

Section C - Description/Specifications/Statement of Work

GENERAL SPECIFICATIONS

ISLAND PARK RANGER STATION SIDEWALK REPLACEMENT

March 24, 2023

1.1 SCOPE OF CONTRACT

- A. This project includes removal of existing concrete sidewalks and stairs and construction of new concrete sidewalks and stairs for the Island Park Ranger Station.

1.2 PROJECT LOCATION

- A. The project is located on the Ashton/Island Park District of the Caribou-Targhee National Forest, Fremont County, Idaho. It is located at 3726 US-20, Island Park, Idaho. The project may be accessed from State Highway 20 and Forest Road 20137.

1.3 SITE INFORMATION AND LIMITATIONS

- A. The following site conditions are considered incidental to the contract and the contractor will not be paid directly for any of the following items:
 - 1. Access shall be maintained to the facilities through construction except as approved by the Contracting Officer for the purpose of reconstructing the sidewalks.
 - 2. The Contractor shall not disrupt existing utility service (water, power, telecom, sewer, etc.) to and within the building.
 - 3. Electric Power Service from Existing System: Electric power from Government's existing system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.
 - 4. Water from Government's existing water system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.
 - 5. Government toilet facilities are available at the site during all construction work. All construction equipment shall be pressure washed before entering the Site. The removal of mud and debris from treads, tracks and undercarriage, with emphasis on axles, frame, cross-members, motor mounts, and underneath steps, running boards, and front bumper/brushguard assemblies will be required. The purpose is to reduce or eliminate the transportation of noxious weeds, which is required by Federal and State regulations.

1.4 TRAFFIC CONTROL AND CONSTRUCTION SIGNING

- A. No work that endangers, interferes, or conflicts with traffic or access to work sites shall be performed until a plan for satisfactory warning and handling of traffic has been submitted by the contractor and approved by the COR and Idaho Department of Transportation. Construction signing for traffic control shall conform to the Manual of Uniform Traffic Control Devices (MUTCD). All traffic control signs will be placed in areas adequate for a truck pulling a fifth wheel trailer to be turned around. Contractor

shall not be paid directly for this item, rather it will be considered incidental to other items of work listed in the Schedule of Items.

1.5 WORK CAMPS, STAGING AND STORAGE AREAS

- A. Areas for staging operations and storage of materials shall be approved by the CO. The Contractor must request in writing for approval from the CO to stage work trailers on site.
- B. No overnight camping will be allowed on site.

1.6 INSPECTION OF WORKSITE

- A. The contractor acknowledges they have taken the necessary steps to ascertain the nature and location of work, and have investigated and satisfied themselves as to the general and local conditions that can affect the work or its cost. Any failure of the contractor to take the actions described and acknowledged in this paragraph will not relieve the Contractor from the responsibility of estimating properly the difficulty and cost of successfully performing the work, or for proceeding to successfully perform the work without additional expenses to the government.

1.7 START DATE

- A. June 12, 2023

1.8 CONTRACT TIME

- A. 45 Calendar Days

1.9 SPECIFICATIONS

- A. The following specifications are attached. Some sections in the schedule of items refer to other sections not listed and are subsidiary to, or are included in payment for other pay items in this contract. These items are considered incidental and no additional compensation will be made.

SECTION 011250 - MEASUREMENT AND PAYMENT

SECTION 011900 - MOBILIZATION

SECTION 013300 - SUBMITTAL PROCEDURES

SECTION 014100 - QUALITY CONTROL

SECTION 024100 - WASTE MATERIAL DISPOSAL

SECTION 024102 - REMOVAL AND DISPOSAL OF STRUCTURES AND OBSTRUCTIONS

SECTION 033000 - CAST-IN-PLACE CONCRETE

SECTION 033440 - CONCRETE STAIRS

SECTION 033530 - CAST-IN-PLACE CONCRETE CURB AND GUTTER

SECTION 033540 - CONCRETE SIDEWALK

SECTION 055213 - PIPE RAILINGS

SECTION 311010 - SITE CLEARING

SECTION 312000 - EARTHWORK

SECTION 312100 - PROJECT SITE PREPARATION AND GRADING
SECTION 312225 - EXCAVATION & EMBANKMENT
SECTION 321204 - CRUSHED AGGREGATE BASE OR SURFACE COURSE

END OF SECTION C
August 2023

USDA FOREST SERVICE, R4
ISLAND PARK RANGER STATION SIDEWALK REPLACEMENT
SECTION 011250 - MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. Measurement and payment for contract work will be made only for and under those pay items included in the Schedule of Items. All other work, labor, materials, equipment, and incidentals necessary to successfully complete the project will be considered as included in the payment for items shown. This section defines the method of measurements and basis of payment for work items listed in the Schedule of Items.
- B. When more than one class, size, type, thickness, etc. is specified in the Schedule of Items for any pay item, suffixes will be added to the item number to differentiate between the pay items.

1.2 DETERMINATION OF QUANTITIES

- A. The following measurements and calculations shall be used to determine contract quantities for payment.
 - 1. For individual construction items, longitudinal and lateral measurements for area computations shall be made horizontally or corrected to horizontal measurement unless otherwise specified. Measurements for geotextiles, netting and erosion control blankets shall be along slope lines.
 - 2. For excavation or embankment volumes, the average end area method shall be used to compute volumes. However, if in the judgment of the Contracting Officer (CO), the average end area method is impractical, measurement shall be made by volume in hauling vehicles or by other three-dimensional methods.
 - 3. For Structures, they shall be measured according to neat lines shown on the drawings or as altered by the CO, in writing, to fit field conditions.
 - 4. For items that are measured by the linear foot, such as pipe culverts, fencing, guardrail, piping, utilities, and underdrains, measurements shall be made parallel to the base or foundation upon which the structures are placed.
 - 5. For aggregates weighed for payment, the tonnage shall not be adjusted for moisture content, unless otherwise provided for.
 - 6. For standard manufactured items (such as fence, wire, plates, rolled shapes, pipe conduits) identified by gauge, weight, section dimensions, and so forth, such identifications shall be considered the nominal weights or dimensions. Unless controlled by tolerances in cited specifications, manufacturer's tolerances shall be accepted.
- B. Earthwork Tolerances - Adjustments of horizontal or vertical alignment, within the tolerances specified in this contract, or shifts of balance points up to 100 feet shall be made by the contractor as necessary to produce the designed sections and to balance earthwork. Such adjustments shall not be considered as "Changes."

1.3 UNITS OF MEASUREMENT

- A. Payment shall be by units defined and determined according to U.S. Standard measure and by the following:
1. Acre: Make longitudinal and transverse measurements for area computations horizontally.
 2. 50lb Bag: Measurement will be for the actual number of 50lb bags of standard bentonite grout.
 3. 94lb Bag: Measurement will be for the actual number of 94lb bags of standard cement or grout.
 4. Cubic Yard (CY): A measurement computed by one of the following methods:
 - a. Excavation, Embankment, or Borrow. The measurement computed by the average end area method from measurements made longitudinally along a centerline or reference line.
 - b. Material in Place or Stockpile. The measurement computed using the dimensions of the in-place material.
 - c. Material in the Delivery Vehicle. The measurement computed using measurements of material in the hauling vehicles at the point of delivery. Vehicles shall be loaded to at least their water level capacity. Leveling of the loads may be required when vehicles arrive at the delivery point.
 5. Each (EA): One complete unit, which may consist of one or more parts.
 6. Gallons (GAL): The quantity shall be measured by any of the following methods:
 - a. Measured volume in container.
 - b. Metered volume by approved metering system.
 - c. Commercially package volume.
 7. Hour (HR): Measurement will be for the actual number of hours (or fraction thereof) ordered by the Contracting Officer and performed by the contractor.
 8. Linear Foot (LF): Measurement of work along its length from point-to-point; parallel to the base or foundation. Do not measure overlaps.
 9. Lump Sum (LS): One complete unit.
 10. Mile: Measured horizontally along the centerline of each roadway, approach, or ramp.
 11. Pound (LB): For sacked or packaged material, measurement will be the net weight as packed by the manufacturer.
 12. Square Foot (SF): Measured on a plane parallel to the surface being measured.
 13. Square Yard (SY): Measured on a plane parallel to the surface being measured.
 14. Ton: Measured as a short ton consisting of 2,000 pounds.

1.4 METHOD OF MEASUREMENT

- A. One of the following methods of measurement for determining final payment is designated on the Schedule of Items for each pay item:
1. **ACTUAL QUANTITIES (AQ)** - These quantities are determined from actual measurements of completed work.

2. **DESIGNED QUANTITIES (DQ)** - These quantities denote the final number or units to be paid for under the terms of the contract. They are based upon the original design data available prior to advertising the project. Original design data include the preliminary survey information, design assumptions, calculations, drawings, and the presentation in the contract. Changes in the number of units shown in the Schedule of Items may be authorized under any of the following conditions:
 - a. As a result of changes in the work authorized by the CO.
 - b. As a result of the CO determining that errors exist in the original design that cause a pay item quantity to change by 15 percent or more.
 - c. As a result of the Contractor submitting to the CO a written request showing evidence of errors in the original design that cause a pay item quantity to change by 15 percent or more. The evidence must be verifiable and consist of calculations, drawings, or other data that show how the designed quantity is believed to be in error.
3. **LUMP SUM QUANTITIES (LSQ)** - These quantities denote one complete unit of work as required by or described in the contract, including necessary materials, equipment, and labor to complete the job. They shall not be measured.
4. **STAKED QUANTITIES (SQ)** - These quantities are determined from staked measurements prior to construction.
5. **VEHICLE QUANTITIES (VQ)** - These quantities are measured or weighed in hauling vehicles.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION (NOT APPLICABLE)

END OF SECTION 011250

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ISLAND PARK RANGER STATION SIDEWALK REPLACEMENT
SECTION 011900 - MOBILIZATION

PART 1 - GENERAL

1.1 SUMMARY

- A. This item is intended to compensate the Contractor for operations including, but not limited to, those necessary for the movement of personnel, equipment, supplies, and incidentals to the project site; for payment of premiums for bonds and insurance for the project; and for any other work and operations which must be performed or costs that must be incurred incident to the initiation of meaningful work at the site and for which payment is not otherwise provided for under the contract.

1.2 MEASUREMENT AND PAYMENT

- A. The measurement shall be lump sum for mobilization. Payment shall be as follows:
1. Bond premiums will be reimbursed after receipt of the evidence of payment.
 2. 50% of the lump sum, not to exceed 5% of the original contract amount, will be paid following completion of 5% of the original contract amount not including mobilization and bond premiums.
 3. Payment of the remaining portion of the lump sum, up to 10% of the original contract amount, will be paid following completion of 10% of the original contract amount not including mobilization and bond premiums.
 4. Any portion of the lump sum in excess of 10% of the original contract amount will be paid after final acceptance.
 5. Progress payments for mobilization and preparatory work shall be subject to retainage.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 011900
August 2023

USDA FOREST SERVICE, R4
ISLAND PARK RANGER STATION SIDEWALK REPLACEMENT
SECTION 013300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other miscellaneous submittals. See Table 013300-1 for a summary of required submittals.
- B. See Section 01450 "Quality Control and Quantity Measurements" for submitting test and inspection reports and Delegated-Design Submittals.

1.2 SUBMITTAL PROCEDURES

- A. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
 - 1. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
 - a. The Contracting Officer (CO) reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- B. Processing Time: Allow enough time for submittal review, including time for re-submittals, as follows. Time for review shall commence on CO's receipt of submittal.
 - 1. Initial Review: Allow 14 days for initial review of each submittal. Allow additional time if processing must be delayed to permit coordination with subsequent submittals. CO will advise Contractor when a submittal being processed must be delayed for coordination.
 - 2. If intermediate submittal is necessary, process it in same manner as initial submittal.
 - 3. Allow 14 days for processing each re-submittal.
 - 4. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing.
- C. Identification: Place a permanent label or title block on each submittal for identification.
 - 1. Indicate name of firm or entity that prepared each submittal on label or title block.
 - 2. Provide a space on label or beside title block to record Contractor's review and approval markings and action taken by CO.
 - 3. Include the following information on label for processing and recording action taken:
 - a. Project name.
 - b. Date.

