, and exposed areas painted with the paint used for shop painting. Apply paint by brush or spray to provide a minimum dry-film thickness of 0.051 millimeter 2-mils. All painted railings shall be the color of Base Brown.

END OF SECTION
TECHNICAL PROVISIONS

SECTION 16375

ELECTRICAL DISTRIBUTION SYSTEM, UNDERGROUND

1. GENERAL:

1.1 References: The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

American National Standards Institute (ANSI)
ANSI C2 National Electrical Safety Code
ANSI C37.72 Deadfront Padmounted Switchgear with Load Interrupting Switches and Separable Connector
ANSI C62.11 Metal Oxide Surge Arresters for AC Power Circuits
ANSI C80.1 Rigid Steel Conduit - Zinc Coated
ANSI C119.1 Sealed Insulated Underground Connector Systems Rated 600 Volts
ANSI F512 PVC Conduit

American Society for Testing and Materials (ASTM)
ASTM A 82 Tie Wire
ASTM A 615 Reinforcing Steel
ASTM B 8 Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft
ASTM C 33 Aggregates
ASTM D 923 Sampling Electrical Insulating Liquids
ASTM D 2447 Polyethylene (PE) Plastic Pipe, Schedules 40 and 80, Based on Outside Diameter

Association of Edison Illuminating Companies (AEIC)
AEIC CS6 Ethylene Propylene Rubber Insulated Shielded Power Cables Rated 5 Through 69 kV

Factory Mutual Engineering and Research Corporation (FM)
FM-01 Approval Guide: A Guide to Equipment, Materials and Services Approved by Factory Mutual Research for Property Conservation

Federal Specifications (FS)
FS W-F-1814/GEN (Rev A; Supple 1, Notice 1) Fuses, Cartridge, High Interrupting Capacity
FS W-S-610(Rev D; Notice 1) Splice Connectors
FS FF-P-101(Rev F) Padlocks
FS HH-I-595 (Rev C) Insulation Tape, Electrical, Pressure-Sensitive Adhesive, Plastic
Institute of Electrical and Electronics Engineers (IEEE)
IEEE C57.12.00 Liquid-Immersed Distribution, Power, and Regulating Transformers
IEEE Std 48 Standard Test Procedures and Requirements for High-Voltage Alternating-Current Cable Terminations
IEEE Std 142 Recommended Practice for Grounding of Industrial and Commercial Power Systems
IEEE Std 386 Separable Insulated Connector Systems for Power Distribution Systems Above 600V
IEEE Std 404 Cable Joints for Use with Extruded Dielectric Cable Rated 5000 V through 46 000 V and Cable Joints for Use with Laminated Dielectric Cable Rated 2500 V Through 500 000 V
IEEE Std 592 Exposed Semiconducting Shields on Premolded High Voltage Cable Joints and Separable Insulated Connectors

National Electrical Manufacturers Association (NEMA)
NEMA LA 1 Surge Arresters
NEMA TC 6 PVC and ABS Plastic Utilities Duct for Underground Installation
NEMA WC 8 Ethylene-Propylene-Rubber-Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy

National Fire Protection Association (NFPA)
NFPA 70 National Electrical Code

Underwriters Laboratories (UL)
UL 6 Rigid Metal Conduit
UL 467 Grounding and Bonding Equipment
UL 486A Wire Connectors and Soldering Lugs for Use with Copper Conductors
UL 651 Schedule 40 and 80 Rigid PVC Conduit
UL 651A Type EB and A PVC Conduit

U.S. Department of Agriculture – Rural Utilities Service
Bulletin 43-5 List of Approved Material
Bulletin 50-3 Specifications for Overhead Construction
Bulletin 50-6 Specifications for Underground Construction

1.2. General Requirements: Items of the same classification shall be identical including equipment, assemblies, parts, and components.

1.2.1 Code Compliance: The installation shall comply with the requirements and recommendations of NFPA 70 and ANSI C2. The workers shall have demonstrated their knowledge of NFPA 70 by being licensed as a Journeyman electrician. These Journeymen shall be working under the supervision of a Licensed Master Electrician.
1.2.2 Standard Product: Material and equipment shall be a standard product of a manufacturer regularly engaged in the manufacture of the product and shall essentially duplicate items that have been in satisfactory use for at least 2 years prior to bid opening.

1.2.3 Nameplates: Each major component of equipment shall have as a minimum the manufacturer's name, address, and catalog or style number on a nameplate securely attached to the item of equipment. Nameplates for individual items of electrical equipment shall be as specified in referenced publications and shall be provided on each item of equipment. Transformer nameplates shall be permanently marked and state that the transformer dielectric to be supplied is non-PCB classified with no PCB content. If transformer nameplate is not so marked, the Contractor shall furnish manufacturer's certification for each transformer that the dielectric is non-PCB classified no PCB content. Certifications shall be related to serial numbers on transformer nameplates. Transformers without certification will be considered as PCB insulated and will not be acceptable. In lieu of the manufacturer's certification, the Contractor may submit a test sample of the dielectric in accordance with ASTM D 923 and have tests performed per ASTM D 3304 at an EPA-approved testing facility to obtain this certification. Transformers with test results indicating any PCB levels shall be replaced. The certification specified shall be submitted and approved prior to acceptance of the transformer and approved dielectric.

1.2.4 Prevention of Corrosion:

1.2.4.1 Metallic Materials: Metallic materials shall be protected against corrosion as specified. Aluminum shall not be used in contact with earth or concrete. Where aluminum conductors are connected to dissimilar metal, fittings conforming to UL 486B shall be used.

