

Oaks Stairway & Overlook Project

Project Specifications

December 1, 2025

LANDSCAPE ARCHITECT

Lynne Dwyer Landscape Architect
2616 N. Figueroa Street, Suite A
Los Angeles, California 90065
Contact: Lynne Dwyer, PLA 3706
323 839-1516
ldwyerla@gmail.com

PROJECT OWNER

Watershed Conservation Authority
100 N. Old San Gabriel Canyon Road
Azusa, CA 91702

Contact: Robert Segarra, Cumming Group - Project Manager
562 583-6743
robert.segarra@cumming-group.com

Jessie Corea, WEBB Associates – Construction Manager
951 248-4273
jessie.corea@webbassociates.com

LAND MANAGER

Forest Services - Angeles National Forest
701 North Santa Anita Avenue
Arcadia, CA 91006

Contact: Justin Seastrand – Natural Resource Specialist
626 574-5278
gary.seastrand@usda.gov

Oaks Stairway & Overlook Project

Project Specifications

December 1, 2025

LANDSCAPE ARCHITECT

Lynne Dwyer Landscape Architect
2616 N. Figueroa Street, Suite A
Los Angeles, California 90065
Contact: Lynne Dwyer, PLA 3706
323 839-1516
ldwyerla@gmail.com

PROJECT OWNER

Watershed Conservation Authority
100 N. Old San Gabriel Canyon Road
Azusa, CA 91702

Contact: Robert Segarra, Cumming Group - Project Manager
562 583-6743
robert.segarra@cumming-group.com

Jessie Corea, WEBB Associates – Construction Manager
951 248-4273
jessie.corea@webbassociates.com

LAND MANAGER

Forest Services - Angeles National Forest
701 North Santa Anita Avenue
Arcadia, CA 91006

Contact: Justin Seastrand – Natural Resource Specialist
626 574-5278
gary.seastrand@usda.gov

OAKS STAIRWAY & OVERLOOK PROJECT SPECIFICATIONS

TABLE OF CONTENTS

DIVISION 00	PROCUREMENT AND CONTRACTING REQUIREMENTS
00 00 01	TABLE OF CONTENTS
00 01 15	LIST OF DRAWINGS
00 22 13	SUPPLEMENTARY INSTRUCTIONS TO OFFERORS
00 31 24.1	CATEGORICAL EXCLUSION (CE) CHECKLIST & EROSION CONTROL PLAN & BMPs
DIVISION 01	GENERAL REQUIREMENTS
01 11 01	USFS GENERAL REQUIREMENTS
01 14 00	WORK RESTRICTIONS – COVID-19
01 32 01	PROJECT SCHEDULE
01 33 00	SUBMITTAL PROCEDURES
01 41 00	QUALITY CONTROL
01 57 19	TEMPORARY ENVIRONMENTAL CONTROLS
DIVISION 02	EXISTING CONDITIONS
02 41 00	DEMOLITION
02 41 00.1	WASTE MATERIAL DISPOSAL
DIVISION 03	CONCRETE
03 30 53	MISCELLANEOUS CAST-IN-PLACE CONCRETE
DIVISION 04	MASONRY
04 43 00	STONE MASONRY
DIVISION 05	METALS
05 12 00	STRUCTURAL STEEL FRAMING
05 52 00	METAL RAILINGS
DIVISION 09	FINISHES
09 90 00	PAINTS AND COATINGS
09 26 23	GRAFFITI RESISTANT COATING
DIVISION 10	SPECIALTIES
10 14 00.10	EXTERIOR SIGNAGE
DIVISION 12	FURNISHINGS
12 93 00	SITE FURNISHINGS
DIVISION 31	EARTHWORKS
31 00 00	EARTHWORKS
DIVISION 32	EXTERIOR IMPROVEMENTS
32 12 19.19	COLD-MIX ASPHALT PAVING
32 12 36	CHIP SEAL PAVING
32 13 13.13	EXPOSED AGGREGATE CONCRETE PAVING
32 15 40	DECOMPOSED GRANITE SURFACING
32 17 23	PAVEMENT MARKINGS

SECTIONS 00 01 15
LIST OF DRAWINGS
PART 1 GENERAL

1.1 SUMMARY

This section lists the drawings for the project pursuant to Contract Drawings, and Specifications dated December 1, 2025.

2.0 LIST OF DRAWINGS

TS-00 TITLE SHEET
D-1.00 DEMOLITION PLAN
L-1.00 DESIGN INTENT
L-2.00 CONSTRUCTION PLAN
L-2.01 CONSTRUCTION PLAN
L-2.50 CONSTRUCTION DETAILS
L-2.51 CONSTRUCTION DETAILS
L-2.52 CONSTRUCTION DETAILS
L-2.53 CONSTRUCTION DETAILS
L-2.54 CONSTRUCTION DETAILS
L-3.00 INTERPRETIVE PLAN
L-3.50 SIGNAGE DETAILS
L-4.00 PLANTING PLAN
L-4.50 PLANTING NOTES
L-5.00 ENVIRONMENTAL PROTECTION MEASURES
L-5.01 ENVIRONMENTAL PROTECTION GUIDELINES
L-6.00 STREET IMPROVEMENTS NOTES
L-6.01 EAST FORK ROAD
L-6.02 EAST FORK ROAD
C-1.00 GRADING PLAN GENERAL NOTES
C-1.01 EROSION CONTROL PLAN
C-2 GRADING PLAN
C-3 GRADING PLAN
C-3.01 SECTION TRAIL PROFILE #1
C-3.02 SECTION AND DETAILS
C-4 HORIZONTAL CONTROL
C-5 DETAILS
S-1.50 SHADE STRUCTURE ELEVATIONS
S-1.51 SHADE STRUCTURE DETAILS
S-1.52 SHADE STRUCTURE DETAILS
S-101 GENERAL NOTES
S-102 TYPICAL DETAILS
S-201 SHADE TRELLIS FRAMING PLAN
S-202 SHADE TRELLIS SECTIONS & DETAILS
S-203 KIOSK PLANS & DETAILS
A-1.0 ROMTEC RESTROOM TITLE PAGE
A-1.1 ROMTEC RESTROOM FLOOR PLAN
A-2.1 ROMTEC RESTROOM ELEVATION
A-2.2 ROMTEC RESTROOM ELEVATION
S-3.1 ROMTEC RESTROOM STRUCTURAL CMU PLAN & DETAILS
S-4.1 ROMTEC RESTROOM FOUNDATION PLAN AND DETAILS

3.0 LIST OF SPECIFICATIONS

00 00 01	TABLE OF CONTENTS
00 01 15	LIST OF DRAWINGS
00 22 13	SUPPLEMENTARY INSTRUCTIONS TO OFFERORS

00 31 24.1	CATEGORICAL EXCLUSION (CE) CHECKLIST & EROSION CONTROL PLAN & BMPs
01 11 01	USFS GENERAL REQUIREMENTS
01 32 01	PROJECT SCHEDULE
01 33 00	SUBMITTAL PROCEDURES
01 41 00	QUALITY CONTROL
01 57 19	TEMPORARY ENVIRONMENTAL CONTROLS
02 37 01	SEDIMENT AND EROSION CONTROL
02 41 00	DEMOLITION
02 41 00.1	WASTE MATERIAL DISPOSAL
03 30 53	MISCELLANEOUS CAST-IN-PLACE CONCRETE
04 43 00	STONE MASONRY
05 12 00	STRUCTURAL STEEL FRAMING
05 52 00	METAL RAILINGS
09 90 00	PAINTS AND COATINGS
09 26 23	GRAFFITI RESISTANT COATING
10 14 00.10	EXTERIOR SIGNAGE
12 93 00	SITE FURNISHINGS
31 00 00	EARTHWORKS
32 12 19.19	COLD-MIX ASPHALT PAVING
32 12 36	CHIP SEAL PAVING
32 13 13.13	EXPOSED AGGREGATE CONCRETE PAVING
32 15 00	AGGREGATE SURFACING
32 15 40	DECOMPOSED GRANITE SURFACING
32 17 23	PAVEMENT MARKINGS

END OF SECTION

DIVISION 00 - PROCUREMENT AND CONTRACTING REQUIREMENTS

**00 22 13.00 20
SUPPLEMENTARY INSTRUCTIONS TO OFFERORS**

PART 1 GENERAL

1.1 CONTRACT LINE ITEMS

Reference Bid Documents Exhibit D – Schedule of Bid Items & Measurement of Payment

END OF SECTION

SECTION 00 31 24.1
CATEGORICAL EXCLUSION (CE) CHECKLIST
EROSION CONTROL PLAN, BASIC BMP CHECKLIST

Oaks Stairway & Maintenance Project, Angeles National Forest
Prepared By: Dannon Dirgo, Hydrologic Technician
March 31, 2020

1.0 INTRODUCTION

This document provides a transition between planning-level mitigations and on-the-ground implementation of erosion and sediment control measures, specifies Best Management Practices (BMPs) applicable to this project proposal and ground-disturbing activities. It is a working document that provides guidance and direction during the planning, construction, restoration, and monitoring phases of the project. All parties involved in the project have a role and responsibility to ensure that ground-disturbing activities comply with the goals and intent of this working document, forest service LMP and national BMP's. All applicable BMPs must be maintained and revised as necessary to assure they continue to perform their intended functions.