- c. Name and address of Contractor.
 - d. Name of manufacturer.
 - e. Unique identifier, including revision number.
 - f. Number and title of appropriate Specification Section.
 - g. Drawing number and detail references, as appropriate.
 - h. If more than one item is shown on submittal sheet, identify item.
- D. Deviations: Highlight, encircle, or otherwise identify deviations from the Contract Documents on submittals.
 - E. Additional Copies: Unless additional copies are required for final submittal, and unless CO observes noncompliance with provisions of the Contract Documents, initial submittal may serve as final submittal.
 - F. Use for Construction: Use only final submittals with mark indicating action taken by CO in connection with construction.

1.3 MEASUREMENT AND PAYMENT

- A. No separate measurement and/or payment will be made for this section. Payment shall be included with work shown in the schedule of items.

PART 2 - PRODUCTS

2.1 ACTION SUBMITTALS – (Submittals requiring CO approval)

- A. General: Prepare and submit Action Submittals required by individual Specification Sections.
 - 1. Number of Copies: Submit three copies of each submittal, unless otherwise indicated. CO will return two copies. Mark up and retain one returned copy as a Project Record Document.
- B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
 - 1. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
 - 2. Mark each copy of each submittal to show which products and options are applicable.
 - 3. Include the following information, as applicable:
 - a. Manufacturer's written recommendations.
 - b. Manufacturer's product specifications.
 - c. Manufacturer's installation instructions.
 - d. Manufacturer's catalog cuts.
 - e. Wiring diagrams showing factory-installed wiring.
 - f. Compliance with recognized trade association standards.
 - g. Compliance with recognized testing agency standards.

- C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
 - 1. Preparation: Include the following information, as applicable:
 - a. Dimensions.
 - b. Identification of products.
 - c. Fabrication and installation drawings.
 - d. Roughing-in and setting diagrams.
 - e. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.
 - f. Notation of dimensions established by field measurement.
 - 2. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring.
- D. Contractor's Construction Schedule: The contractor shall submit a Construction Schedule, for approval by CO, in accordance with the contract provisions within 5 day of commencement of work.
- E. Samples: Prepare physical units of materials or products, including the following:
 - 1. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.

2.2 INFORMATIONAL SUBMITTALS – (Submittals NOT requiring CO approval)

- A. General: Prepare and submit Informational Submittals required by other Specification Sections.
 - 1. Number of Copies: Submit three copies of each submittal, unless otherwise indicated. CO will not return copies.
 - 2. Certificates and Certifications: Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
 - 3. Test and Inspection Reports: Comply with requirements in Section 014100 "Quality Control."
- B. Material Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements.
- C. Field Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements.
- D. Maintenance Data: Prepare written and graphic instructions and procedures for operation and normal maintenance of products and equipment.

- E. **Manufacturer's Instructions:** Prepare written or published information that documents manufacturer's recommendations, guidelines, and procedures for installing or operating a product or equipment. Include name of product and name, address, and telephone number of manufacturer.

PART 3 - EXECUTION

3.1 GENERAL

- A. Review each submittal and check for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to CO.
- B. **Approval Stamp:** Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.
- C. CO will not review submittals that do not bear Contractor's approval stamp and will return them without action.
- D. Submittals not required by the Contract Documents will not be reviewed and may be discarded.
- E. **Substitutions –** Whenever materials, products, and equipment are listed by name or brand in the specifications and/or on the drawings, it is used as a measure of quality, utility, or standard. If the Contractor prefers to use any other brand or manufacturer of same quality, appearance and utility to that specified, he shall request substitution as provided below, not less than 30 days before the planned installation of the item. The Contracting Officer will approve or disapprove the request for substitution.
- F. Requests for substitutions will only be considered if contractor submits the following:
 - 1. Complete technical data including drawings, complete performance specifications, test data, samples and performance tests of the article proposed for substitution. Submit additional information if required by Contracting Officer. All items in the above information shall be circled, tagged, or marked in some way to indicate all deviations or differences which the proposed item differs from the originally specified item.
 - 2. Similar data as above for item originally specified. All items shall be marked to identify where/how the proposed substitution will differ.
 - 3. A statement by the Contractor that the proposed substitution is in full compliance with the contract documents, applicable codes, and laws.
 - 4. The Contractor shall be responsible for any effect upon related work in the project for any substitution and shall pay any additional costs generated by any substitutions.

- 3.2 **SUBMITTAL SCHEDULE –** Submittals shall be made as required by and called for in the drawings and specifications. The following table is a summary of the required

submittals for the project - the table is to assist the Contractor and may not be all inclusive
 – additional submittals may be required by specific specifications:

TABLE 013000-1

Reference Section	Description	Due Date
FAR 52.236-15	Schedule of Work	2 weeks prior to Pre-work meeting
014100-3.2A	Quality Control Plan	2 weeks prior to start of work
033000-1.3A	Product Data	Prior to start of construction
033000-1.3B	Concrete Design Mix	Prior to start of construction
033000-1.3C	Steel Reinforcement shop drawings	Prior to start of construction
033000-1.3D	Field Quality Control – Test Results	within 48 hrs of test
033000-1.3E	Contraction and Expansion Joint Layout	Prior to start of construction
055213-1.3	Handrails	Prior to start of construction
321204-1.2	Source of Aggregate and Backfill and Sieve Analysis.	2 weeks prior to installation

END OF SECTION 013300
 August 2023

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SECTION 014100 - QUALITY CONTROL

PART 1 - GENERAL

1.1 This work shall consist of providing quality control in conformance with the inspection, testing, and product certification requirements of this contract to ensure compliance with the drawings and specifications. The Contractor shall provide all personnel, equipment, tests, and reports necessary to meet the requirements of the contract.

1.2 QUALITY CONTROL

A. The Contractor shall provide and maintain a quality control system that will ensure all services, supplies, and construction work required under this contract conforms to the contract requirements. The Contractor shall perform, or cause to be performed, the sampling, inspection, and testing required to substantiate that all services, supplies, and construction conform to the contract requirements.

B. Special Tests and Inspections: Contractor will engage a testing agency to conduct required special tests and inspections. The Contractor shall authorize the testing agency to perform the required testing and inspections on the work completed. The authority shall include:

1. Testing agency will interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.
2. Testing agency will re-test and re-inspect corrected work.

C. Retesting/Reinspecting: Contractor shall provide quality-control services for retesting and reinspection for replaced construction work or for work that failed to comply with the requirements under the contract.

1.3 SUBMITTALS

- A. Contractor Quality Control Plan
- B. Permits, Licenses, and Certificates
- C. Test and Inspection Reports
- D. As-Built Drawings

1.4 MEASUREMENT AND PAYMENT

A. No separate payment will be made for the work included under this section; rather payment shall be considered to be included in the items of work listed in the Schedule of Items.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 QUALITY CONTROL SYSTEM

- A. General: Perform required testing, inspections, sampling, and similar services per direction specified in the contract drawings and specifications and in accordance with established industry standards.

3.2 CONTRACTOR QUALITY CONTROL PLAN

- A. At the time of the preconstruction conference, the Contractor shall submit for approval a written Contractor Quality Control Plan.
 - 1. If the plan requires any revisions or corrections, the Contractor shall resubmit the plan within 10 days.
 - 2. The Government reserves the right to require changes in the plan during the contract period as necessary.
 - 3. No change in the approved plan may be made without written concurrence by the Contracting Officer.
 - 4. At a minimum, the plan shall include the following:
 - a. A list of personnel responsible for quality control and assigned duties. Include each person's qualifications.
 - b. A copy of a letter of direction to the Contractor's Quality Control Supervisor outlining assigned duties.
 - c. Names, qualifications, and descriptions of laboratories to perform sampling and testing, and samples of proposed report forms.
 - d. Methods of performing, documenting, and enforcing quality control of all work.
 - e. Methods of monitoring and controlling environmental pollution and contamination as required by all applicable regulations and laws.

3.3 TEST AND INSPECTION REPORTS

- A. Submit three copies of complete test results no later than three calendar days after the test was performed.
- B. Submit failing test results and proposed remedial actions within four hours of noted deficiency.
- C. Testing and Inspection Reports shall include the following:
 - 1. Date of issue.
 - 2. Project title and number.
 - 3. Name, address, and telephone number of testing agency.
 - 4. Dates and locations of samples, tests, or inspections.
 - 5. Names of individuals performing tests and inspections.
 - 6. Reference Specification Section(s).
 - 7. Complete test or inspection data.

8. Test and inspection results and an interpretation of test results.
9. Ambient conditions at time sample was taken, tested, or inspected.
10. Comments or professional opinion on whether tested or inspected work complies with the Contract Document requirements.
11. Name and signature of laboratory inspector.
12. Recommendations on retesting and reinspecting.

3.4 PERMITS, LICENSES, AND CERTIFICATES

- A. For Contracting Officer’s records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations relevant to the on performance of the work.

3.5 AS-BUILT DRAWINGS

- A. The Contractor shall maintain a set of the contract drawings depicting as-built conditions. These drawings shall be maintained in a current condition and shall be available for review. All variations from the original contract drawings shall be indicated in red on the drawings. Upon completion of the contract work, as-built drawings shall be submitted to the Contracting Officer.

3.6 SAMPLING, TESTING, AND CERTIFICATION REQUIREMENTS

- A. Sampling, testing, and Certification requirements and frequency for specific items shall be as specified in the drawings and specification. The following table is a summary of the required sampling, testing, and certification for the project - the table is to assist the Contractor, but may not be all inclusive – additional submittals may be required by specific specification section:

B.

TABLE 014100-1			
Item	Subsection	Certification or Test Required	Frequency
033000	2.10	Mixing and Delivery	Each Truck
033000	3.13	Concrete – Slump, Air, Temperature	1 composite per truck load delivered
312000	3.17D	Compaction Test – Exterior Concrete Slabs	1 per slab

END OF SECTION 014100

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USDA FOREST SERVICE, R4
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SECTION 024100 - WASTE MATERIAL DISPOSAL

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the loading, handling, hauling, and placing of excess excavation material, unsuitable excavation material, and construction and demolition debris.

1.2 MEASUREMENT AND PAYMENT

- A. There will be no separate measurement or payment for work in this Section. Waste material disposal is considered incidental to other items of work shown in the Schedule of Items.

PART 2 - PRODUCTS – NOT APPLICABLE

PART 3 - EXECUTION

3.1 WASTE MATERIAL TO BE HAULED TO A LANDFILL

- A. All demolition materials, garbage, and other refuse generated shall be removed from the project site and legally disposed off of Government property in an approved landfill.
- B. The contractor is responsible for all costs and permits associated with landfill disposal.
- C. The Government is not responsible for waste material upon its departure from the project site.

END OF SECTION 024100
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SECTION 024102 - REMOVAL AND DISPOSAL OF STRUCTURES AND OBSTRUCTIONS

PART 1 - GENERAL

1.1 SUMMARY

- A. Includes removal disposal, and backfilling of existing sidewalks, stairs, landings, and all other items to the extent shown on the Drawings.
- B. Related Sections Include the Following:
 - 1. Section 024100 "Waste Material Disposal."
 - 2. Section 312100 "Project Site Preparation and Grading."

1.2 MEASUREMENT AND PAYMENT

- A. Payment will be lump sum for removal and disposal of the sidewalks, stairs, landings, and all other items to the extent shown on the Drawings.