1.2.4.2 Ferrous Metal Hardware: Ferrous metal hardware shall be hot-dip galvanized in accordance with ASTM A 123 and ASTM A 153.

1.2.4.3 Luminaries: Luminaries fabricated from ferrous metals, unless hot-dip galvanized or of porcelain enamel finish, shall be factory finished with a weather-resistant finish that will withstand 200 hours exposure to the salt spray test specified in ASTM B 117. Finish color shall be dark brown, unless otherwise indicated.

1.2.5 Verification of Dimensions: The Contractor shall become familiar with details of the work, shall verify dimensions in the field, and shall advise the Contracting Officer of any discrepancy before performing any work.

1.3 Submittals:

1.3.1 The following shall be submitted in accordance with Section 01000:
Material Equipment
Primary Cable Terminations and Splices
Separable Insulated Connectors
Primary Cable and Conductors

Cable Installation Checklist and Pulling Calculations and Pulling Plan

Miscellaneous Equipment

Concrete Pads and Vaults

Electrical Distribution System

1.3.2 Complete detail drawings and other descriptive data as required demonstrating compliance with the contract documents, after receiving complete material lists but before installing any of these items. Detail drawings shall show the ratings of items and systems and how the components of an item and system are assembled, function together and how they will be installed on the project. Data and detail drawings for component parts of an item or system shall be coordinated and submitted as a unit. Multiple submissions for the same equipment or system are not acceptable, except where prior approval has been obtained from the Contracting Officer. In such cases, a list of data to be submitted later shall be included with the first submission. Detail drawings and manufacturer's data shall consist of the following:

1.3.2.1 Detail drawings showing physical arrangement, construction details, connections, finishes, materials used in fabrication, provisions for conduit or busway entrance, access requirements for installation and maintenance, physical size, electrical characteristics, foundation and support details, and equipment weight. Drawings shall be drawn to scale and/or dimensioned. Catalog cuts and published materials may be included to supplement drawings. All optional items shall be clearly identified as included or excluded.

1.3.2.2 Internal wiring diagrams of equipment showing wiring as actually furnished for this project. External wiring connections shall be clearly identified.

1.3.2.3 Detail drawings for the following items and other items as directed: Switchgear, pad-mounted type.

1.3.2.4 If departures from the contract drawings are deemed necessary by the Contractor, complete details of such departures, including changes in related portions of the project and the reasons therefore, shall be included with the detail drawings. Approved departures shall be made at no additional cost to the Government. Drawings as required to supplement contract drawings, manufacturer's data and drawings, and Contractor's data to demonstrate compliance with applicable contract requirements. Drawings shall be dimensioned or scaled to show the relative arrangement and mounting details of the equipment or equipment assemblies.

1.3.3 Instructions

1.3.3.1 Electrical Distribution System: Instruction manuals shall include assembly, installation, operation and maintenance manuals, spare parts data which provides supplier name, current cost, catalog order number, and a recommended list of spare parts to be stocked, and all documents previously submitted and approved. Manuals shall include data outlining step-by-step procedures for system startup.
and operation, and a troubleshooting guide which lists possible operational problems and corrective action to be taken. A brief description of all equipment and their basic operating features shall be included. Documents shall be bound in a suitable binder adequately marked or identified on the spine and front cover. A table of contents page shall be included and marked with pertinent contract information contents of the manual. Tabs shall be provided to separate different types of documents, such as catalog ordering information, drawings, instructions, and spare parts data. Index sheets shall be provided for each section of the manual when warranted by the quantity of documents included under separate tabs or dividers.

1.3.4 Reports:

1.3.4.1 Tests: Certified factory test reports when manufacturers perform routine factory tests normally performed by the manufacturer, including tests required by standards listed in paragraph REFERENCES. Additional certification to verify that each transformer has passed a production line impulse test consisting of one reduced-wave and one full-wave lightning impulse test on each fully-insulated high-voltage terminal. Field tests shall be made and test reports shall be written and certified by the Contractor. Field tests shall include cable, operational, and resistance-to-ground tests.

1.3.5 Certificates:

1.3.5.1 Qualifications: Certifications, when specified or required, including Certification of the Qualifications of Medium-Voltage Cable Installers, Certified Factory and Field Test Reports, and Certificates of Compliance submitted in lieu of other proofs of compliance with these contract provisions. A certification that contains the names and the qualifications of persons recommended to perform the splicing and termination of medium-voltage cables approved for installation under this contract. The certification shall indicate that any person recommended to perform actual splicing and termination has been adequately trained in the proper techniques and has had at least 3 recent years of experience in splicing and terminating the same or similar types of cables approved for installation. Any person recommended by the Contractor may be required to perform a dummy or practice splice and termination, in the presence of the Contracting Officer, before being approved as a qualified installer of medium-voltage cables. If that additional requirement is imposed, the Contractor shall provide short sections of the approved types of cables with the approved type of splice and termination kits, and detailed manufacturer's instruction for the proper splicing and termination of the approved cable types. The certification shall be accompanied by satisfactory proof of the training and experience of persons recommended by the Contractor as cable installers.