2.0 BACKGROUND/ PURPOSED PROJECT SUMMARY

The project is located in the opposite the Oaks Picnic Area within the San Gabriel National Monument on the Angeles National Forest. The proposed project is located approximately 14 miles north of the city of Azusa on Federal Lands managed by the Angeles National Forest San Gabriel Mountains National Monument. The Oaks Stairway & Overlook site is located directly opposite to the Oaks Picnic Area, approximately .5 miles downstream of the junction of East Fork Road and Glendora Mountain Road. The primary site location is classified as a Developed Area Interface by the ANF (USDAFS, a).

The 1.16-acre Oaks Stairway & Overlook Project consists of .23 acres of hillside restoration using locally sourced native plant species, overlook area with exposed aggregate concrete path and stone barrier wall, kiosk, 3 shade structures, picnic tables, shade trees, 67 striped asphalt parking spaces, two 4-unit restrooms, bike parking, and trash receptacles. The project also includes two formalized paths to access the East Fork for recreational use. The project proposes the demolition of unsafe decommissioned structures, restrooms and a former camp host site.

3.0 DESIGN FEATURES

RCA/Watershed/ Hydrologic Management:

1. RCA's shall be mapped and flagged (Riparian Management Zone or blue and white stripped) prior to project implementation. RCA's will be developed prior to implementation through site specific analysis and shall follow the minimum width outlined in the LMP unless otherwise specified by the forest hydrologist.
2. Store fuel and ignition devices outside of the RCA and a minimum of 150 feet away from any potential waterways. Refueling of equipment, vehicles or machinery shall not occur within the RCA and/or within 150 of a watercourse.
3. Heavy equipment, trucks or roll off dumpsters are not permitted in RCA's without prior consultation with hydrologist or physical scientist. If equipment, trucks or dumpsters are permitted within the RCA, they shall not be used for implementation within 50 feet of channel edge. No equipment shall operate on slopes greater than 35% or cross beyond the break of any swale.
4. Stream or channel crossing shall be done at a 90 angle and at a single armored location. If armored banks are unavailable, a crossing location will be determined by the forest hydrologist.
5. Do not grade soils within an RCA. If grading is required to complete the scope of the project and is within the boundaries of an RCA, consultation with the forest hydrologist is required prior to implementation.
6. Stored or displaced soils and/or material shall not be placed within 100 feet of any potential waterway or drainages.

7. Water quality and hydrologic considerations are to be assessed throughout the duration of the project.
8. Protective sediment barriers shall be placed and staked down around the perimeter of any project associated with ground disturbing activities. If any hazardous materials are discovered while implementing this project the contractor will immediately notify forest service personnel and work with hazmat coordinators for guidance and removal of unauthorized dumps, spills or other materials.
9. Alter project prescriptions and control actions in the RCA's as needed to maintain water quality, ecosystem structure, function and processes.

Soil Porosity/Soil Density:

1. Heavy equipment, trucks or vehicles shall not operate on wet soils. Ground based equipment shall operate on relatively dry soils of high soil strength or bearing capacity. Operate equipment when soil compaction, displacement, erosion and sediment runoff would be minimized (dry). If rutting occurs at 4 inches or greater, work shall be postponed until soils can accommodate the weight of equipment.
2. When possible maintain soil cover with organic material such as small woody debris (< 3 inch in diameter), decaying logs, leaf litter, duff, slash and trimmings to assist in soil porosity, hydrologic conductivity and lower bulk density.
3. Spread organic material parallel with elevation contour to minimize erosion, act as natural sediment catchments and allows for the development of microorganism habitat that is critical for soil health and productivity.

Stabilization:

1. Minimize bare mineral soil. Do not excavate, move or disturb significant soil. If fine grading, demolition or construction disturbs an area of 1 acre or greater the contractor will be required to develop and implement a forest approved SWPP. Disturbance of soil beyond fine grading, gate replacement and waddle installation will require consultation with the forest hydrologist.
2. Equipment, trucks or vehicles shall not operate on slopes greater than 35% and shall not drive in or across the break of swales or drainages.
3. Vehicles and equipment shall be parked or staged in designated parking areas, on flat dry stable ground. Access points in and out of staging areas shall be stabilized using mulch or other organic materials as ground cover not more than 3 inches with straw wattle (natural netting) around the perimeter.
4. Heavy equipment and vehicles parked overnight or at the end of shift shall be consolidated in designated parking areas and have a lipped drip pan in place while stored overnight. Inspect all equipment daily for leaks and immediately repair and/or remove leaking equipment from service if necessary, to protect water quality. Spill kits suitable to accommodate project equipment and fuel storage shall be on site and easily accessible.
5. Set up all equipment (dozers, backhoes, dumpsters, etc.) on existing flat ground of high soil strength. If additional stabilization methods such as mulch, gravel or road base is needed, consult with forest hydrologist prior to implementation.
6. If possible, retain 50% (post demolition/fine grading) evenly well distributed soil cover per treatment unit. Soil cover may be composed of a combination of live vegetation, clippings, mulch or rock in uniform coverage.
7. Do not disturb previous landslides or debris flows. Native material for grading or cover will not be taken from areas of previous debris flows or large-scale disturbances. If native material is needed it shall be taken from surrounding hardened surfaces such as roads.
8. Monitoring of site prep and project implementation shall be done periodically by a qualified forest service specialist.

4.0 EROSION CONTROL PLAN

Staging areas and fuel and Spill Plan:

Monitor all equipment daily for leaks, and immediately repair and/or remove leaking equipment from service if necessary to protect water quality. All hazardous material spill, weather from equipment, fueling activities or other materials handling and storage, shall be contained immediately, and spilled materials and/or contaminated soils disposed of in a legal and responsible manner. An emergency spill kit adequate to contain on-site spills that could result from hazardous materials or equipment shall be at the project site at all times.

- Design and locate parking and staging areas of appropriate size and configuration to accommodate expected vehicles and prevent damage to adjacent water; aquatic, and riparian resources.
- Calculate the expected runoff generated using the appropriate design storm to determine necessary drainage based on the size of the parking or staging area.
- Infiltrate as much of the runoff as possible using permeable surfaces and infiltration ditches or basins in areas where groundwater contamination risk is low.
- Use a single location for ingress and egress of staging area.
- Provide signage to designate parking, staging, and refueling areas, and to minimize impacts to sensitive areas.
- Refueling shall not occur within 150 feet of a watercourse.
- Fuels and other toxicants may not be stored within 150 feet of a watercourse.
- Work closely with the District and Forest Hazmat Coordinators to guide removal of unauthorized dumps or spills.

Erosion Prevention and Control:

Certified weed-free rice straw wattles will be utilized for the diversion, control, disbursement and detention of storm water runoff and sediment from disturbed areas. **All plant material (e.g., straw, mulch, seeds, etc.) used for erosion control and/or road maintenance must be certified weed-free. Only weed-free rice straw or rice mulch shall be allowed. All erosion control material must be biodegradable. Wattles wrapped in "photodegradable" plastic are not acceptable.**

Stabilization and/or re-contouring of any disturbed or excavated slopes shall be done in a manner to properly shed surface water runoff while maintaining structural integrity. If applicable soil protective cover shall be applied on disturbed areas where natural revegetation is inadequate to prevent accelerated erosion.