1.3 PRODUCTS – Not Applicable

PART 2 - EXECUTION

2.1 GENERAL

- A. Topsoil stripping and storage, if required, shall comply with the applicable specification.
- B. The Contractor may use any means to remove the structures or items shown on the Drawings to be removed, as long as the safety of the public is provided and the surrounding site and structures are preserved.
- C. All of a substructure shall be demolished to a depth of 1 foot below the present ground level. All wood, concrete, and metal materials to be removed shall be broken into sufficiently small pieces to enable handling and disposal. All other structures shall be backfilled and the surrounding ground restored to as near normal conditions as practicable in accordance with these specifications.
- D. Backfill for removed items may be excess material from other excavation or borrow from an approved source.
 - 1. Backfill shall be brought up in 12-inch compacted layers.
 - 2. Compaction shall be by mechanical tampers, with at least three passes over the entire surface.
 - 3. Maximum size of rock in backfill shall be 8 inches.
 - 4. Backfill shall be compacted and rounded 6 inches above the natural ground.
 - 5. If the backfill is not in an existing roadway or parking area, and at least 20 feet away from any proposed structure, the backfill shall be as specified above, except

backfill shall be graded to blend with the natural ground and each layer compacted to **85 percent** of the optimum dry density determined by AASHTO T-99, Method C.

6. In areas where backfill is in graveled or paved surface roadways, or within 20 feet of a proposed structure, the backfill shall be as specified above, except it shall be terminated at the grade shown on the drawings and each layer compacted to **95 percent** of the optimum dry density determined by AASHTO T-99, Method C. Completion of backfill shall be in accordance with the applicable surfacing specifications.
7. When topsoil replacement is required, backfill and compaction shall be as specified above, except the backfill shall terminate 6 inches below the natural ground. Placement of topsoil, when required, shall comply with the applicable specification.

- E. Excessive settlement or other evidence of improper backfill shall be corrected by reopening the excavation to the depth required for proper refilling and compaction.

2.2 DISPOSAL

- A. Disposal of debris shall comply with Section 024100 "Waste Material Disposal."

END OF SECTION 024102

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SECTION 033000 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section specifies cast-in place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes.

1.2 DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume; subject to compliance with requirements.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Design Mixtures: For each concrete mixture. Indicate amounts of mixing water to be withheld for later addition at Project site.
- C. Steel Reinforcement Shop Drawings when project design requires special consideration.
- D. Field quality-control test reports.
- E. Contraction and Expansion Joint Layout.

1.4 MEASUREMENT AND PAYMENT

- A. There will be no separate measurement or payment for work in this section. Payment will be included at the contract unit price for items shown on the Schedule of Items.

PART 2 - PRODUCTS

2.1 FORM-FACING MATERIALS

- A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
 - 1. Plywood, metal, or other approved panel materials.
 - 2. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:
 - a. Structural 1, B-B or better; mill oiled and edge sealed.
 - b. B-B (Concrete Form), Class 1 or better; mill oiled and edge sealed.

- B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.
- C. Forms for Cylindrical Columns, Pedestals, and Supports: Metal, glass-fiber-reinforced plastic, paper, or fiber tubes that will produce surfaces with gradual or abrupt irregularities not exceeding specified formwork surface class. Provide units with sufficient wall thickness to resist plastic concrete loads without detrimental deformation.
- D. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.
- E. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
 - 1. Furnish units that will leave no corrodible metal closer than 1 inch (25 mm) to the plane of exposed concrete surface.
 - 2. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

2.2 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 , deformed.
- B. Plain-Steel Wire: ASTM A 82, as drawn.
- C. Deformed-Steel Wire: ASTM A 496.

2.3 REINFORCEMENT ACCESSORIES

- A. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60, plain-steel bars, cut bars true to length with ends square and free of burrs.
- B. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:
 - 1. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.

2.4 CONCRETE MATERIALS

- A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:
 - 1. Portland Cement: ASTM C 150, Type II.
- B. Normal-Weight Aggregates: ASTM C 33, graded, from a single source.

1. Maximum Coarse-Aggregate Size: 1 inch (25 mm) nominal.
 2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- C. Water: ASTM C 94/C 94M and potable.
- D. Fly ash, ground iron blast-furnace slag, or silica fume may partially replace cement in any mix as follows:
1. Fly Ash:
 - a. Class C – Not more than 25 percent of the minimum mass of portland cement may be replaced with class C fly ash.
 2. Ground Iron Blast-Furnace Slag: Not more than 25 percent of the minimum mass of portland cement may be replaced with ground iron blast-furnace slag.
 3. Silica Fume (microsilica): Not more than 10 percent of the minimum mass of portland cement may be replaced with silica fume.
 4. Additionally, fly ash, slag, and silica fume will constitute no more than 50 percent of the total replacement weight.

2.5 ADMIXTURES

- A. Air-Entraining Admixture: ASTM C 260.
- B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
1. Retarding Admixture: ASTM C 494/C 494M, Type B.

2.6 VAPOR RETARDERS

- A. Plastic Vapor Retarder: ASTM E 1745, Class C, or polyethylene sheet, ASTM D 4397, not less than 10 mils (0.25 mm) thick. Include manufacturer's recommended adhesive or pressure-sensitive joint tape.
1. Basis of Design Product: Raven Industries, Vapor Block Plus 20 or approved equal.
- B. Fine-Graded Granular Material: Clean mixture of crushed stone, crushed gravel, and manufactured or natural sand; ASTM D 448, Size 10, with 100 percent passing a 3/8-inch (9.5-mm) sieve, 10 to 30 percent passing a No. 100 (0.15-mm) sieve, and at least 5 percent passing No. 200 (0.075-mm) sieve; complying with deleterious substance limits of ASTM C 33 for fine aggregates.

2.7 CURING MATERIALS

- A. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.

- B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- C. Water: Potable.
- D. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating or nondissipating. Liquid Membrane-Forming Compounds. Material shall be certified by curing compound manufacturer to not interfere with bonding of floor covering

2.8 RELATED MATERIALS

- A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber or ASTM D 1752, cork or self-expanding cork.
- B. Semirigid Joint Filler: Two-component, semirigid, 100 percent solids, epoxy resin with a Type A shore durometer hardness of 80 per ASTM D 2240.
- C. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.
- D. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements, and as follows:
 - 1. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

2.9 REPAIR MATERIALS

- A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch (3.2 mm) and that can be feathered at edges to match adjacent floor elevations.
 - 1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
 - 2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
 - 3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch (3.2 to 6 mm) or coarse sand as recommended by underlayment manufacturer.
 - 4. Compressive Strength: Not less than [**4000 psi**] at 28 days when tested according to ASTM C 109/C 109M.
- B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch (3.2 mm) and that can be feathered at edges to match adjacent floor elevations.
 - 1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
 - 2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.

3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch (3.2 to 6 mm) or coarse sand as recommended by topping manufacturer.
4. Compressive Strength: Not less than **5000 psi (34.5 MPa)** at 28 days when tested according to ASTM C 109/C 109M.

2.10 CONCRETE MIXTURES, GENERAL

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.
 1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.
- B. Limit water-soluble, chloride-ion content in hardened concrete to 0.06 percent by weight of cement.
- C. Admixtures: Use admixtures according to manufacturer's written instructions.

2.11 CONCRETE MIXTURES FOR BUILDING ELEMENTS

- A. Slabs-on-Grade: Proportion normal-weight concrete mixture as follows: Per the structural drawings unless noted otherwise.
 1. Slump Limit: 4 inches (100 mm), plus or minus 1 inch (25 mm).
 2. Compressive Strength: Not less than [**4000 psi**] at 28 days when tested according to ASTM C 109/C 109M.

2.12 FABRICATING REINFORCEMENT

- A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.13 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M and ASTM C 1116, and furnish batch ticket information.
 1. When air temperature is between 85 and 90 deg F (30 and 32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.
- B. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Mix concrete materials in appropriate drum-type batch machine mixer.
 1. For mixer capacity of 1 cu. yd. (0.76 cu. m) or smaller, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released.
 2. For mixer capacity larger than 1 cu. yd. (0.76 cu. m), increase mixing time by 15 seconds for each additional 1 cu. yd. (0.76 cu. m).

3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture type, mixture time, quantity, and amount of water added. Record approximate location of final deposit in structure.

PART 3 - EXECUTION

3.1 FORMWORK

- A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.
- B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.
- C. Limit concrete surface irregularities, designated by ACI 347R as abrupt or gradual, as follows:
 1. Class A, 1/8 inch (3.2 mm) for smooth-formed finished surfaces.
 2. Class B, 1/4 inch (6 mm) for rough-formed finished surfaces.
- D. Construct forms tight enough to prevent loss of concrete mortar.
- E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
 1. Install keyways, reglets, recesses, and the like, for easy removal.
 2. Do not use rust-stained steel form-facing material.
- F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.
- G. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.
- H. Chamfer or round exterior corners and edges of permanently exposed concrete.
- I. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.
- J. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
- K. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

- L. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.2 EMBEDDED ITEMS

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC's "Code of Standard Practice for Steel Buildings and Bridges."

3.3 REMOVING AND REUSING FORMS

- A. General: Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F (10 deg C) for 48 hours after placing concrete, if concrete is hard enough to not be damaged by form-removal operations and curing and protection operations are maintained.
 - 1. Leave formwork for beam soffits, joists, slabs, and other structural elements that supports weight of concrete in place until concrete has achieved at least 70 percent of its 28-day design compressive strength.
 - 2. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.
- B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.
- C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Contracting Officer.

3.4 VAPOR RETARDERS

- A. Plastic Vapor Retarders: Place, protect, and repair vapor retarders according to ASTM E 1643 and manufacturer's written instructions.
 - 1. Lap joints 6 inches (150 mm) and seal with manufacturer's recommended tape.

3.5 STEEL REINFORCEMENT

- A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.

- C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.
- D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

3.6 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by the Contracting Officer.
 - 1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
 - 2. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
 - 3. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
- C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:
 - 1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/4 inch. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
 - 2. Sawed Joints: **No Sawed Joints are allowed on concrete exposed to freezing.**
- D. Expansion Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
 - 1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface, unless otherwise indicated.
 - 2. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

3.7 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.
- B. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.
- C. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or

planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.

1. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.
 2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
 3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches (150 mm) into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.
- D. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
 2. Maintain reinforcement in position on chairs during concrete placement.
 3. Screed slab surfaces with a straightedge and strike off to correct elevations.
 4. Slope surfaces uniformly to drains where required.
 5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.
- E. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
1. When average high and low temperature is expected to fall below 40 deg F (4.4 deg C) for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
 2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.
- F. Hot-Weather Placement: Comply with ACI 301 and as follows:
1. Maintain concrete temperature below 90 deg F (32 deg C) at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
 2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

3.8 FINISHING FORMED SURFACES

- A. As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
- B. Rubbed Finish: Apply the following to smooth-formed finished as-cast concrete where indicated:
 - 1. Grout-Cleaned Finish: Wet concrete surfaces and apply grout of a consistency of thick paint to coat surfaces and fill small holes. Mix one part portland cement to one and one-half parts fine sand with a 1:1 mixture of bonding admixture and water. Add white portland cement in amounts determined by trial patches so color of dry grout will match adjacent surfaces. Scrub grout into voids and remove excess grout. When grout whitens, rub surface with clean burlap and keep surface damp by fog spray for at least 36 hours.
- C. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

3.9 FINISHING FLOORS AND SLABS

- A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture.
 - 1. Apply float finish to surfaces to receive trowel finish and to be covered with fluid-applied or sheet waterproofing.
- C. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
 - 1. Apply a trowel finish to surfaces to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane.
 - 2. Finish and measure surface so gap at any point between concrete surface and an unveled, freestanding, 10-foot- (3.05-m-) long straightedge resting on 2 high spots and placed anywhere on the surface does not exceed 1/8 inch (3.2 mm)
- D. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces indicated. While concrete is still plastic, slightly scarify surface with a fine broom.
 - 1. Comply with flatness and levelness tolerances for trowel finished floor surfaces.

- E. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, and ramps, and elsewhere as indicated.
 - 1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Contracting Officer before application.