1.3.6 Materials and Equipment: When equipment or materials are specified to conform to the standards or publications and requirements of AASHTO, ANSI, ASTM, AEIC, FM, IEEE, IES, NEMA, NFPA, or UL, or to an FS, proof that the items furnished under this section of the specifications conform to the specified requirements shall be included. The label or listing in UL-03 or in FM-01 or the manufacturer's certification or published catalog specification data statement that the items comply with applicable specifications, standards, or publications and with the manufacturer's standards will be acceptable evidence of such compliance. Certificates shall be prepared by the manufacturer when the manufacturer's published data or drawings do not indicate conformance with other requirements of these specifications.
2. PRODUCTS:

2.1 Materials: Materials shall conform to the following requirements:

2.1.1 Cables: Cables shall be of annealed copper. Cables shall be single-conductor type, unless otherwise indicated.

2.1.1.1 Low-Voltage Cables: Low-voltage cables shall conform to UL 854 Type USE for direct burial and UL type THWN for conduit installations. Low voltage cables shall utilize either cross-linked, thermosetting-polyethylene or ethylene-propylene-rubber insulation.

2.1.1.2 Medium-Voltage Cables: Medium-voltage cables shall be ethylene-propylene-rubber-insulated conforming to NEMA WC 8, 15 kV rated with 133% insulation level. Cables shall have a nonmetallic jacket. Outer covering over insulation shall be an insulating PE jacket surrounding a copper concentric neutral shield. Concentric neutral for 4/0 medium voltage cables shall be 11 #14 copper concentric neutral wires (1/3 reduced neutral), concentric neutral for 1/0 medium voltage cables shall be 16 #14 copper wires (full neutral). Jackets, shields, and coverings shall conform to NEMA WC 8. Cables shall have both conductor and insulation semi-conducting screens.

2.1.1.3 Grounding Cables: Grounding cables shall be bare, except where installed in conduit with associated phase conductors. Insulated cable shall conform to UL Type THWN, green color-coded, and shall be insulated to match associated phase conductors rated no more than 600 volts. Bare cables shall be soft-drawn copper in accordance with ASTM B8 unless otherwise indicated; aluminum is not acceptable.

2.1.2 Cable Joints, Terminations, and Connectors:

2.1.2.1 Medium-Voltage Cable Joints: IEEE Std 404 and IEEE Std 592.

2.1.2.2 Medium-Voltage Cable Terminations: IEEE Std 48.

2.1.2.3 Medium-Voltage Separable Insulated Connectors: IEEE Std 386 and IEEE Std 592. Connectors shall be of the load-break type as indicated, of suitable construction for the application and the type of cable connected, and include cable jacket seal as indicated. External clamping points and test points shall be provided.

2.1.2.4 Connectors for Low-Voltage Cables: FS W-S-610; UL 486A for copper conductors and UL 486B for aluminum conductors; and ANSI C119.1 for sealed insulated connectors.

2.1.3 Cast Iron: ASTM A 48, Class 30B, minimum.
2.1.4 Concrete: Concrete shall be as specified in Section 03301. Duct encasement shall be of monolithic construction. Where a connection is made to an existing duct line, the concrete encasement shall be well bonded or doweled to the existing encasement.

2.1.5 Conduit and Fittings, Steel:

2.1.5.1 Conduit, Rigid: ANSI C80.1 and UL 6.

2.1.5.2 Conduit Outlets and Fittings: NEMA FB 1, and UL 514A.

2.1.5.3 Conduit sweeps shall be steel.

2.1.6 Duct and Conduit Caulking Compound: Compounds for sealing ducts and conduit shall have a putty-like consistency workable with the hands at temperatures as low as 35° F, shall neither slump at a temperature of 300° F, nor harden materially when exposed to the air. Compounds shall adhere to clean surfaces of asbestos-cement, fiber, or plastic ducts; metallic conduits or conduit coatings; concrete, masonry, or lead; any cable sheaths, jackets, covers, or insulation materials; and the common metals. Compounds shall form a seal without dissolving, noticeably changing characteristics, or removing any of the ingredients. Compounds shall have no injurious effect upon the hands of workmen or upon materials.

2.1.7 Duct and Fittings, Nonmetallic Type for Installation Underground: Wall thickness and fittings shall be suitable for the application. Ducts shall be single, round-bore type. Ducts shall be of the same material when used for applications requiring the same type of wall thickness.

2.1.7.1 Plastic: NEMA TC 6 Thinwall: Type EB, NEMA TC 2 Schedule 40.

2.1.7.2 Conduit fittings shall conform to the applicable NEMA standards, except that where NEMA standards for conduit fittings do not exist for the type of plastic installed, fittings shall be as recommended by the conduit manufacturer.

2.2 Components:

2.2.1 Grounding and Bonding: Equipment, UL 467. Wire, ASTM B 8, softdrawn copper.

2.2.2 Lamps and Ballasts: Lamps shall be suitable for the burning position utilized. Ballasts shall conform to ANSI C82.4; shall be coordinated to the lamp the ballast supplies; shall be rated for 240 volts; and shall have a power factor of not less than 90 percent, a crest factor of 2.0 or less, and a voltage range of not less than plus or minus 10 percent. Unless indicated otherwise, ballasts shall be constant wattage or regulating type and shall be suitable for operating at minus 40° F and above.

2.2.2.1 High-Pressure Sodium Lamps: ANSI C78.380. Lamps shall be furnished corresponding to ANSI size and type designations S55SC-150, S54SB-100, to the lamp ordering codes indicated on the plans.
2.2.3 Luminaire Components, Roadway Lighting:


2.2.3.2 Photo-Control Devices: ANSI C136.10. Submittals shall include control diagrams, if required.

2.2.4 Nameplates: Nameplates shall be made of corrosion-resistant metal with not less than ¼-inch tall raised or engraved characters. The nameplate shall be mounted on the front of the enclosure.