- Prevent or minimize the discharge of sediment into water bodies during construction, reconstruction, fine grading and/ or re-contouring.
- Certified weed-free rice straw wattles shall be placed downslope of project disturbance and utilized to redirect, deflect or contain runoff/ material from road surfaces and waterways.
- Complete all necessary stabilization measures prior to predicted precipitation that could result in surface runoff.
- Do not operate equipment when ground conditions could result in excessive rutting, or runoff, that could deliver sediment directly to watercourses or water bodies.

Schedule to Implement Erosion and Sediment Control Measures:

- Review Erosion Control Plan with contractor, demolition/construction crew, and/or restoration crew.
- Monitor implementation of BMP's using checklist.
- Field review of work being performed with forest hydrologist or physical scientist or qualified specialist.
- Monitor implementation of BMP's after demolition/construction of units is completed, and before the contractor is released from the project.

5.0 BEST MANAGEMENT PRACTICES

AqEco-2. Operations in Aquatic Ecosystems

- Clearly delineate work zone using blue flagging
- Refuel and service equipment only in designated staging areas outside of RCA's
- Schedule and conduct operations at least critical periods (dry periods)
- Inspect work site at regular intervals during and after activities, identify if need for mid-project corrections.
- Contour site to disperse runoff, minimize erosion and stabilize slopes
- Do not move or disturb significant soil without prior consultation with a specialist.
 - Disturbance of soil beyond fine grading and gate replacement will require consultation.

AqEco-4. Stream Channels and Shorelines

- Do not remove wood or other material in streams if partially covered with soil. (maintains stability of channel)
- Only remove wood or other materials if not covered with soil and such action maintains or improves safety and stability at bridges and culverts.

Veg-2. Erosion Prevention and Control

- Maintain natural drainage pattern of the area wherever practical.
- Operate equipment when soil compaction, displacement, erosion, and sediment runoff would be minimized (dry).
- Avoid ground equipment operations on unstable, wet, or easily compacted soils
- Berms from tracked or wheeled equipment will be smoothed to a maximum height of 4 inches and shall be broken up to reduce long straight lines.

Veg-3. Aquatic Management Zones

- Minimize the number of stream crossings, cross at armored banks.

Veg-8. Mechanical Site Treatment

- Operate mechanical equipment so that furrows and soil indentions are aligned with the contour.
- Do not leave piled soil, berms or material after fine grading

Road-10. Equipment Refueling and Servicing

- Spill kits are required on site and within close proximity to vehicles/equipment being operated
- Report spills and initiate suitable cleanup action in accordance with applicable State and Federal laws, rules, and regulations.
- Clean up and remove spilled materials, residues, and any other hazardous materials from NFS land according to specified requirements in appropriate guiding document.
- Do not store fuel within RCA's
- Do not refuel equipment or vehicles in RCA's or within 150 feet of waterways

6.0 BMP CHECKLIST

AqEco-2. Operations in Aquatic Ecosystems

Project-Specific Applications	Yes	No	N/A
Clearly delineate work zone			
Refuel and service equipment only in designated staging areas			
Schedule and conduct operations at least critical periods (dry periods)			
Inspect work site at regular intervals during and after activities, identify if need for mid-project corrections.			
Contour site to disperse runoff, minimize erosion and stabilize slopes			

AqEco-4. Stream Channels and Shorelines

Project-Specific Applications	Yes	No	N/A
Remove wood or other material in streams only if such action maintains or improves stream condition, provides for safety and stability at bridges and culverts, is needed to avoid or minimize excessive erosion of stream banks, or reduces flood hazard.			

Consult with the hydrologist for all activities within the RCA.			
---	--	--	--

Veg-2. Erosion Prevention and Control

Project-Specific Applications	Yes	No	N/A
Maintain natural drainage pattern of the area wherever practical.			
Operate equipment when soil compaction, displacement, erosion, and sediment runoff would be minimized (dry).			
Avoid ground equipment operations on unstable, wet, or easily compacted soils.			
Berms from tracked or wheeled equipment will be smoothed to a maximum height of 4 inches and shall be broken up to reduce long straight lines.			

12.7- Watershed Management

Project-Specific Applications	Yes	No	N/A
All potentially impacted wetlands and RCAs will be identified on maps as part of project development.			
Implementation of mechanized activities will not be permitted in RCAs. Treatment relevant to the survival and quality of wetlands will be allowed after approved alternatives and consultation with a hydrology specialist.			
Project planners and administrators are responsible for consulting with a watershed specialist prior to or during project implementation for adjusting or interpreting application of watershed management requirements.			

Hydrologic Design Features

Project-Specific Applications	Yes	No	N/A
Treatment shall not be implemented in designated RCA's without prior consultation.			
Refueling or mechanical maintenance within the RCA			
Mechanical treatment within the RCA			
Timber and downed wood was felled parallel to elevation interval to prevent waterways and to create natural sediment barriers.			
Stream or channel crossing was done at a single location.			
Any berms created in project implementation were pulled back and smoothed.			
Soils, pile or materials were placed in or within 150 feet of a waterway or drainage channel.			
Vehicles were stored in appropriate locations with drip pans in place.			

Soil Management

Project-Specific Applications	Yes	No	N/A
Erosion control or soil stabilization measures were implemented while soil			

disturbing work was active. (Stabilizing measures may include but not be limited to soil binders, silt fences, straw mulch geotextiles, erosion-control mats, wood mulching, fiber rolls, straw bales).			
Existing vegetation was preserved where feasible .			
Limited disturbance on slopes, steep grades exposed soils and/or previous debris flow or slides.			
Evenly disperse mulch and slashed clippings			
Project access points and staging areas were stabilized such that soil, sediment and other materials are not tracked out or carried away during runoff events.			
Ground based equipment operated on relatively dry soils of high soil strength or bearing capacity.			
Staging areas and access routes will be rehabilitated after project completion.			
Reported, clean up and/or removal of spilled materials, residues, and any other hazardous materials.			
Project was inspected during and after activities.			
Mid project problems or concerns were addressed, recorded and adjusted with forest approval.			

References

U.S. Forest Service (2005) Land Management Plan, Part 2: Angeles National Forest Strategy
U. S. Forest Service. (2012). *National Best Management Practices for Water Quality Management on National Forest System Lands, Volume 1: National Core BMP Technical Guide*. (FS-990a). Washington, D.C.: USD

END OF SECTION

SECTIONS 01 11 01 USFS GENERAL REQUIREMENTS

PART 1 GENERAL

1.0 POINT OF CONTACT

Forest Services - Angeles National Forest

Contact: Justin Seastrand – Natural Resource Specialist
626 574-5278
gary.seastrand@usda.gov

Watershed Conservation Authority

Contact: Robert Segarra, Cumming Group - Project Manager
562 583-6743
robert.segarra@cumming-group.com

1.1 UTILITIES

A. Utility owners/providers

Utility owners/providers have services and/or equipment which may affect the work, are as follows:

Water	USFS Angeles National Forest (ANF) 701 N. Santa Anita Ave. Arcadia, CA 91006 (626) 574-1613
Sanitary & Trash	ANF
Electric	Southern California Edison General Customer Service: 800-990-7788 Agricultural Customers: 800-896-1245 Report Voltage Issues: 800-611-1911
Underground Utilities	DigAlert Underground Service Alert of Southern California P.O. Box 77070 Corona, Ca. 92877-0102 811 or 800-422-4133
Phone/ Cable/Satellite	TBD

- B. Should the contractor require access to a fire hydrant, water for construction may be obtained at Rincon Fire Station. Contractor to request access at least 1 week prior to date in which water is needed. Water pressure and availability subject to change as fire suppression needs arise.

2.0 SITE CONTROL MEASURES

- A. Contractor shall maintain a clean and secure job site.

- B. Contractor shall protect in place all infrastructure including but not limited to existing curbs, gutters and driveway aprons.
- C. Contractor shall maintain a clean and secure job site.
- D. Contractor shall protect in place existing asphalt road ingress and egress across property and as denoted on plans and details.
- E. Contractor shall comply with any and all directives issued by the Agency's designated representative in order to prevent dust or other material from becoming a nuisance or annoyance.
- F. The contractor shall keep all adjacent highways, streets and haul routes clean of dirt and debris originating from the construction site or resulting from the project work.