3.10 MISCELLANEOUS CONCRETE ITEMS

- A. Filling In: Fill in holes and openings left in concrete structures, unless otherwise indicated, after work of other trades is in place. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.
- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

3.11 CONCRETE PROTECTING AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.
- B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h (1 kg/sq. m x h) before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for the remainder of the curing period.
- D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.
- E. Cure concrete according to ACI 308.1, by one or a combination of the following methods:
 - 1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
 - a. Water.
 - b. Continuous water-fog spray.
 - c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch (300-mm) lap over adjacent absorptive covers.
 - 2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides

and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

- a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.
 - b. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.
 - c. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer certifies will not interfere with bonding of floor covering used on Project..
3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.
- a. After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer unless manufacturer certifies curing compound will not interfere with bonding of floor covering used on Project.

3.12 CONCRETE SURFACE REPAIRS

- A. Defective Concrete: Repair and patch defective areas when approved by Contracting Officer. Remove and replace concrete that cannot be repaired and patched to Contracting Officer's approval.
- B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part portland cement to two and one-half parts fine aggregate passing a No. 16 (1.18-mm) sieve, using only enough water for handling and placing.
- C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
 1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch (13 mm) in any dimension in solid concrete, but not less than 1 inch (25 mm) in depth. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
 2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
 3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Contracting Officer.

- D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch (0.25 mm) wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
 2. After concrete has cured at least 14 days, correct high areas by grinding.
 3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
 4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
 5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch (6 mm) to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
 6. Repair defective areas, except random cracks and single holes 1 inch (25 mm) or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4-inch (19-mm) clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
 7. Repair random cracks and single holes 1 inch (25 mm) or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.
- E. Perform structural repairs of concrete, subject to Contracting Officer's approval, using epoxy adhesive and patching mortar.
- F. Repair materials and installation not specified above may be used, subject to Contracting Officer's approval.

3.13 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Contractor will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.

- B. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
1. Testing Frequency: See Table 3.6 in Section 014100. A composite sample set consists of one slump test, one air entrainment test, and one temperature test.
 2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample. Perform additional tests when concrete consistency appears to change or water is added.
 3. Air Content: ASTM C 231, pressure method, for normal-weight concrete; one test for each composite sample.
 4. Concrete Temperature: ASTM C 1064/C 1064M; one test for each composite sample.
 5. Compression Test Specimens: ASTM C 31/C 31M. Cast and laboratory cure one set of three standard cylinder specimens for each composite sample.
 - a. Compressive-Strength Tests: ASTM C 39/C 39M; test one of three laboratory-cured specimens at 7 days and one specimen at 28 days. If either previous tests fail, test third specimen at 28 days.
 - b. Strength of each batch delivered will be satisfactory if 28-day compressive-strength tests equals or exceeds specified compressive strength.
- C. Test results shall be reported in writing to Contracting Officer and Contractor within 48 hours of testing. Reports shall contain project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
- D. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
- E. Correct deficiencies in the work that test reports and inspections indicate does not comply with the Contract Documents.

END OF SECTION 033000
August 2023

USDA FOREST SERVICE, R4
ISLAND PARK RANGER STATION SIDEWALK REPLACEMENT
SECTION 033440 - CONCRETE STAIRS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. This work shall consist of constructing concrete stairs (including landings) in accordance with the requirements of this specification and to the lines and dimensions as shown on the drawings and as staked in the field.

B. Related Sections include the following:

1. Section 033000 "Cast-In-Place Concrete" for concrete and reinforcing.
2. Section 312225 "Excavation and Embankment"
3. Section 321204 "Crushed Aggregate Base" for preparing subgrade.

1.2 MEASUREMENT AND PAYMENT

A. Measurement of concrete will be Cubic Yards, as indicated in the Schedule of Items. The quantity to be measured shall be cubic yards of either "Nonreinforced Concrete" or "Reinforced Concrete." In either case, the concrete will be measured in accordance with the dimensions shown on the drawings or such other dimensions as may be ordered in writing by the Contracting Officer. No deduction will be made for the volume occupied by bar reinforcing steel or structural steel in the concrete.

PART 2 - PRODUCTS

2.1 AGGREGATE BASE MATERIAL

A. Aggregate leveling material upon which the concrete will be placed shall be in accordance with Section 321204 "Crushed Aggregate Base" and as Shown on the Drawings. Material shall be crushed aggregate base – grading D or alternative approved by the CO.

B. CONCRETE

C. Concrete shall be in accordance with Section 033000 "Case In Place Concrete".

PART 3 - EXECUTION

3.1 GENERAL

A. If adjacent surfaces (asphalt or concrete) are complete, they shall be neatly cut and prepared for construction of the concrete stairs.

3.2 EXCAVATION

- A. Excavate and backfill to sub-base as shown on the drawings in according with section 312225 “Excavation and Embankment”.
- B. Compact sub-base until visual displacement ceases making no fewer than three complete passes with an approved lightweight mechanical tamper, roller, or vibratory compactor.
- C. SUB-BASE
- D. Place and compact a leveling course of crushed aggregate material as shown on the drawing to a minimum compacted depth of 12-inches.
- E. Moisten or dry the aggregate base material to an uniform moisture content suitable for compaction Compact the leveling course until visual displacement ceases making no fewer than three complete passes with an approved lightweight mechanical tamper, roller, or vibratory system.

3.3 CONCRETE STAIRS

- A. Concrete stairs shall be constructed in on complete unit or segments as approved by the COR and as Shown on the Drawings.
- B. Tie the stairs/landing into the building with #4 rebar expansion joint.
- C. Run #4 rebar along the ramp, minimum 2’ OCEW.
- D. Apply ½” thick expansion joint material between stairs and ramp and concrete sidewalks.
- E. The final finish of the stairs shall receive a light broom finish in the same direction as the traffic flow.

3.4 CLEANUP

- A. Upon completion of the work, the area shall be finish graded as Shown on the Drawing using topsoil material.
- B. When the stair installation has been completed, all debris and material not utilized shall be removed.

END OF SECTION 026440

August 2023

USDA FOREST SERVICE, R4
ISLAND PARK RANGER STATION SIDEWALK REPLACEMENT
SECTION 033530 - CAST-IN-PLACE CONCRETE CURB AND GUTTER

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Cast-in-place concrete curb and gutter.
- B. Related Sections include the following:
 - 1. Section "Crushed Aggregate Base or Surface Course" for preparing subgrade.
 - 2. Section "Cast-In-Place Concrete" for concrete and reinforcing.

1.2 MEASUREMENT AND PAYMENT

- A. Measurement shall be the linear foot of concrete curb and gutter measured in place along the edge of curb. Measurement and payment shall include clearing and grubbing, construction and compaction of the subgrade, crushed aggregate base course, and concrete.

PART 2 - PRODUCT (not used)

PART 3 - EXECUTION

3.1 GENERAL

- A. The parking area shall be graded and shaped to required elevations prior to construction of curb and gutter.
- B. The base for the gutter shall be excavated to the required depth.
- C. The base shall be compacted with two passes of an approved mechanical compactor.

3.2 INSTALLATION

- A. The curb shall be neatly formed and cast-in-place in accordance with Section 033000. Control joints shall be installed at maximum 10' on centers, and expansion joint (1/2" felt) shall be installed at maximum 60' on centers.

3.3 BACKFILL

- A. Backfill up to the finished subgrade elevation of the parking lot shall be a crushed aggregate and/or native soil placed and compacted in accordance with Section 02240. The remaining native soil backfill on the slope side of the curb and gutter shall be

uniformly spread to the neat lines as shown on the drawings and compacted with two passes of an approved mechanical compactor.

3.4 CLEANUP

- A. When the installation of the curb and gutter has been completed, all debris and material not utilized shall be removed.

END OF SECTION 02624

August 2023

USDA FOREST SERVICE, R4
ISLAND PARK RANGER STATION SIDEWALK REPLACEMENT
SECTION 033540 - CONCRETE SIDEWALK

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. This work shall consist of constructing concrete sidewalks (including flagpole base) and accessible ramps from parking area in accordance with the requirements of this specification and to the lines and dimensions of the existing sidewalks and as shown on the drawings and as staked in the field.
- B. Related Sections include the following:
 - 1. Section 321204 "Crushed aggregate Base" for preparing subgrade.
 - 2. Section 033000 "Cast-In-Place Concrete" for concrete and reinforcing.
 - 3. Section 312100 "Site Preparation and Grading" for preparation of subgrade
 - 4. Section 311010 "Site Clearing"
 - 5. Section 312000 "Earthwork" for construction of subgrade.

1.2 MEASUREMENT AND PAYMENT

- A. Payment shall be linear feet for construction of the sidewalks and each for curb cut ramps from the parking area as shown in the Drawings and in place of existing. Measurement and payment shall include site clearing, construction and compaction of the subgrade and concrete.

PART 2 - PRODUCT

2.1 COMPACTION

- A. Fill material and natural ground upon which the concrete will be placed shall be in accordance with Section 312000 "Earthwork."

2.2 CONCRETE

- A. Placement, Finishing, Curing, and Protection shall be in accordance with Section 033000 "Cast-in-Place Concrete."

2.3 JOINTS

- A. The sidewalk shall be divided into sections by control joints formed by a jointing tool. The control joints shall extend into the concrete at least 1/4 of the slab thickness. Joints shall match as nearly as possible adjacent joints in curb or pavements, be equally spaced, and not be spaced more than 10 feet. Spacing of expansion joints with 1/2 inch thick pre-

molded joint filler extending the full depth of the sidewalk shall not exceed 50 feet unless otherwise shown on the drawings.

- B. Construction joints shall be formed around all appurtenances, such as manholes, utility poles, etc., which extend into and through the sidewalks. Pre-molded expansion joint filler 1/2 inch thick shall be installed in these joints. Expansion joint filler shall be installed between concrete sidewalks and any fixed structure such as a building or bridge. This expansion joint material shall extend to the full depth of the walk.

PART 3 - EXECUTION

3.1 GENERAL

- A. The area for construction of the sidewalk shall be cleared and grubbed in accordance with the drawings and specifications Section 311010 "Site Clearing."
- B. The subgrade for the sidewalk shall be graded and shaped to required elevations for construction of the base course and concrete sidewalk. Construction and compaction of subgrade shall be in accordance with specification section 312000 "Earthwork."
- C. The aggregate base course shall be constructed and compacted to the thickness shown on the drawings and in accordance with specifications section 321204 "Crushed Aggregate Base and Surface Course." Minimum thickness shall be 12 inches compacted depth unless noted otherwise.
- D. Concrete shall be placed to the dimensions shown on the drawings and in accordance with specification section 033000 "Cast In Place Concrete."

3.2 FINISH GRADING AND CLEANUP

- A. Backfill and finish grade around sidewalk. Finish grading shall be native soil material placed next to sidewalk from top of sidewalk and graded away for a minimum of 2 feet at a 2 to 5 percent slope. Blend into adjacent area beyond 2 feet.
- B. When the installation has been completed, all debris and material not utilized shall be removed.

END OF SECTION 033540

August 2023

USDA FOREST SERVICE, R4
ISLAND PARK RANGER STATION SIDEWALK REPLACEMENT
SECTION 055213 - PIPE RAILINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Steel pipe railings.

1.2 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design railings, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

B. Structural Performance: Railings shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:

1. Handrails and Top Rails of Guards:

- a. Uniform load of 50 lbf/ ft. applied in any direction.
- b. Concentrated load of 200 lbf applied in any direction.
- c. Uniform and concentrated loads need not be assumed to act concurrently.

C. Infill of Guards:

- a. Concentrated load of 50 lbf applied horizontally on an area of 1 sq. ft.
- b. Infill load and other loads need not be assumed to act concurrently.

D. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

1.3 ACTION SUBMITTALS

A. Product Data: For the following:

1. Manufacturer's product lines of mechanically connected railings.
2. Railing brackets.
3. Grout, anchoring cement, and paint products.

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

C. Delegated-Design Submittal: For railings, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.4 MEASUREMENT AND PAYMENT:

- A. Payment will be lump sum for materials and installation of the railings as shown on the Drawings and in place of existing.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Steel Pipe Railings:
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide a product as noted in the drawings or comparable product by one of the following:
 - a. Local manufacturer meeting design criteria.