2.2.5 Padlocks: Padlocks shall be Best manufacturer-supplied with Contractor core. Base will change out core after project completion.

2.2.6 Poles: Street light poles shall be steel with bronze painted finish.

2.2.7 Protective Apparatus and Metering Devices:

2.2.7.1 Circuit Breakers, Low-Voltage: NEMA FU1, NFPA 70

2.2.7.2 Fuses, Medium-Voltage, Including Current-Limiting: NEMA SG 2.

2.2.8 Switches, Medium-Voltage: IEEE C37.30 thru ANSI C37.35.

2.2.9 Surge Arresters: NEMA LA 1 of the zinc-oxide type, intermediate class and heavy duty distribution class.

2.2.10 Pad-Mounted Compartmental: ANSI C57.12.26 and ANSI C57.12.25.

2.2.11 Warning Signs, High-Voltage: Porcelain enameled steel or approved equal.

2.2.12 Pad mounted Switchgear: ANSI C37.72 and ANSI C37.60.

2.2.13 Pad-Mounted Switches: The switchgear shall be configured with 2 incoming compartments for loop-feed arrangement or one incoming compartment for radial-feed as required, equipped with oil-insulated, load-interrupter switches. The outgoing compartments shall be provided with non-reclosing vacuum-type interrupters or circuit breakers. Ratings at 60 Hz shall be 15 Kv, 3 phase, 200 amp. Refer to Paragraph 3.12.2 of the Section for additional requirements.

2.3 Factory Coating: Equipment and component items, including but not limited to cabinets, switches and ferrous metal luminaries not hot-dip galvanized or porcelain enamel finished, shall be provided with corrosion-resistant finishes which shall withstand 125 hours of exposure to the salt spray test specified in ASTM B 117 without loss of paint or release of adhesion of the paint primer coat to the metal surface in excess of 1/16 inch from the test mark. The scribed test mark and test evaluation shall be in accordance
with ASTM D 1654 with a rating of not less than 7 in accordance with TABLE 1, (Procedure A). Cut edges or otherwise damaged surfaces of hot-dip galvanized sheet steel or mill galvanized sheet steel shall be coated with a zinc rich paint conforming to MS DOD-P-21035. Pole finish shall be as indicated on drawings. Switch and cabinet finish color shall be dark brown.

3. EXECUTION:

3.1 General Installation Requirements: Equipment installed aerially shall conform to the requirements of Paragraph 3.17. Except as covered herein, excavation, trenching, and backfilling shall conform to the requirements of Section 02222 EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES SYSTEMS.

3.2 Cables, General Requirements: The type of installation, size and number of cables shall be as indicated. Conductors larger than No. 8 AWG shall be stranded, except as indicated. Each phase and each circuit shall be identified by means of fiber, laminated plastic, or nonferrous-metal tags, or approved equal, in each manhole, each hand hole, each junction box, and at each terminal. Loads shall be divided as evenly as practicable on the various phases of the system. Manufacturer's written recommendations shall be furnished for each type of splice and medium-voltage cable joint and termination, and shall be approved before any work is done. Medium-voltage cable joints and terminations shall be the standard product of a manufacturer and shall be of the factory preformed type. Medium-voltage cable joints shall be made by qualified cable splicers. Compounds and tapes shall be electrical grade suitable for the cable insulation provided and shall use design materials and techniques recommended by the manufacturer. Maximum length of cable pull and cable pulling tensions shall not exceed the cable manufacturer's recommendations for a given cable irrespective of duct configuration or manhole spacing shown on the plans.

3.2.1 Duct Line Installation: Cables shall be installed in duct lines where indicated. Cable joints in medium-voltage cables shall be made in equipment pedestals only. Neutral conductors shall be installed in the same duct with their associated phase conductors.

3.2.2 Direct-Burial Installation: Low-voltage cables for street light circuits and parking lot circuits shall be placed in conduit that is buried directly in the earth as indicated. Minimum cover from the top of a conduit to finished grade shall be 24 inches for low-voltage cables.

3.2.2.1 Trenching: Trenches shall be excavated to depths required to provide the minimum necessary cable cover. Bottoms of trenches shall be smooth and free of stones and sharp objects. Where bottoms of trenches comprise materials other than sand or stone-free earth, 3-inch layers of sand or stone-free earth shall be laid first and compacted to approximate densities of surrounding firm soil.

3.2.2.2 Cable Installation: Cables shall be unreeled along the sides of or in trenches and carefully placed on sand or earth bottoms. Pulling of cables into direct-burial trenches from a fixed reel position will not be permitted, except as required to pull cables through conduits under paving or railroad tracks. Where cables cross, a separation of least 3 inches shall be provided, unless each cable circuit is protected by a
non-metallic conduit sleeve at the crossing. Where single-conductor cable is installed, all three phases and the neutral shall be installed in the same sleeve. Bend radius of any cable shall be not less than 10 times the diameter of the cable. In no case shall cables be left under longitudinal tension. The first 4-inch layer of backfill shall be of sand or stone-free earth. Place a metallic backed warning tape over cables.