3.0 WEED CONTROL MEASURES:

- A. Ground disturbing equipment, or vehicles that have been operated off existing roads or highways should be washed completely, prior to entering the ANF. All dirt or vegetative material should be removed, with a focus on the undercarriage, wheels, or ground disturbing components.
- B. ANF staff may inspect equipment or vehicles for compliance upon arrival at the work site. If identified by ANF staff, vehicles or equipment operated in or adjacent to noxious weed populations may require removal of dirt and vegetative material prior to movement or demobilization.
- C. For the placement of erosion control devices (including but not limited to straw bales and waddles) as needed for Best Management Practices (BMPs), the contractor shall use certified weed-free products.

4.0 QUALITY CONTROL MEASURES:

- A. All quality control (QC) shall be done by the contractor, including assuring compressive strength of concrete and asphalt mix design.
- B. All visual inspections for concrete, asphalt and utility work shall be coordinated with the Forest Engineer for quality assurance (QA).

5.0 BORROW SITE FOR FILL

- A. For fill and embankment material, a borrow location for each site requiring native fill (including abandoned concrete vaults) shall be determined by the ANF at a location within ½ mile from each project area. The contractor shall transport all needed fill material from the borrow site to the fill location.

END OF SECTION

DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01 32 01

PROJECT SCHEDULE

PART 1 GENERAL

1.1 REFERENCES

This specification is adapted from United Facilities Guild Specification UFGS-12 93 00 (August 2017). For a list of references for Section 12 93 00 for Project Schedule see <https://www.wbdg.org/ffc/dod/unified-facilities-guide-specifications-ufgs/ufgs-01-32-01-00-10>.

1.2 SUBMITTALS

Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES

- A. Project Schedule

PART 2 EXECUTION

3.1 GENERAL REQUIREMENTS

Prepare for approval a Project Schedule. Show in the schedule the proposed sequence to perform the work and dates contemplated for starting and completing all schedule activities. The scheduling of the entire project is required. The scheduling of design and construction is the responsibility of the Contractor.

Develop the Project Schedule to the appropriate level of detail to address major milestones and to allow for satisfactory project planning and execution. Include activities associated with the critical submittals and their approvals, procurement, fabrication, and delivery of long lead materials, equipment, fabricated assemblies, and supplies. Long lead procurement activities are those with an anticipated procurement sequence of over 90 calendar days.

END OF SECTION

SECTION 01 33 00 SUBMITTAL PROCEDURES

PART 1 - GENERAL

SUMMARY

This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, Mock-ups and other miscellaneous submittals.

SUBMITTAL PROCEDURES

A. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.

B. Processing Time: Allow enough time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Project Manager'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. Project Manager 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.

PART 2 - PRODUCTS

2.1 SUBMITTALS

A. General: Prepare and submit Submittals required by individual Specification Sections.

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. Samples: Prepare physical units of materials or products, including the following:

1. Fabricated or unfabricated physical examples of materials, equipment or workmanship that illustrate functional and aesthetic characteristics of a material or product and establish standards by which the work can be judged.
2. Color samples from the manufacturer's standard line (or custom color samples if specified) to be used in selecting or approving colors for the project.
3. Field samples and mock-ups constructed on the project site establish standards ensuring work can be judged. Includes assemblies or portions of assemblies that are to be incorporated into the project and those that will be removed at conclusion of the work.

E. 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.

F. 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.

G. Maintenance Data: Prepare written and graphic instructions and procedures for operation and normal maintenance of products and equipment.

H. 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

GENERAL

A. 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 Project Manager will approve or disapprove the request for substitution.

B. 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 Project Manager. 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.

END OF SECTION

SECTION 01 41 00 QUALITY CONTROL

PART 1 - GENERAL

1.1 WORK

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

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.

1.3 SUBMITTALS

- A. Permits, Licenses, and Certificates (if necessary)
- B. Test and Inspection Reports (if necessary)
- C. As-Built Drawings as required

1.4 MEASUREMENT AND PAYMENT

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.

3.3 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.

3.4 PERMITS, LICENSES, AND CERTIFICATES

- A. For Project Manager'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 Project Manager.

END OF SECTION

SECTION 01 57 19 TEMPORARY ENVIRONMENTAL CONTROLS

PART 1 - GENERAL

1.1 REFERENCES

This specification is adapted from United Facilities Guide Specification UFGS-01-57-19 (August 2017). For a list of references for Section 01 57 19 for Temporary Environmental Controls see <https://www.wbdg.org/ffc/dod/unified-facilities-guide-specifications-ufgs/ufgs-01-57-19>.

1.2 RELATED WORK:

- A. BMPs and Erosion Control: 00 31 24.01 ANF CE Checklist & BMPs
- B. General Requirements: Section 01 11 01 USFS GENERAL REQUIREMENTS
- C. Construction Waste Management: Section 02 41 00.1 WASTE MANAGEMENT DISPOSAL.

PART 2 – PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION

3.1 PROTECTION OF NATURAL RESOURCES

Minimize interference with, disturbance to, and damage to fish, wildlife, and plants, including their habitats. Prior to the commencement of activities, consult with the Angeles National Forest, regarding rare species or sensitive habitats that need to be protected. The protection of rare, threatened, and endangered animal and plant species identified, including their habitats, is the Contractor's responsibility. Preserve the natural resources within the project boundaries and outside the limits of permanent work. Restore to an equivalent or improved condition upon completion of work that is consistent with the requirements of the Angeles National Forest or as otherwise specified. Confine construction activities to within the limits of the work indicated or specified.

3.2 FLOW WAYS

Do not alter water flows or otherwise significantly disturb the native habitat adjacent to the project and critical to the survival of fish and wildlife, except as specified and permitted.

3.3 VEGETATION

Except in areas to be cleared, do not remove, cut, deface, injure, or destroy trees or shrubs without the Project Manager's permission. Do not fasten or attach ropes, cables, or guys to existing nearby trees for anchorages unless authorized by the Project Manager. Where such use of attached ropes, cables, or guys is authorized, the Contractor is responsible for any resultant damage. Protect existing trees that are to remain to ensure they are not injured, bruised, defaced, or otherwise damaged by construction operations. Remove displaced rocks from uncleared areas. Coordinate with the Project Manager and the Angeles National Forest to determine appropriate action for trees and other landscape features scarred or damaged by equipment operations.

3.4 STREAMS

See 00 31 24.01, ANF CE Checklist & BMPs.

3.5 STORMWATER

Do not discharge stormwater from construction sites to the sanitary sewer. Obtain authorization in advance from the Angeles National Forest for any release of contaminated water.

3.6 ARCHAEOLOGICAL RESOURCES

All archaeological resources are to be protected. No archaeological resources are known to exist within the work area. If, during excavation or other construction activities, any previously unidentified or unanticipated historical, archaeological, and cultural resources are discovered or found, activities that may damage or alter such resources will be suspended. Resources covered by this paragraph include, but are not limited to: any human skeletal remains or burials; artifacts; shell, midden, bone, charcoal, or other deposits; rock or coral alignments, pavings, wall, or other constructed features; and any indication of agricultural or other human activities. Upon such discovery or find, immediately notify the Project Manager so that the appropriate authorities may be notified and a determination made as to their significance and what, if any, special disposition of the finds should be made. Cease all activities that may result in impact to or the destruction of these resources. Secure the area and prevent employees or other persons from trespassing on, removing, or otherwise disturbing such resources. The Government retains ownership and control over archaeological resources.

3.7 HISTORICAL RESOURCES

Existing historical resources within the work area are shown on the drawings where applicable. Protect these resources and be responsible for their preservation during the life of the Contract.

3.8 SOLID WASTE MANAGEMENT

Control and Management of Solid Wastes Pick up solid wastes, and place in covered containers that are regularly emptied. Do not prepare or cook food on the project site. Prevent contamination of the site or other areas when handling and disposing of wastes. At project completion, leave the areas clean. Employ segregation measures so that no hazardous or toxic waste will become co-mingled with non-hazardous solid waste. Transport solid waste off Government property and dispose of it in compliance with 40 CFR 260, state, and local requirements for solid waste disposal. A Subtitle D RCRA permitted landfill is the minimum acceptable offsite solid waste disposal option. Verify that the selected transporters and disposal facilities have the necessary permits and licenses to operate. Solid waste disposal offsite must comply with most stringent local, state, and federal requirements, including 40 CFR 241, 40 CFR 243, and 40 CFR 258. Manage hazardous material used in construction, including but not limited to, aerosol cans, waste paint, cleaning solvents, contaminated brushes, and used rags, in accordance with 49 CFR 173.