2.2 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design railings, including attachment to building construction.
- B. Structural Performance: Railings, including attachment to building construction, shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
 - 1. Handrails and Top Rails of Guards:
 - a. Uniform load of 50 lbf/ ft. Applied in any direction.
 - b. Concentrated load of 200 lbf applied in any direction.
 - c. Uniform and concentrated loads need not be assumed to act concurrently.
 - d. Infill of Guards:
 - e. Concentrated load of 50 lbf applied horizontally on an area of 1 sq. ft..
 - f. Infill load and other loads need not be assumed to act concurrently.

2.3 METALS, GENERAL

- A. Brackets, Flanges, and Anchors: Cast or formed metal of same type of material and finish as supported rails unless otherwise indicated.
 - 1. Provide type of bracket with predrilled hole for exposed bolt anchorage and that provides 1-1/2-inch clearance from inside face of handrail to finished wall surface.

2.4 STEEL AND IRON

- A. Pipe: ASTM A 53/A 53M, Type F or Type S, Grade A, Standard Weight (Schedule 40), unless another grade and weight are required by structural loads.
- B. Plates, Shapes, and Bars: ASTM A 36/A 36M.

2.5 FASTENERS

- A. General: Provide the following:
 - 1. Ungalvanized-Steel Railings: Plated steel fasteners complying with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5 for zinc coating.
- B. Post-Installed Anchors: Torque-controlled expansion anchors capable of sustaining, without failure, a load equal to 6 times the load imposed when installed in unit masonry and 4 times the load imposed when installed in concrete, as determined by testing according to ASTM E 488/E 488M, conducted by a qualified independent testing agency.
 - 1. Material for Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, unless otherwise indicated.

2.6 MISCELLANEOUS MATERIALS

- A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
- B. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.
- C. Epoxy Intermediate Coat: Complying with MPI #77 and compatible with primer and topcoat.
- D. Polyurethane Topcoat: Complying with MPI #72 and compatible with undercoat.
- E. Nonshrink, Nonmetallic Grout: Factory-packaged, non-staining, noncorrosive, nongaseous grout complying with ASTM C 1107/C 1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.

2.7 FABRICATION

- A. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- B. Form work true to line and level with accurate angles and surfaces.
- C. Welded Connections: Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove flux immediately.
 - 4. At exposed connections, finish exposed surfaces smooth and blended so no roughness shows after finishing and welded surface matches contours of adjoining surfaces.
- D. Nonwelded Connections: Connect members with concealed mechanical fasteners and fittings. Fabricate members and fittings to produce flush, smooth, rigid, hairline joints.

- E. Form changes in direction by bending.
- F. For changes in direction made by bending, use jigs to produce uniform curvature for each repetitive configuration required. Maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.
- G. Close exposed ends of railing members with prefabricated end fittings.
- H. Provide wall returns at ends of wall-mounted handrails unless otherwise indicated.
- I. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work unless otherwise indicated.
 - 1. At brackets and fittings fastened to plaster or gypsum board partitions, provide crush-resistant fillers or other means to transfer loads through wall finishes to structural supports and prevent bracket or fitting rotation and crushing of substrate.

2.8 STEEL AND IRON FINISHES

- A. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
- B. Primer Application: Apply shop primer to prepared surfaces of railings unless otherwise indicated. Comply with requirements in SSPC-PA 1, "Shop, Field, and Maintenance Painting of Steel," for shop painting. Primer need not be applied to surfaces to be embedded in concrete or masonry.
- C. High-Performance Coating: Apply epoxy intermediate and polyurethane topcoats to prime-coated surfaces. Comply with coating manufacturer's written instructions and with requirements in SSPC-PA 1, "Shop, Field, and Maintenance Painting of Steel," for shop painting. Apply at spreading rates recommended by coating manufacturer.
 - 1. Color: As selected by COR from manufacturer's full range.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Set railings accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.
 - 1. Do not weld, cut, or abrade surfaces of railing components that are coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.
 - 2. Set posts plumb within a tolerance of 1/16 inch in 3 feet .
 - 3. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet.

- B. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.
 - 1. Coat, with a heavy coat of bituminous paint, concealed surfaces of aluminum that are in contact with grout, concrete, masonry, wood, or dissimilar metals.

3.2 ANCHORING POSTS

- A. Use metal sleeves preset and anchored into concrete for installing posts. After posts are inserted into sleeves, fill annular space between post and sleeve with nonshrink, nonmetallic grout, mixed and placed to comply with anchoring material manufacturer's written instructions.
- B. Form or core-drill holes not less than 5 inches deep and 3/4 inch larger than OD of post for installing posts in concrete. Clean holes of loose material, insert posts, and fill annular space between post and concrete with nonshrink, nonmetallic grout, mixed and placed to comply with anchoring material manufacturer's written instructions.
- C. Anchor posts to metal surfaces with oval flanges, angle type, or floor type as required by conditions, connected to posts and to metal supporting members.

END OF SECTION 055213
FEBRUARY 2022

USDA FOREST SERVICE, R4
ISLAND PARK RANGER STATION SIDEWALK REPLACEMENT
SECTION 311010 - SITE CLEARING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Protecting existing trees and vegetation to remain.
 - 2. Removing trees and other vegetation.
 - 3. Clearing and grubbing.
 - 4. Topsoil stripping.
 - 5. Removing above-grade site improvements.
 - 6. Temporary erosion and sediment control measures.

1.2 MATERIALS OWNERSHIP

- A. Except for materials indicated to be stockpiled or to remain Government's property, cleared materials shall become Contractor's property and shall be removed from the site.

1.3 PROJECT CONDITIONS

- A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.
- B. Salvable Improvements: Carefully remove items indicated to be salvaged and store on Government's premises where indicated or as Directed by the Contracting Officer (C.O.).
- C. Notify utility locator service for area where Project is located before site clearing.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

- A. Satisfactory Soil Materials: As specified in Division 2 Section "Earthwork."
 - 1. Obtain approved borrow soil materials off-site when satisfactory soil materials are not available on-site.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Provide erosion-control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

- B. Protect and maintain benchmarks and survey control points from disturbance during construction.
- C. Locate and clearly flag trees and vegetation to remain or to be relocated.
- D. Protect existing site improvements to remain from damage during construction.
 - 1. Restore damaged improvements to their original condition, as acceptable to CO.

3.2 TREE PROTECTION

- A. Where excavation for new construction is required within drip line of trees, hand clear and excavate to minimize damage to root systems. Use narrow-tine spading forks, comb soil to expose roots, and cleanly cut roots as close to excavation as possible.
- B. Repair or replace trees and vegetation indicated to remain that are damaged by construction operations, in a manner approved by CO.

3.3 UTILITIES

- A. Do not interrupt utilities serving facilities occupied by Government or others unless permitted. Arrange to provide temporary utility services.

3.4 CLEARING AND GRUBBING

- A. Remove obstructions, trees, shrubs, grass, and other vegetation to permit installation of new construction. Removal includes digging out stumps and obstructions and grubbing roots.
- B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material, unless further excavation or earthwork is indicated.
 - 1. Place fill material in horizontal layers not exceeding 8-inch (200-mm) loose depth, and compact each layer to a density equal to adjacent original ground.

3.5 TOPSOIL STRIPPING

- A. Remove sod and grass before stripping topsoil.
- B. Strip topsoil to whatever depths are encountered in a manner to prevent intermingling with underlying subsoil or other waste materials.
- C. Stockpile topsoil materials away from edge of excavations without intermixing with subsoil. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust.

3.6 SITE IMPROVEMENTS

- A. Remove existing above- and below-grade improvements as indicated and as necessary to facilitate new construction.

3.7 DISPOSAL

- A. Disposal: Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials, including trash and debris, and legally dispose of them off Government's property.

END OF SECTION 02230

August 2023

USDA FOREST SERVICE, R4
ISLAND PARK RANGER STATION SIDEWALK REPLACEMENT
SECTION 312000 - EARTHWORK

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
1. Preparing subgrades for slabs-on-grade, sidewalks, lawns, and plantings.
 2. Sub-surface drainage.

1.2 DEFINITIONS

- A. Backfill: Soil materials used to fill an excavation.
- B. Borrow or Select Borrow: Satisfactory soil material used for embankment, backfill, or fill construction that is either imported from off-site or excavated from designated locations at the site.
- C. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.
1. Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Contracting Officer. Additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
 2. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction of the Contracting Officer. Unauthorized excavation, as well as remedial work directed by Contracting Officer, shall be without additional compensation.
 3. Unclassified Excavation: Excavation to subgrade elevation and to lines and dimensions indicated regardless of the character of surface and subsurface conditions encountered, including rock, soil materials, and obstructions.
- D. Fill: Soil materials used to raise existing grades.
- E. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.
- F. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below subbase, aggregate base, drainage fill, initial or subsequent backfill, or topsoil materials.
- G. Utilities include on-site underground pipes, conduits, ducts, and cables, as well as underground services within building.

1.3 SUBMITTALS

- A. Contractor shall submit to the Contracting Officer for approval source of aggregates and backfill materials and certified sieve analysis. Materials from Government Sources are exempt from this requirement.

1.4 PROJECT CONDITIONS

- A. Existing Utilities: Do not interrupt utilities serving facilities occupied by Government or others unless permitted in writing by Contracting Officer and then only after arranging to provide temporary utility services according to requirements indicated:
 - 1. Notify Contracting Officer not less than two days in advance of proposed utility interruptions.
 - 2. Do not proceed with utility interruptions without Contracting Officer's written permission.
 - 3. Contact utility-locator service for area where Project is located before excavating.

1.5 MEASUREMENT AND PAYMENT

- A. There will be no separate measurement or payment for work in this Section. Payment will be included in the contract unit price as shown on the Schedule of Items.

PART 2 - PRODUCTS

2.1 BACKFILL MATERIALS, GENERAL

- A. Excavated material may be processed and used for backfill if the Contractor can show compliance with the material specified herein to the satisfaction of the Contracting Officer. If excavated material is not sufficient to meet requirements, Contractor shall import needed material.
- B. Satisfactory Soils: ASTM D 2487 soil classification groups GW, GP, GM, SW, SP, and SM, or a combination of these group symbols; free of rock or gravel larger than 3 inches (75 mm) in any dimension, debris, waste frozen materials, vegetation, and other deleterious matter.
- C. Unsatisfactory Soils: ASTM D 2487 soil classification groups GC, SC, ML, MH, CL, CH, OL, OH, and PT, or a combination of these group symbols.
 - 1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.
- D. Backfill and Fill: Satisfactory soil materials.
 - 1. Remove rocks over 8 inches in maximum dimension, ice or frozen earth, muck, debris, and earth with high void content.
 - 2. Remove rocks over 4 inches in maximum dimension for backfill placed within 12 inches of foundation.

2.2 ENGINEERED FILL

- A. Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1 1/2 inch sieve and not more than 12 percent passing a No. 200 sieve.
- B. DRAINAGE FABRIC
- C. Nonwoven geotextile, specifically manufactured as a drainage geotextile; made from polyolefin's, polyesters, or polyamides; and with the following minimum properties determined according to ASTM D 4759 and referenced standard test methods:
 - 1. Grab Tensile Strength: 110 lbf (490 N); ASTM D 4632.
 - 2. Tear Strength: 40 lbf (178 N); ASTM D 4533.
 - 3. Puncture Resistance: 50 lbf (222 N); ASTM D 4833.
 - 4. Water Flow Rate: 150 gpm per sq. ft. (100 L's per sq.m.); ASTM D 4491.
 - 5. Apparent Opening Size: No. 50 (0.3 mm); ASTM D 4751.

2.3 ACCESSORIES

- A. Detectable Warning Tape: Acid- and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored as follows:
 - 1. Red: Electric.
 - 2. Yellow: Gas, oil, steam, and dangerous materials.
 - 3. Orange: Telephone and other communications.
 - 4. Blue: Water systems.
 - 5. Green: Sewer systems.
- B. Tracer Wire: #14 copper wire, covered.