3.2.2.3 Medium-Voltage Cable Joints or Low-Voltage Cable Splices: Cable joints or splices in direct-burial cables are not permitted in runs of 1000 feet or less, nor at intervals of less than 1000 feet in longer runs, except as required for taps. Locations of cable joints or splices in shorter intervals, where required to avoid obstructions or damage to cables, shall be approved. Cable joints or splices shall be installed in cable boxes, except that medium-voltage separable connectors or low-voltage sealed insulated connectors do not require cable boxes. Submittals for seismic connectors shall be included.

3.3 Medium-Voltage Cables: Medium-voltage cables shall be suitable for a rated circuit voltage of 15 kV. Other parts of the cable system such as separable connectors, joints, splices, and terminations shall have ratings not less than the rating of the cables on which they are installed. Separable insulated connectors shall have nominal voltage ratings coordinated to associated apparatus ratings rather than cable ratings when used to connect cable to apparatus. Cables shall be provided with 133 percent insulation level. Conductor size shall be as indicated. Neutral conductors of grounded neutral systems shall be as indicated. Cable shall be installed strictly in accordance with the cable manufacturer's recommendations. The Contractor shall obtain from the manufacturer an installation manual or set of instructions which address such aspects as cable construction, insulation type, cable diameter, cable weight, minimum bending radius for training, minimum bending radius for tension pulling, maximum allowable sidewall pressure for tension pulling, minimum radius of roller sheave for tension pulling, cable temperature, lubricants, coefficient of friction, conduit cleaning, storage temperature, lubricants, coefficient of friction, conduit cleaning, storage procedures, moisture seals, testing for and purging moisture, etc. The Contractor shall then prepare a checklist of significant requirements perform pulling calculations and prepare a pulling plan which shall be forwarded along with the manufacturer's instructions to the Contracting Officer for review prior to installation. Cable pulling tension shall be continuously monitored during all cable pulls to insure that maximum allowable tension is not exceeded. Minimum temperature for cable installation shall be 32° F.

Cable identification tags shall be installed at all cable separable connectors, splices, and terminations. Tags shall indicate circuit number, phase and destination station number. Terminations shall be installed with sufficient cable slack so that elbows are installed without back pressure.

3.3.1 Terminations: Terminations shall be IEEE No. 48, Class 1 or Class 2; of the wet process positive pressure slip-on porcelain, molded elastomer, prestretched elastomer, or heat-shrinkable elastomer. Acceptable elastomers are track-resistant silicone rubber or track-resistant ethylene-propylene compounds, such as ethylene propylene rubber or ethylene propylene diene monomer. If stress relief provisions are not inherent, provide accessory devices. Separable insulated connectors shall be used where indicated for apparatus terminations. Terminations shall be of the outdoor type (Class I). Class 2 terminations are not acceptable. Class 3 terminations are not acceptable. Terminations, where required,
shall be provided with mounting brackets suitable for the intended installation and with grounding provisions for the cable shielding. Separable connectors shall be included in submittals.

3.3.1.1 Factory Preformed Type: Molded elastomer, wet-process porcelain, prestretched, and heat-shrinkable terminations shall utilize factory preformed components. Terminations shall have basic impulse levels as required for the system voltage level.

3.4 Low-Voltage Cables: Cable shall be rated 600 volts. Other parts of cable systems such as splices and terminations shall be rated at not less than 600 Volts. Splices in wires No. 10 AWG and smaller shall be made with an insulated, solderless, pressure type connector, Type I, Class 1, Grade B, Style G, or Type II, Class 1 of FS W-S-610 and conforming to the applicable requirements of UL 486A. Splices in wires No. 8 AWG and larger shall be made with non-insulated, solderless, pressure type connector, Type II, Class 2 of FS W-S-610, conforming to the applicable requirements of UL 486A and UL 486B. They shall then be covered with an insulation and jacket material equivalent to the conductor insulation and jacket. All splices below grade or in wet locations shall be sealed type conforming to ANSI C119.1 or shall be waterproofed by a sealant-filled, thick wall, heat shrinkable, thermosetting tubing or by pouring a thermosetting resin into a mold that surrounds the joined conductors.

3.5 Duct Lines: Duct lines shall be concrete-encased, thin-wall EB type or direct buried thick wall type Schedule 40 PVC.

3.5.1 Requirements: Numbers, sizes, and depth of burial of ducts shall be as indicated. Duct lines shall be laid with a minimum slope of 4 inches per 100 feet. Depending on the contour of the finished grade, the high-point may be at a terminal, a manhole, a hand hole, or between manholes or hand holes. Conduit for horizontal sweeps and vertical riser shall be Scheduled 40 PVC. Minimum horizontal bend radius shall be 48" and the minimum vertical bend radius shall be 36". Otherwise, long sweep bends having a minimum radius of 25 feet shall be used for a change of direction of more than 5 degrees, either horizontally or vertically. Both curved and straight sections may be used to form long sweep bends as required, but the maximum curve used shall be 30 degrees and manufactured bends shall be used. Ducts shall be provided with end bells whenever duct lines terminate in manholes or hand holes. A 5-mil brightly colored plastic tape not less than 3 inches in width and suitable inscribed at not more than 10 feet on centers with a continuous metallic backing and a corrosion-resistant 1-mil metallic foil core to permit easy location of the duct line, shall be placed approximately 10 inches below finished grade levels of such lines.

Conduits for street crossings shall be installed PVC coated in rigid steel casement pipe. These conduits shall be bored under road. Maintain same depth as conduit on either side of road.