3.9 CONTROL AND MANAGEMENT OF HAZARDOUS WASTE

Do not dispose of hazardous waste on Government property. Do not discharge any waste to a sanitary sewer, storm drain, or to surface waters or conduct waste treatment or disposal on Government property without written approval of the Project Manager.

3.10 HAZARDOUS WASTE/DEBRIS MANAGEMENT

Identify construction activities that will generate hazardous waste or debris. Provide a documented waste determination for resultant waste streams. Identify, label, handle, store, and dispose of hazardous waste or debris in accordance with federal, state, and local regulations, including 40 CFR 261, 40 CFR 262, 40 CFR 263, 40 CFR 264, 40 CFR 265, 40 CFR 266, and 40 CFR 268. Manage hazardous waste in accordance with the approved Hazardous Waste Management Section of the EPP. Store hazardous wastes in approved containers in accordance with 49 CFR 173 and 49 CFR 178. Hazardous waste generated within the confines of Government facilities is identified as being generated by the Government. Prior to removal of any hazardous waste from Government property, hazardous waste manifests must be signed by personnel from

the Angeles National Forest. Do not bring hazardous waste onto Government property. Provide the Project Manager with a copy of waste determination documentation for any solid waste streams that have any potential to be hazardous waste or contain any chemical constituents listed in 40 CFR 372-SUBPART D.

END OF SECTION

SECTION 02 37 01 SEDIMENT AND EROSION CONTROL MEASURES

PART 1 - GENERAL

1.1 The work under this section consists of furnishing all necessary labor, equipment, materials, and performing all operations in connection with construction sediment and control measures.

A. General

1. All erosion and sediment control measures are to be placed prior to any disturbance caused by grading and or excavation and shall conform to the requirements of the appropriate regulatory agency for the State.
2. The Contractor shall be solely responsible for ensuring that erosion and sediment control measures are implemented and maintained at the site.
3. Soil disturbing activities include but are not limited to: Clearing and grubbing, excavation for utilities and foundations, roadway and parking lot construction, construction or modification of site drainage, grading, and preparation for final seeding.

1.2 SUBMITTALS

- A.** The Contractor shall be required to submit a sediment and erosion control plan in accordance with this specification for approval by the Contracting Officer 2 weeks prior to start of work.

1.3 PERMITS

- A.** The Contractor shall apply for and pay for a National Pollutant Discharge Elimination System (NPDES) permit from the state the project resides in.

1.3 MEASUREMENT AND PAYMENT

- B.** 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 SYNTHETIC FILTER FABRIC FOR SILT FENCES.

- A.** Pervious sheet of polypropylene, nylon, or polyethylene fabric conforming to the following physical and hydraulic characteristics:

Physical Properties	(Min.) Requirement	Test Method
Grab Tensile	lbs. W120/F100	ASTM-D-4632
Grab Elongation	% 15	ASTM-D-4632
Mullen Burst	psi 275	ASTM-D-3786
Puncture	lbs. 65	ASTM-D-4833
Trapezoidal Tear	lbs. 50	ASTM-D-4533
UV Resistance	% 80	ASTM-D-4355
AOS	US Sieve # 30/40	ASTM-D-4751
Permittivity	gal/min-sq. ft. 90	ASTM-D-4491

- B.** Filter fabric should contain ultraviolet ray inhibitors and stabilizers to provide a minimum of 6 months of expected usable construction life at a temperature range of 0 to 120 F.

1. Support Posts: 4 foot - 2 x 2 wood.

2.2 CERTIFIED WEED FREE

- A. All plant material (e.g., straw, mulch, seeds, etc.) used for erosion control and/or road maintenance must be certified weed-free. Only weed-free rice straw or rice mulch shall be allowed. All erosion control material must be biodegradable. Wattles wrapped in "photodegradable" plastic are not acceptable.

PART 3 - EXECUTION

3.1 CONSTRUCTION

- A. Install straw bales at local drainage ways to prevent silt intrusion upon adjacent drainage courses. Remove straw bales following establishment of vegetation cover and utilize as mulch at swales or on steep slopes.
- B. Prior to construction, install silt fence along the downhill construction limits to prevent silt intrusion upon adjacent land.
- C. Install sediment and erosion control measures on the down slope toe of all top soil stock piles.
- D. Maintain and remove all erosion controls as specified.
- E. If the proposed activities include seeding, revegetation or landscaping, the Forest Botanist must approve all seed mixtures or plant species considered. Any seeds or plants being proposed for seeding or planting are required to be approved by the Forest Botanist.

3.2 DUST CONTROL

- A. In areas subject to surface and air movement of dust, where on-site or off-site damage is likely to occur, one or more of the following preventive measures shall be taken for dust control:
 - 1. Minimize the period of soil exposure through the use of temporary ground cover and other temporary stabilization practices.
 - 2. Sprinkle the site with water until surface is wet. Repeat as needed.

3.3 SILT FENCE

- A. Silt fences are appropriate for the following general locations:
 - 1. Immediately upstream of the point(s) of runoff discharge from a site before flow becomes concentrated. Below disturbed areas where runoff may occur in the form of overland flow.
 - 2. Along the down slope toe of all top soil stock piles.
- B. Materials.
 - 1. Utilize standard strength synthetic filter fabric for sediment barriers. The filter fabric shall be purchased in a continuous roll cut to the length of the barrier to avoid the use of joints. When joints are necessary, filter cloth shall be spliced together only at a support post, with a minimum 6 inch overlap, and securely sealed.
 - 2. The standard strength filter fabric shall be stapled or wired to the fence and 6 inches of the fabric shall be extended into the ground. Filter fabric shall not be stapled to existing trees.
 - 3. Support posts shall be spaced at a maximum 6 feet and driven securely into the ground a minimum of 24 inches.
 - 4. Filter fabric shall be buried a minimum of 12 inches.
 - 5. The height of a silt fence shall not exceed 36 inches. Higher fences may impound volumes of water sufficient to cause failure of the structure.
- C. Maintenance.
 - 1. Silt fences and filter barriers shall be inspected immediately after each rainfall and

at least daily during prolonged rainfall.

2. Silt fences shall be inspected for depth of sediment, tears, and to see if the fabric is securely attached to the fence posts, and to see that the fence posts are firmly in the ground. Any deficiencies shall be repaired immediately.

3. Should the fabric on a silt fence or filter barrier decompose or become ineffective prior to the end of the expected usable life and the barrier still be necessary, the fabric shall be replaced promptly.

4. Sediment deposits should be removed after each storm event and/or when deposits reach approximately 1/3 the height of the barrier or when the sediments limit or prevent the flow of water through the fabric hydraulic.

5. Any sediment deposits remaining in place after the silt fence or filter barrier is no longer required shall be dressed to conform with the existing grade, prepared, and seeded.

3.4 STRAW BALE EROSION CONTROL FENCE

- A. Straw bale erosion control fences are appropriate for the following general locations:
 - 1. Sheet flow applications: Straw bales shall be placed in a single row, lengthwise on the contour with ends of adjacent bales tightly abutting one another.
 - 2. Channel flow applications: Straw bales shall be placed in a single row, lengthwise and oriented perpendicular to the direction of flow with ends of adjacent bales tightly abutting one another. The barrier shall be extended to such a length that the bottoms of the end bales are higher in elevation than the top of the lowest middle bale to assure that sediment laden runoff will flow either through or over the barrier but not around it.
- B. The barrier shall be entrenched and backfilled. A trench shall be excavated the width of a bale and the length of the proposed barrier to a minimum depth of 4 inches. After the bales are staked and chinked, the excavated soil shall be backfilled against the barrier. Backfill shall conform to the ground level of the downhill side and shall be built up to 4 inches against the uphill side of the barrier.
- C. Each bale shall be securely anchored by at least 2 stakes or rebar driven through the bale. The first stake in each bale shall be driven toward the previously laid bale to force the bales together. Stakes or rebar shall be driven a minimum of 12 inches into the ground or deep enough into the ground to securely anchor the bales, whichever is greater.
- D. The gaps between bales shall be chinked (filled by wedging with straw to prevent water from escaping between the bales). Loose straw scattered over the area immediately uphill from a straw bale barrier tends to increase barrier efficiency.