PART 3 - EXECUTION

3.1 LOCATION, ALIGNMENT AND GRADE

- A. The location of all structures shall be staked out and grades established by the Contractor. Locations shall be approved by the Contracting Officer before excavation is started.

3.2 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earthwork operations.
- B. Protect subgrades and foundation soils against freezing temperatures or frost. Provide protective insulating materials as necessary.

- C. Provide erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

3.3 DEWATERING

- A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.
- B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.
 - 1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.
 - 2. Install a dewatering system to keep subgrades dry and convey ground water away from excavations. Maintain until dewatering is no longer required.

3.4 EXPLOSIVES

- A. Do not use explosives.

3.5 EXCAVATION SUPPORT AND PROTECTION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards that could develop during excavation.
- B. Design, furnish, install, monitor, and maintain excavation support and protection system capable of supporting excavation sidewalls and resisting soil and hydrostatic pressures and superimposed and construction loads.
- C. The contractor shall meet State General Safety Orders and the provisions of the Occupational Safety and Health Administration (OSHA) pertaining to excavation support and protection, including 29 CFR 1926 Subpart P.

3.6 EXCAVATION, GENERAL

- A. Unclassified Excavation: Excavation to subgrade elevations regardless of the character of surface and subsurface conditions encountered, including rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.
 - 1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.
- B. Topsoil shall be removed from the area to be excavated and from the area where excavated material will be piled, prior to excavation. Topsoil shall be stored as specified below.

- C. Maintain the excavations to guard against and prevent injury to employees and the public. Provide adequate shoring and bracing as required by OSHA and other local governing regulations.
- D. Excavations left open at the end of the working day shall be fenced to protect the public.

3.7 EXCAVATION FOR WALKS AND PAVEMENTS

- A. Excavate surfaces under walks and pavements to indicated cross sections, elevations, and grades.

3.8 APPROVAL OF SUBGRADE

- A. Notify Contracting Officer when excavations have reached required subgrade.
- B. If Contracting Officer determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.
- C. Proof roll subgrade below the building slabs and pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof roll wet or saturated subgrades.
- D. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Contracting Officer.

3.9 UNAUTHORIZED EXCAVATION

- A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill may be used when approved by Contracting Officer.
 - 1. Fill unauthorized excavations under other construction or utility pipe as directed by Contracting Officer.

3.10 STORAGE OF SOIL MATERIALS

- A. Stockpile, borrow materials and satisfactory excavated soil materials. Stockpile soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
 - 1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.
- B. Topsoil shall be kept separate from trench-excavated material by either stockpiling or by windrowing on the opposite side of the trench from which the trench excavated material will be placed. Topsoil will be reused after backfilling on those areas from which it came.

3.11 STRUCTURE BACKFILL

- A. Place and compact backfill in excavations promptly, but not before completing the following:

1. Construction below finish grade including, where applicable, damp proofing, waterproofing, and perimeter insulation.
 2. Surveying locations of underground utilities for record documents.
 3. Inspecting and testing underground utilities and storage tanks.
 4. Removing concrete formwork.
 5. Removing trash and debris.
 6. Removing temporary shoring and bracing, and sheeting.
 7. Installing permanent or temporary horizontal bracing on horizontally supported walls.
- B. Place and compact fills and backfills adjacent to structures in such a manner as to prevent wedging action or eccentric lodging upon or against the structures.
- C. Place backfill in horizontal layers not more than 12 inches thick with proper moisture content for the required degree of compaction. Flooding or puddling is not allowed. Compact each layer as specified. Backfill layers under concrete flatwork shall be not more than 6 inches thick
- D. Do not place backfill against any concrete footings or structure without prior permission of the Contracting Officer and in no case less than 7 days after placement of concrete.
- E. Heavy equipment shall not be operated within four feet of any structure.
- F. Provide for anticipated settlement and shrinkage of the backfill and for the finished grades required.

3.12 FILL

- A. Preparation: Remove vegetation, topsoil, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface before placing fills.
- B. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.
- C. Place and compact fill material in layers to required elevations as follows:
1. Under grass and planted areas, use satisfactory soil material.
 2. Under sidewalks, concrete slabs and pavements, use aggregate grading "C".
 3. Under steps and ramps, use engineered fill.
 4. Under building slabs, use engineered fill.
 5. Under footings and foundations, use engineered fill.

3.13 MOISTURE CONTROL

- A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill layer before compaction to within 2 percent of optimum moisture content.
1. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.

2. Remove and replace, or scarify and air-dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.14 COMPACTION OF BACKFILLS AND FILLS

- A. The minimum degree of compaction required shall be a percent of the maximum laboratory density obtained by the standard proctor test AASHTO T99 or ASTM D698. The in-place field density shall be determined by AASHTO T238 or ASTM D2922. The minimum compaction requirements are:
 1. Under structures, water and septic tanks, utility boxes, building slabs, steps, and pavements, scarify and recompact top 12 inches of existing subgrade and each layer of backfill or fill material at 95 percent.
 2. Under walkways, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill material at 90 percent.
 3. Under lawn or unpaved areas, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill material at 85 percent.

3.15 GRADING

- A. General: Uniformly grade areas to a smooth surface, free from irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
 1. Provide a smooth transition between adjacent existing grades and new grades.
 2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.
- B. Site Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:
 1. Lawn or Unpaved Areas: Plus or minus 1 inch (25 mm).
 2. Walks: Plus or minus 1 inch (25 mm).
 3. Pavements: Plus or minus 1/2 inch (13 mm).
- C. Grading inside Building Lines: Finish subgrade to a tolerance of 1/2 inch (13 mm) when tested with a 10-foot (3-m) straightedge.

3.16 AGGREGATE BASE COURSE [SUBBASE AND BASE COURSES]

- A. Install separation fabric on prepared subgrade according to manufacturer's written instructions, overlapping sides and ends.
- B. Under pavements and walks, place subbase course on separation fabric according to fabric manufacturer's written instructions and as follows:
- C. Under pavements and walks, place subbase course on prepared subgrade and as follows:
 1. Place base course material over subbase.

2. Subbase and base course compaction required shall be 95 percent of the maximum laboratory density obtained by the standard proctor test AASHTO T99 or ASTM D698. The in-place field density shall be determined by AASHTO T238 or ASTM D2922.
3. Shape subbase and base to required crown elevations and cross-slope grades.
4. When thickness of compacted subbase or base course is 6 inches (150 mm) or less, place materials in a single layer.
5. When thickness of compacted subbase or base course exceeds 6 inches (150 mm), place materials in equal layers, with no layer more than 6 inches (150 mm) thick or less than 3 inches (75 mm) thick when compacted.

3.17 FIELD QUALITY CONTROL

- A. Testing Agency: Contractor will engage a qualified independent geotechnical engineering testing agency to perform field quality control testing.
- B. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earthwork only after test results for previously completed work complies with requirements.
- C. Footing Subgrade: At footing subgrades, at least one test of each soil stratum will be performed to verify design-bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by Contracting Officer.
- D. Testing agency will test compaction of soils in place according to ASTM D 2922. Tests will be performed at the following locations and frequencies:
 1. Paved and Building Slab Areas: At subgrade and at each compacted fill and backfill layer, at least one test for every 2000 sq ft (186 sq. m) or less of paved area or building slab, but in no case fewer than three tests.
 2. Foundation Wall Backfill: At each compacted backfill layer, at least one test for each 100 feet (30 m) or less of wall length, but no fewer than two tests.
- E. When testing agency reports that subgrades, fills or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil to depth required; recompact and retest until specified compaction is obtained.
- F. Excessive settlement or other evidence of improper backfill shall be corrected by reopening the trench or excavation to the depth required for proper compaction and then shall be refilled and satisfactorily compacted.
- G. The correction and retesting of unacceptable work shall be paid by the Contractor at no expense to the Government.

3.18 PROTECTION

- A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing and erosion. Keep free of trash and debris.

- B. Repair and reestablish grades to specify tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.
 - 1. Scarify or remove and replace soil material to depth as directed by Contracting Officer, reshape and recompact.
- C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
 - 1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to the greatest extent possible.

3.19 SURFACE FINISH

- A. In unpaved areas all surfaces shall be restored to the original ground line or elevations shown on the drawings and left in a uniform and neat condition. Any stockpiled topsoil shall be smoothly distributed over disturbed areas to elevations shown on the drawings.
- B. In paved areas, apply surface treatment as specified and shown on the drawings.

3.20 WASTE MATERIAL

- A. According to Section 024100 "Waste Material Disposal."

END OF SECTION 312000

August 2023

USDA FOREST SERVICE, R4
ISLAND PARK RANGER STATION SIDEWALK REPLACEMENT
SECTION 312100 - PROJECT SITE PREPARATION AND GRADING

PART 1 - GENERAL

1.1 This Section includes the following:

- A. Clearing, grubbing, sediment and erosion control measures, shaping, compacting, excavating, and/or filling to the established sub grade as shown on the drawings, details and as staked. Such items covered include, but are not limited to construction of subgrade for roads, parking areas, campground spurs, pathways, concrete slabs, subsurface drainage structures, and grading around constructed features.
- B. This section also includes the disposal of waste materials generated.

1.2 RELATED SECTIONS:

- A. The following Sections contain requirements that relate to this Section:
 - 1. Section 024100 "Waste Material Disposal" for the loading, handling, hauling, and placing of excess excavation material, and unsuitable excavation material.
 - 2. Section 312000 "Earthwork" for preparing subgrades for slabs-on-grade, walks, pavements, lawns, and plantings, and for excavating and backfilling for buildings, structures, utility trenches, and buried mechanical and electrical utilities.
 - 3. Section 312225 "Excavation and Embankment" for construction of roads, parking areas, spurs, pathways, and drainage features.

1.3 REFERENCES

- A. The publications 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.
 - 1. Standard Moisture Density Test, AASHTO T-99, Method C or D.
 - 2. Density of Soil In-Place by the Sand-Cone Method, AASHTO T191
 - 3. Density of Soil In-Place by the Drive Cylinder Method, AASHTO T204
 - 4. Density of Soil In-Place by the Rubber-Balloon Method, AASHTO T205
 - 5. Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)), ASTM D698
 - 6. Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method, ASTM D1556
 - 7. Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method, ASTM D2167
 - 8. Standard Classification of Industrial Fluid Lubricants by Viscosity System, ASTM D2422

1.4 METHOD OF MEASUREMENT AND PAYMENT:

- A. There will be no separate measurement or payment for work in this section. Payment will be included at the contract unit price for other items shown on the Schedule of Items. This item shall include, sediment and erosion control, shaping, earthwork, and excavation and/or embankment (including compacting), and all other incidentals necessary to complete the work as shown on the drawing details and as staked.
- B. This item shall also include hauling excess excavation and boulders.

PART 2 - EXECUTION

2.1 PREPARATION

- A. Stripping Sod and Other Organic Materials: Sod, pine needles, and soil heavy in organic materials (topsoil) shall be stripped to mineral soil prior to any excavation or placement of fill material. Stripped material shall be stockpiled on site and placed on disturbed areas upon completion of grading operations. Excess stripped material shall be disposed of in accordance with Section 024100 "Waste Material Disposal".

2.2 GRADING

- A. Graded areas shall be constructed of shallow cuts and fills using native excavated soil and/or select borrow. Some light excavation shall be performed to remove protruding boulders and surface irregularities and at other locations as staked by the Contracting Officer.

2.3 EARTHWORK

- A. Shall be completed in accordance with Section 312000 "Earthwork" for the construction of subgrades for slabs-on-grade, family unit and group area pads, sidewalks, plantings, and for excavating and backfilling for buildings, structures, utility trenches, and buried mechanical and electrical utilities.
- B. Shall be completed in accordance with Section 312225 "Excavation and Embankment" for construction of Roads, Parking Areas, Asphalt Paths, Campground Spurs, and Drainage Features.