3.5.2 Treatment: Ducts shall be kept clean of concrete, dirt, or foreign substances during construction. Field cuts requiring tapers shall be made with proper tools and match factory tapers. After a duct line is completed, a standard flexible mandrel shall be used for cleaning followed by a brush with stiff bristles. Mandrels shall be at least 12 inches long and have diameters 1/4 inch less than the inside diameter of the
duct being cleaned. Pneumatic rodding may be used to draw in lead wires. A coupling recommended by the duct manufacturer shall be used whenever an existing duct is connected to a duct of different material or shape. Ducts shall be stored to avoid warping and deterioration with ends sufficiently plugged to prevent entry of any water or solid substances. Ducts shall be thoroughly cleaned before being laid. Plastic ducts shall be stored on a flat surface and protected from the direct rays of the sun.

3.5.2.1 Existing Duct Lines and Conduit: Existing ducts or conduits shall have water, concrete, dirt, and foreign substances removed from them before new cables are pulled into them.

3.5.3 Concrete Encasement: Where called for; each single duct shall be completely encased in reinforced concrete with a minimum of 3 inches of concrete around each duct, except that only 2 inches of concrete are required between adjacent electric power or adjacent communication ducts, and 4 inches of concrete shall be provided between adjacent electric power and communication ducts. Duct line encasements shall be monolithic construction. Where a connection is made to a previously poured encasement, the new encasement shall be well bonded or doweled to the existing encasement. Separators or spacing blocks shall be made of steel, concrete, plastic, or a combination of these materials placed not further apart than 4 feet on centers. Ducts shall be securely anchored to prevent movement during the placement of concrete and joints shall be staggered at least 6 inches vertically.

3.5.4 Non-encased Direct-Burial: Top of duct lines shall be not less than 24 inches below finished grade. Ducts shall be installed with a minimum of 3 inches of earth around each duct, except that between adjacent electric power and communication ducts, 12 inches of earth is required. Bottoms of trenches shall be graded toward manholes or hand holes and shall be smooth and free of stones, soft spots, and sharp objects. Where bottoms of trenches comprise materials other than sand or stone-free earth, 3-inch layers of sand or stone-free earth shall be laid first and compacted to approximate densities or surrounding firm soil before installing ducts in direct-contact tiered fashion. Joints in adjacent tiers of duct shall be vertically staggered at least 6 inches. The first 4-inch layer of backfill cover shall be sand or stone-free earth compacted as previously specified. Duct banks may be held in alignment with earth. However, high-tiered banks shall use a wooden frame or equivalent form to hold ducts in alignment prior to backfilling. Selected earth at duct banks shall be thoroughly tamped in 4- to 6-inch layers.

3.5.5 Installation of Couplings: Joints in each type of duct shall be made up in accordance with the manufacturer's recommendations for the particular type of duct and coupling selected and as approved. In the absence of specific recommendations, various types of duct joint couplings shall be made watertight as specified.

3.5.5.1 Plastic Duct: Duct joints shall be made by brushing a plastic solvent cement on insides of plastic coupling fittings and on outsides of duct ends. Each duct and fitting shall then be slipped together with a quick one-quarter-turn twist to set the joint tightly.

3.5.5.2 Spare Duct Lines and Conduit: Spare ducts or conduits shall have a pull rope installed for future cable or wire pulling. The pull rope shall be made of a synthetic material such as nylon to keep it from rotting.
3.6 Lighting:

3.6.1 Lighting Luminaires: Luminaries shall be of the enclosed type, each consisting of a cast aluminum housing, a finished aluminum reflector for corrosion protection, an enclosing glass refractor or globe providing the indicated IES RP-8 type light distributions, and a slip-fitter capable of adapting to the steel pole mounting brackets/arms. Luminaire heads shall have standard dimensions suitable for interchangeable, standard optical assemblies. Head shall be internally wired and rated 600 volts. Lamps shall be of the sizes and types indicated and provided with appropriate ballasts. Luminaire style shall be in accordance with base standards.

3.6.2 Photo Control: Luminaires shall be controlled by a photo-control element located on each luminaire. Each photo-control element shall have an adjustable operating range of approximately 0.5 to 5.0 foot-candles and shall be mounted in a replaceable, weatherproof, plug-in or twist-lock assembly. Submittals shall include control diagrams.

3.6.3 Poles: Lighting poles shall be a nominal 35 ft length, straight square steel unless otherwise specified. Poles shall be suitable for use with underground supply conductors. Metal poles shall be designed for a wind velocity of 80 mph at the base of the pole, for a wind gust factor of 1.3, and for the height and drag factors recommended by AASHTO LTS-1. The effective projected area of luminaires and other pole-mounted devices shall be taken into account in pole design. Poles shall have grounding provisions. Bases shall be of the anchor-bolt-mounted type. The type of pole shaft material provided shall not be mixed on any project. Poles shall be located at least 3 ft. from fire hydrants and shall be located to avoid conflicts with manholes, traffic signs, street signs, and pad mounted equipment.

3.6.3.1 Steel Poles: Steel poles and steel brackets shall be painted bronze in accordance with ANSI IES RP.

3.6.4 Pole Setting (Metal Poles): Poles shall be mounted on cast-in-place foundations. Conduit ells shall be provided for cable entrances into pole interiors.