3.5 STRAW WATTLE OR ROLL

- A. Straw wattles shall be installed in accordance to manufacturer's installation guidelines.
- B. At a minimum:
 - 1. The wattle shall be entrenched and backfilled. A trench shall be excavated the width of the straw wattle and the length of the proposed barrier to a depth of 2-3 inches.
 - 2. Each wattle shall be securely anchored by at least one 18-24 inch stake every 3-4 feet and with a stake on each end. Stakes shall be driven perpendicular to slope face through the middle of the wattle until 2-3 inches remains exposed above the wattle.
 - 3. After the wattles are staked, compact excavated soil against the uphill side of the barrier.
 - 4. Adjacent wattles should tightly abut.

3.6 MAINTENANCE

- A. Inspection shall be frequent and repair or replacement shall be made promptly as needed. Straw bale carriers shall be removed when they have served their usefulness, but not before the upslope areas have been permanently stabilized.

END OF SECTION

SECTION 02 41 00 DEMOLITION

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section specifies demolition and removal of buildings, portions of buildings, utilities, other structures and debris.

1.2 RELATED WORK:

- A. BMPs and Erosion Control: 00 31 24.01 ANF CE Checklist & BMPs
- B. General Requirements: Section 01 11 01 USFS GENERAL REQUIREMENTS
- C. Environmental Protection: Section 01 57 19, TEMPORARY ENVIRONMENTAL CONTROLS.
- D. Construction Waste Management: Section 02 41 00.1 WASTE MANAGEMENT DISPOSAL.

1.3 PROTECTION:

- A. Perform demolition in such manner as to eliminate hazards to persons and property; to minimize interference with use of adjacent areas, utilities and structures or interruption of use of such utilities; and to provide free passage to and from such adjacent areas of structures.
- B. Provide safeguards, including warning signs, barricades, temporary fences, warning lights, and other similar items that are required for protection of all personnel during demolition and removal operations.
- C. Maintain fences, barricades, lights, and other similar items around exposed excavations until such excavations have been completely filled.
- D. Provide enclosed dust chutes with control gates from each floor to carry debris to truck beds and govern flow of material into truck. Provide overhead bridges of tight board or prefabricated metal construction at dust chutes to protect persons and property from falling debris.
- E. Prevent spread of flying particles and dust. Sprinkle rubbish and debris with water to keep dust to a minimum. Do not use water if it results in hazardous or objectionable condition such as, but not limited to; ice, flooding, or pollution. Vacuum and dust the work area daily.
- F. Before beginning any demolition work, the Contractor shall survey the site and examine the drawings and specifications to determine the extent of the work. The contractor shall take necessary precautions to avoid damages to existing items to remain in place, to be reused, or to remain the property of OWNER; any damaged items shall be repaired or replaced as approved by the Resident Engineer. The Contractor shall coordinate the work of this section with all other work and shall construct and maintain shoring, bracing, and supports as required. The Contractor shall ensure that structural elements are not overloaded and shall be responsible for increasing structural supports or adding new supports as may be required as a result of any cutting, removal, or demolition work performed under this contract. Do not overload structural elements. Provide new supports and reinforcement for existing construction weakened by demolition or removal works. Repairs, reinforcement, or structural replacement must have Resident Engineer's approval.
- G. The work shall comply with the requirements of Section 01 57 19, TEMPORARY ENVIRONMENTAL CONTROLS, Section 00 31 24.01 ANF CE Checklist & BMPs, Section 01 14 01 WORK RESTRICTIONS – BAT SURVEYS and Section 02 41 00.1 WASTE MANAGEMENT DISPOSAL.

1.4 UTILITY SERVICES:

- A. Demolish and remove outside utility service lines shown to be removed.
- B. Remove abandoned outside utility lines that would interfere with installation of new utility lines and new construction.

PART 2 – PRODUCTS

Not Used

PART 3 - EXECUTION

3.1 DEMOLITION

- A. Completely demolish and remove buildings and structures, including all appurtenances related or connected thereto, as noted below:
 - 1. As required for installation of new utility service lines.
 - 2. To full depth within an area defined by hypothetical lines located 1500 mm (5 feet) outside building lines of new structures.
- B. Debris, including brick, concrete, stone, metals and similar materials shall become property of Contractor and shall be disposed of by him daily, off the project site to avoid accumulation at the demolition site. Materials that cannot be removed daily shall be stored in areas specified by the Resident Engineer. Break up concrete slabs below grade that do not require removal from present location into pieces not exceeding 600 mm (24 inches) square to permit drainage. Contractor shall dispose debris in compliance with applicable federal, state or local permits, rules and/or regulations.
- C. In removing buildings and structures of more than two stories, demolish work story by story starting at highest level and progressing down to third floor level. Demolition of first and second stories may proceed simultaneously.
- D. Remove and legally dispose of all materials, other than earth to remain as part of project work, from any trash dumps shown. Materials removed shall become property of contractor and shall be disposed of in compliance with applicable federal, state or local permits, rules. All materials in the indicated trash dump areas, including above surrounding grade and extending to a depth of 1500mm (5feet) below surrounding grade, shall be included as part of the lump sum compensation for the work of this section. Materials that are located beneath the surface of the surrounding ground more than 1500 mm (5 feet), or materials that are discovered to be hazardous, shall be handled as unforeseen. The removal of hazardous material shall be referred to Hazardous Materials specifications.
- E. Remove existing utilities as indicated or uncovered by work and terminate in a manner conforming to the nationally recognized code covering the specific utility and approved by the Resident Engineer. When Utility lines are encountered that are not indicated on the drawings, the Resident Engineer shall be notified prior to further work in that area.

3.1.2.1 Utilities and Related Equipment

- 1. Do not interrupt existing utilities serving occupied or used facilities, except when authorized in writing by the Contracting Officer. Do not interrupt existing utilities serving facilities.
- 2. Do not begin demolition or deconstruction work until all utility disconnections have been made. Shut off and cap utilities for future use, as indicated.

3.1.2.2 Disconnecting Existing Utilities

- 1. NOTE: Where the materials, meters, or related equipment to be affected in the area of demolition or deconstruction are the property of the local utility companies and not of the Angeles National Forest, the specifier must contact them, determine the disposition of the existing utilities, and modify the requirements herein as needed.

2. Remove existing utilities, as indicated and terminate in a manner conforming to the nationally recognized code covering the specific utility and approved by the Contracting Officer. When utility lines are encountered but are not indicated on the drawings, notify the Contracting Officer prior to further work in that area. Remove meters and related equipment and deliver to a location [on the station] in accordance with instructions of the Contracting Officer

3.2 CLEAN-UP

- A. On completion of work of this section and after removal of all debris, leave site in clean condition satisfactory to Resident Engineer. Clean-up shall include off the site disposal of all items and materials not required to remain property of the Angeles National Forest as well as all debris and rubbish resulting from demolition operations.

END OF SECTION

SECTION 02 41 00.1 WASTE MATERIAL DISPOSAL

PART 1 - GENERAL

1.1 SUMMARY

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

1.2 MEASUREMENT AND PAYMENT

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 DISPOSAL AREA

- A. All excavated material not used in the construction of embankments or backfilling of trenches, or other excess material resulting from the excavation and embankment operation shall be hauled to a disposal area designated by the ANF.
- B. All unsuitable excavated material and oversize boulders that are not to be used shall be hauled to a disposal area.
- C. All stumps, slash and other clearing and grubbing debris shall be hauled to a disposal area.
- D. Disposal Area: All waste material above shall be hauled to the disposal area on Government property as designated by the ANF.
 - 1. Waste material shall be piled and compacted to form a dense layer.
 - 2. The size and shape of the piled waste material shall be designated by the ANF.
 - 3. The piled material shall be covered with soil to a uniform depth of twelve inches minimum and sloped to 2:1 or flatter.
 - 4. The disposal site shall be left suitable for seeding. If the proposed activities include seeding, revegetation or landscaping, the Forest Botanist must approve all seed mixtures or plant species considered.

3.2 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 Angeles National Forest is not responsible for waste material upon its departure from the project site.