2.4 CLEANUP

- A. The Contractor shall confine his operation to that area within the staked fill or cut line of existing roadways, parking areas, paths, etc. No equipment shall be moved over, operated from, or be parked outside this staked fill or cut line, clearing limit, or existing roadway. No materials shall be moved over, stored, or obtained from outside the staked cut or fill lines except by written permission of the Contracting Officer. No rocks, stumps, limbs, debris, soil, or other material shall be left as a windrow or accumulation along the toe of fills, top of cuts, or adjacent areas.

END OF SECTION 312100

August 2023

USDA FOREST SERVICE, R4
ISLAND PARK RANGER STATION SIDEWALK REPLACEMENT
SECTION 312225 - EXCAVATION & EMBANKMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. This work consists of excavating material and constructing embankments. This work includes furnishing, hauling, stockpiling, placing, disposing, sloping, shaping, compacting, and finishing earthen and rocky material; drainage excavation; removal of slide material; and excavation and disposal of unsuitable material.

1.2 DEFINITION

- A. Excavation - All material excavated from within the right-of-way or easement areas that is not included under other pay items listed in the Schedule of Items. Roadway excavation includes all material encountered regardless of its nature or characteristics.
- B. Borrow or Select Borrow - Material used for embankment construction that is obtained from outside the roadway prism from sources shown on the Drawings. Additional sources of borrow excavation will be subject to approval in advance by the Contracting Officer.
- C. Embankment Construction. Embankment construction consists of placing and compacting roadway or borrow excavation. This work includes:
 - 1. Preparing foundation for embankment;
 - 2. Constructing roadway embankments;
 - 3. Benching for side-hill embankments;
 - 4. Constructing dikes, ramps, mounds, and berms, and
 - 5. Backfilling subexcavated areas, holes, pits, and other depressions.
- D. Suitable Material - Granular material conforming to ASTM D 2487 soil classification groups GW, GP, GM, SW, SP, and SM, or a combination of these group symbols; free of rock or gravel larger than 24 inches in any dimension, debris, waste frozen materials, vegetation, and other deleterious matter.
- E. Unsuitable Material - ASTM D 2487 soil classification groups GC, SC, ML, MH, CL, CH, OL, OH, and PT, or a combination of these group symbols.

1.3 MEASUREMENT AND PAYMENT

- A. There will be no separate measurement or payment for work in this section. Payment will be included at the contract unit price for other items shown on the Schedule of Items.

PART 2 - PRODUCTS

NOT APPLICABLE

PART 3 - EXECUTION

3.1 CLEARING & GRUBBING

- A. Clearing and grubbing shall be accomplished before excavation or embankment placement begins. Pioneering of roads, slash disposal, and grubbing of stumps may proceed concurrently with clearing and grubbing operation when approved by the Contracting Officer. Excavation and placement operations shall be conducted so slash material to be treated will not be incorporated in the roadway.

3.2 ROADWAY EXCAVATION AND EMBANKMENT SURFACE PREPARATION

- A. General: Do not disturb material and vegetation outside the construction limits. Incorporate only suitable material into embankments. At the end of each day's operations, shape to drain and compact the work area to a uniform cross-section. Eliminate all ruts and low spots that could hold water.
- B. Rock Cuts: Excavate rock cuts to 6 inches below subgrade within the roadbed limits. Backfill to subgrade with suitable material.
- C. Earth Cuts: Scarify earth cuts to 6 inches below subgrade within the roadbed limits.
- D. Embankments Surface Preparation: Remove topsoil and break up the ground surface to a minimum of 6 inches by plowing or scarifying.
- E. All material shall be compacted according to "Embankment Placing Methods" paragraph in Part 3.

3.3 PIONEERING

- A. Pioneering operations for the top of excavation slopes, toe of embankments, or pioneer road construction shall prevent undercutting of the final excavation slope, depositing of materials outside of the roadway limits, and any restriction of drainage.

3.4 UTILIZATION OF EXCAVATED MATERIALS

- A. All suitable, excavated material shall be used in the construction of embankments, subgrades, shoulders, slopes, bedding, and backfill for structures and for other purposes as shown on the Drawings.
 - 1. Excess Excavation:
 - a. Designed excess excavation shall be disposed of as shown on the Drawings.
 - 2. Rock for Slope Protection:
 - a. Excavated rock suitable for protection of embankments may be conserved and used in lieu of a DESIGNATED materials source.
 - 3. Conserving Material:

- a. Material encountered in the excavation, suitable for cushion, road finishing, or other purposes, may be conserved and utilized instead of materials from DESIGNATED sources. Excessively wet material that is otherwise suitable for embankment shall be field drained and dried before placement.
4. Excavation of Unsuitable Material:
 - a. Unsuitable material shall be excavated and disposed of as shown on the Drawings or on site as directed by the Contracting Officer (CO). Excavated areas shall be backfilled with suitable material when necessary to complete the work. Frozen material shall not be placed in embankments. Rocks that are too large to be incorporated into the embankment shall be broken for incorporation into the embankment, maneuvered to the face of the embankment and embedded so that they will not roll.
 5. Conservation of Topsoil:
 - a. When shown on the Drawings, suitable topsoil shall be removed, transported, and deposited in the DESIGNATED stockpile areas.

3.5 DRAINAGE EXCAVATION

- A. Drainage excavation shall include construction of side ditches, minor channel changes, inlet and outlet ditches, furrow ditches, ditches constructed along the road but beyond the roadway limits, and other minor earth drainage structures as shown on the Drawings. Excavated material shall be utilized in accordance with "Utilization of Excavated Materials" paragraph above.

3.6 FINISHING ROADBED

- A. For roads receiving aggregate base or surface course, only rocks that do not protrude above the subgrade more than one-third of the depth of the base or surface course, or 3 inches, whichever is less, may remain in place.
- B. For unsurfaced roads, unless otherwise shown on the Drawings, the top 4 inches below the finished road surface shall not contain rocks larger than 4 inches in greatest dimension. Oversize material shall be removed, reduced to acceptable size, or covered by importing suitable material approved by the Contracting Officer.
- C. The subgrade shall be visibly moist during shaping and dressing. Low sections, holes, cracks, or depressions shall be brought to grade with suitable material approved by the Contracting Officer. Final compaction of the subgrade shall meet the requirements of the embankment placing method specified.

3.7 SNOW REMOVAL

- A. Snow or ice shall not be incorporated in the embankment. Snow shall be removed in advance of the work and deposited beyond the roadway limits in a manner that will not cause resource damage or waste material.

3.8 FINISHING SLOPES

- A. Finished slopes shall conform reasonably to the lines staked on the ground or shown on the Drawings. The finished slope shall be left in a roughened condition to facilitate the establishment of vegetative growth. The finish associated with template and stringline or hand-raking methods will not be allowed. Loose rock, loose debris, and other loose material, each of which is larger than 6 inches in diameter, shall be removed from the slope unless otherwise shown on the Drawings.
- B. The tops of excavations, excluding areas of solid rock, shall be blended with the adjacent terrain by rounding where shown on the Drawings. Decomposed rock that may be cut without blasting or ripping shall be rounded. Earth overlying rock shall be rounded above the rock.
- C. All rock excavations that require blasting shall be formed with controlled blasting techniques unless otherwise shown on the Drawings. Controlled blasting is defined as the controlled usage of explosives and blasting accessories in appropriately aligned and spaced drill holes for the purpose of producing a free surface or shear plane in the rock excavation slopes and of minimizing landscape damage, adjacent ground vibration, and overbreak. Presplitting is not intended unless shown on the Drawings.
- D. Unless directed otherwise by the Contracting Officer, the contractor shall drill, blast, and excavate short test sections (not to yield in excess of 1,000 cubic yards) to determine the controlled blasting method, hole spacing, and charge best suited to the material encountered.

3.9 OVERBUILDING & LANDSCAPE & STREAM PROTECTION

- A. Unless otherwise agreed to by the Contracting Officer, excavation or embankment material shall be confined within the roadway limits to avoid overbuilding and to protect the landscape and streams.

3.10 SUBGRADE TREATMENTS

- A. Subgrade treatment shall consist of soil modification by admixing aggregates, placing geotextiles, fiber mat, wood corduroy, rock blanket, or other similar materials. The construction and material requirements for the type of subgrade treatment will be shown on the Drawings.

3.11 EARTH BERMS

- A. Permanent earth berms shall be constructed along the shoulder of the traveled way at locations shown on the Drawings. Material used in the construction of berms shall be well graded with no rocks having a dimension greater than one-fourth the height of the berm.
- B. Acceptable material for the berm may be windrowed as the roadbed is constructed. When the local material is not acceptable, material shall be imported from approved sources.

Material used for berm construction shall contain no frozen material, roots, sod, or other deleterious material. Material shall not be wasted over the embankment slope.

- C. Compaction shall be accomplished by operating the spreading equipment over the full section of the berm.

3.12 EMBANKMENT PLACING METHODS

- A. All Methods: When an embankment is to be placed across swampy ground and removal of unsuitable material or subgrade treatment is not required, the lower part of the embankment shall be constructed in a single layer to the minimum depth necessary to support construction equipment.

- B. Specific Methods: All embankments shall be placed by **Method 4 unless otherwise noted.**

1. Method 1. Side Casting and End Dumping: Embankment may be placed by side casting and end dumping. Where material containing a large amount of rock is used to construct embankments, working smaller rocks and fines in with the larger rocks and fines to fill the voids shall provide a solid embankment.
2. Method 2. Layer Placement: Surfaces steeper than a ratio of 3 horizontal to 1 vertical (3:1) upon which embankment is to be placed, shall be roughened or stepped to provide permanent bonding of new and old materials.
 - a. Embankment shall be layer placed, except over rock surfaces, in which case material may be placed by end dumping to the minimum depth needed for operation of spreading equipment. Each embankment layer shall be leveled and smoothed before placement of subsequent layers. Hauling and spreading equipment shall be operated uniformly over the full width of each layer.
 - b. Suitable material shall be placed in layers no more than 12 inches thick, except when the material contains rock more than 9 inches in diameter, in which case layers may be of sufficient thickness to accommodate the material involved. No layer shall exceed 24 inches before compaction.
 - c. Placing individual rocks or boulders greater than 24 inches will be permitted provided the embankment would accommodate them. Such rocks and boulders shall be at least 6 inches below subgrade. They shall be carefully distributed and the voids filled with finer material to form a dense and compacted mass.
 - d. Where material containing large amounts of rock is used to construct embankments, the layers may be of sufficient thickness to accommodate the material involved. A solid embankment with adequate compaction shall be constructed by working smaller rock and fines in with the larger rocks to fill the voids and by operating hauling and spreading equipment uniformly over the full width of each layer as the embankment is constructed.
 - e. Material shall be at moisture content suitable to obtain a mass that will not visibly deflect under the load of the hauling and spreading equipment. Excessively wet material shall be handled in accordance with Subsection 3.3.1.3.

3. Method 3. Layer Placement (Roller Compaction): Embankments shall be placed as specified in Method 2. Placement shall be in horizontal layers not exceeding 12 inches prior to compaction except when the material contains rock more than 9 inches in diameter, in which case layers may be of sufficient thickness to accommodate the material involved. Compaction equipment shall be operated over the full width of each layer until visible deformation of the layer ceases or in the case of the sheepfoot roller, the roller "walks out" of the layer. At least three complete passes shall be made.
 - a. Compaction equipment shall be capable of obtaining compaction requirements without detrimentally affecting the compacted material. The compacting units may be of any type, provided they are capable of compacting each lift of material as specified and meet the minimum requirements contained herein. Minimum requirements for rollers are as follows:
 - 1) Tamping or sheepfoot rollers shall meet the following minimum requirements:
 - a) Diameter - 40"
 - b) Completely filled with liquid.
 - 2) Grid rollers shall be capable of exerting a force of 250 pounds per inch of width of roller drum.
 - 3) Steel-wheel rollers, other than vibratory, shall be capable of exerting a force of not less than 250 pounds per inch of width of the compression roll or rolls.
 - 4) Vibratory steel-wheel rollers shall have a minimum weight of 6 tons. The compactor shall be equipped with amplitude and frequency controls and specifically designed to compact the material on which it is used.
 - 5) Pneumatic-tire rollers shall have smooth tread tires of equal size that provide a uniform compacting pressure for the full width of the roller and shall meet the following minimum requirements:
 - 6) Towed rollers:
 - a) Ballast density shall exceed 100 pounds per cubic foot;
 - b) Volume of ballast shall exceed 7 cubic feet per tire;
 - c) Tire pressure shall exceed 45 pounds per square inch
 - 7) Self propelled rollers: Shall exert a force that exceeds 200 pounds per linear inch of rolling width.
4. Method 4. Controlled Compaction: Embankments shall be placed as specified in Method 2, except earth embankments shall be placed in horizontal layers not exceeding 12 inches (loose measure) and compacted. Material shall be at moisture content suitable for attaining the required compaction. Embankments and the top 1-foot of excavation sections shall be compacted to at least 95 percent of the maximum density as determined by AASHTO T 99, Method C or D.