3.6.4.1 Cast-In-Place Foundations: Concrete foundations, sized as indicated, shall have anchor bolts accurately set in foundations using templates supplied by the pole manufacturer. After the concrete has cured, pole anchor bases shall be set on foundations and leveled by shimming between anchor bases and foundations or by setting anchor bases on leveling nuts and grouting. Poles shall be set plumb. Anchor bolts shall be the manufacturer’s standard, and not less than necessary to meet the pole wind loading specified herein and other design requirements. A channel of 1-inch square or 1-inch radius cross section shall be provided in the top of each pole base, or grout, to allow moisture drainage off the metal pole.

3.6.5 Weather Proof Disconnect: Disconnect for street light circuits shall be rated 60A, 600V. Disconnect shall be permanently mounted as shown on the drawings. Provide 60 amp fuses.

3.6.5.1 Provide service entrance rated breaker within equipment.
3.6.5.2 Enclosure: NEMA PB1, Type 3R as scheduled.

3.6.5.3 Cabinet Box: As shown on drawings.

3.6.5.4 Cabinet Front: As shown on drawings. Locks to be keyed alike. Finish in manufacturer’s standard gray enamel.

3.7 Non-metallic Pull boxes: Rated for underground usage, rated 8000 psi minimum.

3.8 Connections Between Medium-Voltage Aerial and Underground Systems: Where indicated, connections between medium-voltage underground and aerial systems shall be made as shown. Underground cables shall be extended up poles in conduit to medium-voltage cable terminations. Conduits shall be secured to wood poles by two-hole galvanized steel pipe straps spaced not more than 10 feet apart and with one strap not more than 3 feet from any outlet or termination.

3.9 Grounding: Neutral conductors, cable shields, metallic cable sheaths and armor, metallic conduits, cable terminations, junction boxes, poles, surge arresters, fencing enclosing electrical equipment, and other noncurrent-carrying metallic parts of equipment shall be grounded.

3.9.1 General Requirements: A resistance of not greater than 25 ohms shall be provided, unless otherwise specified. Ground resistances shall be measured in normally dry conditions not less than 48 hours after rainfall. Resistances of systems requiring separate ground rods, rather than a counterpoise, shall be measured separately before bonding below grade. The combined ground resistance of separate systems bonded together below grade may be used to meet the specified ground resistance, but the minimum number of rods indicated must still be provided.

3.9.1.1 Ground Rods: Ground rods shall be copper-clad steel conforming to UL 467 not less than 5/8 inch in diameter by 8 feet in length. Unless otherwise indicated, ground rods shall be driven into the ground until tops of rods are approximately 1 foot below finished grade. In counterpoise systems, tops of ground rods shall be approximately at elevations of counterpoises. Where the specified ground resistance cannot be met with the indicated number of ground rods, additional grounds rods, longer ground rods, or deep-driven sectional rods shall be installed and connected until the specified resistance is obtained, except that not more than three additional 8-foot ground rods shall be required at any one installation. Ground rods shall be spaced as evenly as possible at least 6 feet apart and connected 1 foot below grade.

3.9.1.2 Connections: Connections above grade shall be made with bolted solderless connectors and those below grade may be made by a fusion-welding process.

3.9.2 Neutral Grounding: Neutral conductors shall be grounded where indicated. Ground wires shall be not less than No. 1/0 AWG, except that where the rated phase current exceeds 400 amperes, the size of neutral ground wires shall be increased to not less than one-half the size of the cross-sectional area of the individual phase conductors. Neutral ground wires shall be protected by conduit where such wires run
exposed above grade in non-fence enclosed areas or are run through concrete construction. Where concrete penetration is necessary, nonmetallic conduit shall be cast flush with the points of concrete entrance and exit so as to provide an opening for the ground wire and the opening shall be sealed with a suitable compound after installation of the ground wire. Bends greater than 45 degrees in ground wire connections to the ground rods or counterpoises are not permitted.

3.9.3 Equipment Grounding: Equipment frames of metal-enclosed equipment, medium-voltage cable shields at cable joints and terminations, metal splice boxes, chain-link fencing, and other noncurrent-carrying metal items, shall be grounded unless otherwise indicated. Connections to earth shall be made in the same manner as required for neutral grounding. Equipment or devices operating at less than 750 volts may be connected to secondary neutral grounds. Equipment operating at more than 750 volts to ground shall be provided with grounds separate from secondary neutral grounds, but both grounds shall be bonded together below grade at the ground rods or may utilize a common counterpoise.

3.9.4 Surge Arrester Grounding: Surge arresters shall be grounded. Resistance to ground for intermediate-class arresters shall be not more than 10 ohms and for distribution-class arresters shall be not more than 25 ohms. Ground wire connections shall be not less than No. 4 AWG for distribution arresters and No. 1/0 AWG for intermediate arresters. Connections to earth shall be made in the same manner as required for neutral conductors. Surge arrester grounds may use the same ground wires provided for equipment operating at more than 750 volts. Surge arrester and secondary neutral grounds shall be separate from and independent of each other but both grounds shall be bonded together below grade at the ground rods or may utilize a common counterpoise.

3.9.5 Lighting Pole Grounding: Bases of lighting poles shall be connected to an adjacent ground rod by means of a No. 6 AWG wire. A ground connection from poles back to neutral ground points shall also be provided utilizing either metal raceways or ground wires.

3.9.6 Manhole, Hand hole, or Concrete Pull box Grounding: Ground rods installed in electrical-distribution-system manholes, hand holes, or concrete pull boxes shall be properly connected to the cable shielding, metallic sheath, and armor at each cable joint or splice by means of No. 4 AWG or equivalent braided tinned copper wire. Connections to metallic cable sheaths shall be by means of tinned terminals soldered to ground wires and to cable sheaths. Care shall be taken in soldering not to damage metallic cable sheaths or shields. Ground rods shall be protected with a double wrapping of pressure-sensitive plastic tape for a distance of 2 inches above and 6 inches below concrete penetrations. Ground wires shall be neatly and firmly attached to manhole or hand hole walls and the amount of exposed bare wire shall be held to a minimum.