END OF SECTION

DIVISION 03 - CONCRETE
SECTION 03 30 53
MISCELLANEOUS CAST-IN-PLACE CONCRETE

PART 1 – GENERAL

1.1 SUMMARY

This work shall consist of furnishing and placing reinforcement concrete and construction in accordance with the specifications and in conformity with the lines, grades and dimensions as shown on the drawings or established by the Project Manager. Section includes cast-in-place concrete, including reinforcement, concrete materials, mixture design, placement procedures, and finishes

1.2 REFERENCES

- A. ACI 117 Standard Specifications for Tolerances for Concrete Construction and Materials.
- B. ACI 301 Structural Concrete for Buildings.
- C. ACI 318 Building Code Requirements for Reinforced Concrete
- D. ACI 347 Recommended Practice for Concrete Formwork.
- E. ASTM A 184 Fabricated Deformed Steel Bar Mats for Concrete

1.3 RELATED WORK

- A. BMPs and Erosion Control: Section 00 31 24.01 ANF CE Checklist & BMPs
- B. General Requirements: Section 01 11 01 USFS GENERAL REQUIREMENTS
- C. Exposed Aggregate Concrete: Sections 32 13 13.13 EXPOSED AGGREGATE CONCRETE

1.4 SUBMITTALS

- A. Product Data: For each type of product.
- B. Design Mixtures: For each concrete mixture.
- C. Submit for Engineer's review test results.
- D. Submit manufacturer's certificate, certifying that the products meet or exceed specified requirements.

1.5 QUALITY ASSURANCE

- A. To perform the works in accordance with ACI 301.
- B. No variations to the Specification or drawings to be made without approval. Submit details of any reasons for the proposed variations from this Specification, the drawings, and the Engineer's written or drawn instructions for approval.
- C. All visual inspections for concrete, asphalt and utility work shall be coordinated with the Forest Engineer for quality assurance (QA).
- D. Comply with the appropriate American Standards and manufacturer's specifications for all materials used. Acquire cement and aggregate from the same source for all work. Mark, document and identify materials so as to ensure that they are used as specified.
- E. Conform to ACI 305R when concreting during hot weather.
- F. Perform all sampling, laboratory and site tests by an Independent Testing Agency/Laboratory.
- G. Carry out all tests and checks on site in the presence of or as directed by the Engineer and as required by the Specification.
- H. Maintain at the site the following apparatus in good operating condition:
 - I. Apparatus for assessing workability in accordance with ACI 304.
 - J. Apparatus for making concrete cylinders in accordance with ASTM C 470.
- K. A maximum and minimum thermometer close to the works for measuring atmospheric shade

temperature.

- L. When the concrete arrived on site does not meet the specified slump or any other test requirements and reached the site beyond the time limit, Engineer has authority to reject the load of concrete. Cart away the rejected concrete out of project site immediately.
- M. Ready-Mix-Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

- A. Comply with ACI 301 (ACI 301M).
- B. Comply with ACI 117 (ACI 117M).

2.2 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed.
- B. Plain-Steel Welded-Wire Reinforcement: ASTM A 1064/A 1064M, plain, fabricated from as-drawn steel wire into flat sheets.

2.3 CONCRETE MATERIALS

2.3.1 Cementitious Materials:

- A. Portland Cement: ASTM C 150/C 150M, Type I or Type V.
- B. Fly Ash: ASTM C 618, Class C or F.
- C. Slag Cement: ASTM C 989/C 989M, Grade 100 or 120.
- D. The cement to be used is type PAL 42.5 for all concrete structures according to the Lebanese norm.
- E. It shall be originating from manufacturers approved by the Project Manager, shipped and sealed, labeled bags only. Cement delivered in bulk shall not be used unless authorized by the Project Manager.
- F. Only one (1) type or brand of cement shall be used in any one structural member. Mixing of types or brands will not be permitted.
- G. Storage capacity shall be sufficient to meet the requirements for 30 (thirty) working days unless in the opinion of the Project Manager the supply from the manufacturer is so limited that more storage capacity is necessary.
- H. Cement shall be stored in moisture proof storage sheds in such a manner that the oldest is used first. Neither stale nor reclaimed or re-sacked cement shall be used. The contractor shall not store cement in areas subject to flooding.
- I. Cement remaining in bulk storage at the mill prior to shipment for more than six (6) months or cement stored in bags in local storage by the contractor or a vendor for more than three (3) months after shipment from the mill, may be retested before use and will be rejected if its fails to meet any of the requirements of these specifications.

2.3.2 Normal-Weight Aggregate: ASTM C 33/C 33M, 1-1/2-inch nominal maximum aggregate size.

- A. Source of supply: The aggregates shall be extracted from any official natural quarries (stone or sand) approved by the Project Manager. The loss by Abrasion Test (Los Angeles) shall not be more than 35.

- B. Fine aggregates: Fine aggregates shall conform to AASHTO M6 and shall consist of natural sand and crushed rock having hard and durable particles having a maximum of 30 as Los Angeles or, if approved by the Project Manager, other inert materials having similar characteristics 100% passing 9.5 mm sieve and 2% to 10% passing 0.15 mm sieve. It shall not contain harmful materials such as iron pyrites, coal, mica, shale or similar laminated materials such as flat and elongated particles or any materials which may attack the reinforcement in such a form or in sufficient quantity as to adversely affect the strength, durability and texture of the concrete.
- C. The “sand equivalent” (Piston method) of the nature sand shall not be less than 70%
- D. Coarse aggregates: Coarse aggregates shall conform to AASHTO M 80 and shall consist of gravel, crushed gravel, or crushed stone free from coating of clay or other deleterious substances. It shall not contain harmful or any other materials in such a form or in sufficient quantity as to adversely affect the strength and durability of the concrete. If necessary or requested by the Project Manager, coarse aggregate shall be washed to remove deleterious substances. The loss by Abrasion Test (Los Angeles) shall not be more than 30.
- E. Combined aggregates: Combined aggregates are composed of a mixture of coarse aggregates and fine aggregates. They shall be used only in proportions with the prior approval of the Project Manager. In no case shall materials passing no. 200 (0.075 mm) sieve exceed 3% by weight of the combined aggregates.
- F. Air-Entraining Admixture: ASTM C 260/C 260M.
- G. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures and that do not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.

2.3.3 Water: ASTM C 94/C 94M.

- A. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
- B. Retarding Admixture: ASTM C 494/C 494M, Type B.
- C. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
- D. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
- E. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
- F. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

2.4 FIBER REINFORCEMENT

- A. Synthetic Micro-Fiber: [Monofilament] [or] [fibrillated] polypropylene micro-fibers engineered and designed for use in concrete, complying with ASTM C 1116/C 1116M, Type III.

2.5 RELATED MATERIALS

- A. Vapor Retarder: Plastic sheet, ASTM E 1745, Class A or B.
- B. Vapor Retarder: Polyethylene sheet, ASTM D 4397, not less than 10 mils (0.25 mm) thick; or plastic sheet, ASTM E 1745, Class C.C. Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber, or ASTM D 1752, cork or self-expanding cork.

2.6 CURING MATERIALS

- A. Evaporation Retarder: Waterborne, monomolecular film forming; manufactured for application to fresh concrete.
- B. Absorptive Cover: AASHTO M 182, Class 3, burlap cloth or cotton mats.
- C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- D. Water: Potable.
- E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B.
- F. Clear, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.

2.7 CONCRETE MIXTURES

- A. Normal-Weight Concrete:
 - 1. Minimum Compressive Strength: 30 MPa at 28 days.

2. Maximum W/C Ratio: 0.45
3. Cementitious Materials: Use fly ash, pozzolan, slag cement, and silica fume as needed to reduce the total amount of portland cement, which would otherwise be used, by not less than 40 percent.
4. Slump Limit: 100 mm for concrete with verified slump of 50 to 100 mm before adding high-range water-reducing admixture or plasticizing admixture, plus or minus 25 mm.
5. Air Content: Maintain within range permitted by ACI 301 (ACI 301M). Do not allow air content of trowel-finished floor slabs to exceed 3 percent.

2.8 CONCRETE MIXING

2.8.1 Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M[and ASTM C 1116/C 1116], and furnish batch ticket information.

- a. When air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 FORMWORK INSTALLATION

Design, construct, erect, brace, and maintain formwork according to ACI 301 (ACI 301M).

3.2 EMBEDDED ITEM INSTALLATION

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.

3.3 VAPOR-RETARDER INSTALLATION

Install, protect, and repair vapor retarders according to ASTM E 1643; place sheets in position with longest dimension parallel with direction of pour. Lap joints (150 mm) and seal with manufacturer's recommended adhesive or joint tape.