- a. The density of the embankment material will be determined during the progress of the work in accordance with AASHTO T 191, T 205 or T 238; T 217, T 239, or T 255. Corrections for coarse particles will be made in accordance with AASHTO T 99, Note 7.
 - b. Density requirements will not apply to portions of rock embankments that cannot be tested in accordance with approved methods. When this condition exists, compaction shall be provided by working smaller rocks and fines in with the larger rocks to fill the voids and by operating equipment over the embankment materials.
5. Method 5. Controlled Compaction Using Density Control Strips. The embankment placement requirements for Method 4 shall apply for this method except that compaction shall be performed as shown below:
- a. To determine target density, a control strip shall be constructed at the beginning of work on each type of material to be compacted. Each control strip, constructed to acceptable density and surface tolerances, shall remain in place and become a section of the completed roadway. Unacceptable control strips shall be corrected or removed and replaced at the contractor's expense. A control strip shall have an area of approximately 400 square yards and shall be of the same depth specified for the construction of the course that it represents.
 - b. The materials used in the construction of the control strip shall meet the specification requirements. They shall be furnished from the same source and shall be of the same type and moisture content used in the remainder of the course represented by the control strip.
 - c. The base upon which a control strip is to be constructed will be approved by the Contracting Officer before placing control strip material.
 - d. The equipment used in the construction of the control strip will be approved by the Contracting Officer and shall be of the same type and weight as that to be used on the remainder of the course represented by the control strip.
 - e. Compaction of control strips shall commence immediately after the course has been placed to the specified thickness and shall be continuous and uniform over the entire surface. Compaction of the control strip shall be continued until no discernable increase in density can be obtained by additional compactive effort.
 - f. Upon completion of the compaction, the mean density of the control strip will be determined by averaging the results of 10 nuclear density tests taken at randomly selected sites within the control strip. The mean density of the control strip shall be the target density for the remainder of the course that it represents.
 - g. If the mean density of the control strip is less than 95 percent of the maximum density as determined in the laboratory compacted specimens, the Contracting Officer may request the construction of another control strip. The test procedure used to establish the maximum density will be shown on the Drawings.

- h. A new control strip may also be requested by the Engineer or by the contractor when:
 - i. A change in the material or job mix formula is made.
 - j. Ten days of production have been accepted without construction of a new control strip.
 - k. There is reason to believe that a control strip density is not representative of the material being placed.
 - l. The specified course shall be compacted to at least 95 percent of the target density. A portable nuclear moisture-density test device in accordance with AASHTO T 238 and T 239 will test density.
 - m. Where portions of rock embankment are constructed that cannot be tested in accordance with approved methods, each layer shall be rolled full width with the same number of passes as the adjacent embankment containing material represented by a control strip.
- 6. Method 6. Special Project Controlled Compaction: Embankments shall be placed and compacted to at least 90 percent of the maximum density determined by AASHTO T 180, Method C or D, except that compaction of not less than 95 percent of AASHTO T 180, Method C or D, shall be obtained for a minimum depth of 1 foot below subgrade for the width of the roadbed in both excavation and embankment sections.
 - a. The density will be determined during the work in accordance with AASHTO T 191, T 205 or T 238; T 217, T 239 or T 255. Corrections for coarse particles will be made in accordance with AASHTO T 99, Note 7.

3.13 CONSTRUCTION TOLERANCES

- A. The tolerance class shall be “C” for roads, spurs and parking areas and “E” for all pathways. Roadway ditches shall be constructed to flow in the direction shown on the Drawings.
- B. Deviations shall be uniform in the direction of change for a distance of 200 feet or more along the project centerline.

TOLERANCE CLASS **

Item	A	B	C	D	E	F	G	H	I	J
Roadbed Width (Ft)	+0.5	+0.5	+1	+1	+1	+1	+1	+1.5	+1	+2
Subgrade Elevation (Ft)	±0.1	±0.2	±0.2	±0.5	±0.5	±1	±1	±1.5	±2	±3
Centerline Alignment (Ft)	0.2	0.2	0.5	0.5	1	1	1	1.5	2	3
Slopes, Excavation and Embankment (Percent Slope)*	±3	±5	±5	±5	±5	±5	±10	±10	±10	±10

**Maximum allowable deviation from construction stakes and drawings.

*Maximum allowable deviation from staked slope measured from slope stakes or hinge points.

END OF SECTION 312225

August 2023

USDA FOREST SERVICE, R4
ISLAND PARK RANGER STATION SIDEWALK REPLACEMENT
SECTION 321204 - CRUSHED AGGREGATE BASE OR SURFACE COURSE

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes furnishing, hauling and placing one or more courses of aggregate base or surface course material on roadways, campground spurs, parking areas, concrete pads, sidewalks, and pathways. In addition, may include furnishing, hauling, and placing crushed aggregate for bedding and backfill.

1.2 SUBMITTALS

- A. Aggregate source, gradation, and material properties.
 - 1. Submit target values within the gradation ranges shown in Table 321204-1 and /or 321204-2 for the required grading. After reviewing the Contractor's proposed target values the CO will determine the final values for the gradation and notify the Contractor in writing.
- B. Material Properties

1.3 MEASUREMENT AND PAYMENT

- A. Crushed Aggregate: Number of Cubic Yards of material supplied and installed measured in place to the lines and grades shown on the Drawings. Crushed aggregate shall be used for the construction of sidewalks, stairs, ramp, and other items as shown on the Drawings.
- B. No adjustment in a contract unit price will be made for variations in quantity due to differences in the specific gravity or moisture content.

PART 2 - PRODUCTS

2.1 AGGREGATES

- A. General: Furnish aggregate Subbase, Base, or Surface Courses meeting the gradation ranges shown in Table 321204-1 and Table 321204-2. Aggregate grade selection shall be as shown on the Drawings and in the Schedule of Items.
- B. Materials shall be obtained from an approved source. Furnish aggregates that consist of hard, durable particles or fragments of crushed stone, crushed slag, or crushed gravel meeting the appropriate gradation and conforming to the following:
 - 1. Los Angeles abrasion, AASHTO T 96 40%
max
 - 2. Sodium sulfate soundness loss (five cycles), AASHTO T 104 12%
max

3. Durability index, AASHTO T 210 35 min
 4. Fractured faces, ASTM D 5821 (Subbase or Base)..... 50%
min
 5. Fractured faces, ASTM D 5821 (Surface Course)..... 75%
min
 6. Free from organic matter and lumps or balls of clay.
- C. Obtain the aggregate gradation by crushing, screening, and blending processes as necessary.
- D. AGGREGATE GRADATION

Table 321204-1, Crushed Aggregate Grading Requirements for Subbase and Base.

Percent Passing (AASHTO T27 and T11)					
Sieve	Grading A (Subbase)	Grading B (Subbase)	Grading C (Base)	Grading D (Base)	Grading E (Base)
2 1/2 -inch	100				
2-inch	97-100	100	100		
1-1/2-inch		97-100			
1-inch	65-79 (6)		80-100 (6)	100	
3/4-inch			60-94 (6)	86-100 (6)	100
1/2-inch	45-59 (7)				
3/8-inch			40-69 (6)	51-82 (6)	62-90 (6)
No. 4	28-42 (6)	40-60 (8)	31-54 (6)	36-64 (6)	36-74 (6)
No. 40	9-17 (4)			12-26 (4)	12-26 (4)
No. 200	4-8 (3)	4-12 (4)	4-7 (3)	4-7 (3)	4-7 (3)

() The value in the parentheses is the allowable deviation (+ / -) from the target values.
Liquid Limit, AASHTO T89 = 25 max. Plastic Limit, AASHTO T-90 = nonplastic.

Table 321204-2, Crushed Aggregate Grading Requirements for Surface Course.

Percent Passing (AASHTO T27 and T11)		
Sieve	Grading F (Surface Course)	Grading G (Surface Course)
1-1/2-inch	100	
1-inch	97-100	100
3/4-inch	76-89 (6)	97-100
1/2-inch		
3/8-inch	56-68 (6)	70-80 (6)
No. 4	43-53 (7)	51-63 (7)
No. 8		
No. 16	23-32 (6)	28-39 (6)
No. 40	15-23 (5)	19-27 (5)
No. 200	10-16 (4)	10-20

() The value in the parentheses is the allowable deviation (+ / -) from the target values. Liquid Limit, AASHTO T 89 = 35 max, Plastic Index, AASHTO T90 = 2 to 9 if percent passing the No. 200 sieve is less than 12% and less than 2 if the percent passing the No. 200 sieve is greater than 12%.

If the plasticity index (PI) is greater than 0, the TV range for the No. 200 sieve size is 8-12 (4).

PART 3 - EXECUTION

3.1 GENERAL

- A. Verify that subgrade is dry and in suitable condition, locate areas that are unstable or that require further compaction.
- B. Proceed with aggregate placement only after unsatisfactory conditions have been corrected and subgrade is approved in writing by the Contracting Officer (CO).

3.2 PREPARATION OF SUBGRADE

- A. The subgrade shall be prepared in accordance with requirements of other specifications sections.
- B. The subgrade shall conform to the lines and grades shown on the Drawings. Suitable material shall be utilized in the preparation of the subgrade. When embankment or fill is necessary, subgrade shall be placed in compacted layers not exceeding 6 inches. Unless specified otherwise, subgrade shall be compacted to 95 percent of AASHTO T 99, method C or D.

- C. Suitable material for subgrade shall be granular material or fine compatible soil free of excess moisture, muck, frozen lumps, roots, sod, and other deleterious material. Remove all rock particles and hard earth clods larger than 3 inches in the longest dimension.

3.3 MIXING AND SPREADING

- A. Mix the aggregate and adjust the moisture content to obtain uniform moisture. Spread and shape the mixture on the prepared surface in a uniform layer not to exceed 6 inches in compacted thickness.
- B. Route hauling equipment uniformly over the full width of the surface to minimize rutting or uneven compaction.

3.4 COMPACTING

- A. Compact each layer of aggregate full width. Compact each layer to a density of at least 95 percent of the maximum density as determined by AASHTO T 99 method C or D.
- B. Testing shall be at intervals specified in tables shown in Section 014100 "Quality Control."

3.5 SURFACE AND CONSTRUCTION TOLERANCES

- A. Shape the surface to the required template and as staked. Surface shall be graded and shaped smooth to within 1/2-inch in 10 feet.
- B. Maintain the aggregate course to the correct lines, grade, and cross-section by blading, watering, and rolling until placement of the next course.
- C. Upon completion of full placement and after haul trucks have completed their haul across section of the road, the road shall be finish bladed, watered, and rolled.
- D. Aggregate shall be placed as shown on the drawings and as staked. Tolerance for thickness of aggregate shall be +/- 1/2-inch and for width shall be + 1-foot.

3.6 ACCEPTANCE

- A. Aggregate shall be accepted following placement when shown to meet material quality, gradation, compaction requirements, required depth and width, and finish blading.

END OF SECTION 321204

August 2023