3.10 Tests:

3.10.1 Operating Test: After the installation is completed, the Contractor shall conduct an operating test for approval. Equipment shall be demonstrated to operate in accordance with the requirements herein. Tests shall be performed in the presence of the Contracting Officer. The Contractor shall furnish
instruments and personnel required for the test and the Government will furnish the necessary electric power.

3.10.2 Ground-Resistance Measurements: Ground-resistance measurements of each ground rod shall be taken and certified by the Contractor to the Contracting Officer. No part of the electrical distribution system shall be energized prior to the resistance testing of that system's ground rods and grounding system and submission of test results to the Contracting Officer. Test reports shall indicate the location of the ground rod and grounding system and the resistance and the soil conditions at the time the test was performed. When the building water service is used as a ground or part of the grounding system, ground-resistance measurements shall also be made of this connection. Ground-resistance measurements shall be made in normally dry weather, not less than 24 hours after rainfall, and with the ground under test isolated from other grounds. The resistance to ground shall be measured using the fall-of-potential method described in IEEE Std 142.

3.10.3 Medium-Voltage Cable Test: After installation and before the operating test or connection to an existing system, the medium-voltage cable system shall be given a high potential test. Direct-current voltage shall be applied on each phase conductor of the system by connecting conductors as one terminal and connecting grounds or metallic shieldings or sheaths of the cable as the other terminal for each test. Prior to making the test, the cables shall be isolated by opening applicable protective devices and disconnecting equipment. The method, voltage, length of time, and other characteristics of the test shall be in accordance with NEMA WC 7 or NEMA WC 8 for the particular type of cable installed, and shall not exceed the recommendations of IEEE Std 404 for cable joints and IEEE Std 48 for cable terminations unless the cable and accessory manufacturers indicate higher voltages are acceptable for testing. Should any cable fail due to a weakness of conductor insulation or due to defects or injuries incidental to the installation or because of improper installation of cable, cable joints, terminations, or other connections, the Contractor shall make necessary repairs or replace cables as directed.

3.11 Finishing: Painting shall be as specified and applied at the factory.

3.12 Miscellaneous Equipment:

3.12.1 Load Break Junction Enclosure: Enclosure units shall be of the size and type indicated. Cabinets shall be top hinged and constructed of mild steel and shall be given a rust-inhibiting treatment and a dark brown finish coat by the manufacturer. Enclosure shall have provisions for mounting multipoint load break modules with stainless steel clamps designed for the purpose. Enclosure units shall be assembled by the manufacturer and each shall be shipped as a complete unit so that field installation is limited to mounting enclosure on a concrete pad and concrete vault unit as indicated. Enclosures shall meet ANSI tamper proof design including penta-head locking device and padlock.

3.12.2 Pad Mounted Switchgear: Pad mount switchgear shall be outdoor, low profile, dead front design of the type and configuration indicated and shall be constructed according to ANSI Standard C37.72. Cabinets shall be top hinged and constructed of mild steel and shall be given a rust-inhibiting treatment and a dark brown finish coat by the manufacturer. Switchgear shall have 200 amp bushing wells with
load break inserts as indicated. Continuous current rating shall be 200 amp as indicated. Each switched
way shall be independently operable with a hook stick and shall incorporate ganged three phase switches.
Switched ways shall utilize oil emmersed, vacuum switch elements. Switched ways with fault sensing
shall be rated 200 amps continuous current, incorporate programmable trip levels, and incorporate single
or three interruption as indicated. Switchgear shall be suitable for mounting on a concrete vault unit as
indicated. Cabinet shall meet ANSI tamper proof design including penta-head locking device and
padlock. Cabinet doors shall be sized so that cable grounding devices can be installed with sufficient
clearance to close and lock the doors.

3.12.3  Fault Indicators: Fault indicators shall be completely self-contained requiring no external wiring,
sealed and rated for installation in wet locations and be automatically resetting requiring no external tools
for resetting. Trip settings shall be 300 amps. Coordinate with settings at substation.

3.12.4  Station Numbers: Pad mount equipment shall be provided with permanently marked station
numbers stenciled on the exterior and interior of the equipment. Station designation will be determined
during construction.

3.12.5  Padlocks: Padlocks shall be provided for all pad mount equipment.

3.12.6  Concrete Pads and Vaults: Pads and vaults shall be constructed of reinforced concrete as
indicated. Concrete work as specified in Section 03301.

3.13  Cable Identification: Contractor shall ring out and install cable identification tags and station
number stenciling for cable and equipment as indicated. Cable identification tags shall be installed as
indicated. Tags shall indicate circuit number, phase, and destination station number.

3.15  Removal: Contractor shall be responsible to remove and dispose of all existing overhead, primary
and secondary electrical, telephone and CATV facilities as indicated. Removal shall be in accordance
with Section 02050, Demolition. Poles shall be removed completely. Cutting off of poles at ground line
will not be permitted. Anchor rods shall be unscrewed or cut off 1 foot below ground line.

3.16  Overhead Line Modifications:

3.16.1  General: Contractor shall make modifications to existing overhead lines as indicated.

END OF SECTION