3.4 STEEL REINFORCEMENT INSTALLATION

Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

3.5 JOINTS

3.5.1 General: Construct joints true to line with faces perpendicular to surface plane of concrete.

3.5.2 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:

3.5.3 Isolation 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.

- A. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated.

3.6 CONCRETE PLACEMENT

- A. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301 (ACI 301M).
- B. Do not add water to concrete during delivery, at Project site, or during placement.
- C. Consolidate concrete with mechanical vibrating equipment according to ACI 301 (ACI 301M).

3.7 FINISHING FORMED SURFACES

3.7.1 Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections exceeding 1/2 inch (13 mm).

- A. Apply to concrete surfaces.

3.7.2 Rubbed Finish: Apply the following rubbed finish, defined in ACI 301 (ACI 301M), to smooth-formed-finished as-cast concrete where indicated:

- A. Smooth-rubbed finish.
- B. Grout-cleaned finish.
- C. Cork-floated finish.

3.7.3 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.

3.8 FINISHING UNFORMED SURFACES

- A. General: Comply with ACI 302.1R for screeding, restraighening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Screed surfaces with a straightedge and strike off. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane before excess moisture or bleedwater appears on surface.
- C. Do not further disturb surfaces before starting finishing operations.
- D. Scratch Finish: Apply scratch finish to surfaces indicated and surfaces to receive concrete floor topping or mortar setting beds for ceramic or quarry tile, portland cement terrazzo, and other bonded cementitious floor finishes unless otherwise indicated.
- E. Float Finish: Apply float finish to surfaces indicated, to surfaces to receive trowel finish, and to floor and slab surfaces to be covered with fluid-applied or sheet waterproofing, fluid-applied or direct-to-deck-applied membrane roofing, or sand-bed terrazzo.
- F. Trowel Finish: Apply a hard trowel finish to surfaces indicated and to floor and slab surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin film-finish coating system.
- G. Trowel and Fine-Broom Finish: Apply a partial trowel finish, stopping after second troweling, to surfaces indicated and to surfaces where ceramic or quarry tile is to be installed by either thickset or thinset methods. Immediately after second troweling, and when concrete is still plastic, slightly scarify surface with a fine broom.
- H. Slip-Resistive Broom Finish: Apply a slip-resistive finish to surfaces indicated and to exterior concrete platforms, steps, and ramps. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route.

3.9 CONCRETE PROTECTING AND CURING

3.9.1 General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and with ACI 301 (ACI 301M) for hot-weather protection during curing.

3.9.2 Evaporation Retarder: Apply evaporation retarder to 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.

3.9.3 Begin curing after finishing concrete but not before free water has disappeared from concrete surface.

3.9.4 Curing Methods: Cure formed and unformed concrete for at least seven days by one or a combination of the following methods:

- A. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
 - 1. Water.
 - 2. Continuous water-fog spray.
 - 3. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch (300-mm) lap over adjacent absorptive covers.
- B. 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.
- C. 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.
- D. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a 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. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

3.10 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- B. Tests: Perform according to ACI 301 (ACI 301M).
 - 1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd. (4 cu. m), but less than 25 cu. yd. (19 cu. m), plus one set for each additional 50 cu. yd. (38 cu. m) or fraction thereof.
 - 2. Testing Frequency: Obtain at least one composite sample for each 100 cu. yd. (76 cu. m) or fraction thereof of each concrete mixture placed each day.

END OF SECTION

DIVISION 04 – MASONRY

SECTION 04 43 00 STONE MASONRY

PART 1 GENERAL

1.1 DESCRIPTION

Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:

Stone masonry
Stone Facing
Stone Base
Stone Pavers
Stone Stair Treads

1.2 RELATED WORK

- A. BMPs and Erosion Control: Section 00 31 24.01 ANF CE Checklist & BMPs
- B. General Requirements: Section 01 11 01 USFS GENERAL REQUIREMENTS
- C. Misc. Cast in Place Concrete: Sections 03 30 53 MISC. CAST-IN-PLACE CONCRETE

1.3 RELATED DOCUMENTS (NOT USED)

1.4 REFERENCE STANDARDS

American National Standards Institute (ANSI)
ANSI A118.8 Modified Epoxy Emulsion Mortar/Grout

American Society for Testing and Materials (ASTM) including but not limited to the following:

1.3.2.2 ASTM A185 Steel Welded Wire Fabric, Plain, for Concrete Reinforcement
ASTM A276 Stainless and Heat-Resisting Steel Bars and Shapes
ASTM C136 Sieve Analysis of Fine and Coarse Aggregates
ASTM C144 Aggregate for Masonry Mortar
ASTM C150 Portland Cement
ASTM C207 Hydrated Lime for Masonry Purposes
ASTM C476 Grout for Masonry
ASTM C615 Dimension Stone
ASTM C880 Test Method for Flexural Strength of Dimension Stone
ASTM C1242 Guide for Selection, Design, and Installation of Dimension Stone
ASTM D226 Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing

Marble Institute of America (MIA)

National Building Granite Quarries Association, Inc. (NBGQA)

Tile Council of North America (TCNA)

1.5 SUBMITTALS

Submit the following in accordance with Section 01 33 00 Submittal Procedures

1. Shop Drawings indicating fabrication and installation methods, to include plans at not less than 1/2" = 1'-0" (or 1:20) scale, elevations at 1/4" = 1'-0" (1:50) scale and details at not less than 3" = 1'0" (1:5) scale. Indicate required field dimensions, materials, finishes, substructure, all fastening devices and accessory items. Include coordination details for related and adjoining work.
2. Three sets for each color, grade, finish, and variety of stone required. Include 2 or more samples in each set showing the full range of variations expected in these characteristics. Each sample shall be not less than 18"x18" (450mm x450mm)
3. If stone is to be sealed, then, sample submitted for approval is to be sealed prior to submittal with a sealer that does not greatly alter the appearance of the stone.
4. Submit three grout samples for each color specified
5. Product Data: For each variety of stone, stone accessory, and other manufactured product specified including setting materials and sealants.

1.5.1 Mock-ups: To be performed on inconspicuous sections of actual construction under the same weather conditions expected the remainder of the work.

- A. Size: 5 linear feet or as appropriate for the project specified. Do not proceed with work until mock-up is approved by Project Manager. Repair unacceptable work.
- B. Confirm with Project Manager that the replacement masonry units meet specification requirements and that sufficient quantity required for the work have been identified.

1.6 QUALITY ASSURANCE

1.6.1 Installer Qualifications: Engage an installer having skilled craftsmen or individuals with extensive experience who have successfully completed stone installations similar in material, design, and extent to that indicated for Project.

1.6.2 Qualifications shall include evidence and experience of skilled craftsmen or individuals who specialize in the handling, placement, assembling and finishing the materials and products required for stone installation.

1.6.3 Source Limitations for Stone: Obtain each variety of stone from a single quarry with resources to provide materials of consistent quality in appearance and physical properties without delaying the work. Source Limitations for Mortar and Grout Materials: Obtain mortar ingredients of uniform quality for each cementitious component from a single manufacturer and each aggregate from one source or producer.

1.7 DELIVERY, STORAGE AND HANDLING

1.7.1 Coordinate with ANF for location of material storage and staging.

1.7.2 Deliver materials to Project site in undamaged condition.

1.7.3 Store and handle stone and related materials to prevent deterioration or damage due to moisture, temperature changes, contaminants, corrosion, breaking, chipping, or other causes.

- A. Store cementitious materials off the ground, under cover, and in a dry location.
- B. Store aggregates, covered and in a dry location, where grading and other required characteristics can be maintained and contamination avoided.
- C. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.8 PROJECT CONDITIONS AND TOLERANCES

1.8.1 Protection of Stone Masonry: During erection, cover tops of walls, projections, and sills with waterproof sheeting at the end of each day's work. Cover partially completed stone masonry when construction is not in progress.

1.8.2 Stain Prevention: Immediately remove grout, mortar, and soil to prevent them from staining the face of stone masonry.

- A. Protect base of walls from rain-splashed mud and mortar splatter by coverings spread on the ground and over the wall surface.
- B. Protect ledges, and projections from mortar droppings.

1.8.3 Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen subgrade or setting beds. Remove and replace stone assemblies damaged by frost or freezing conditions. Comply with cold weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

- A. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F (4 deg C) and above and will remain so until masonry has dried, but not less than 7 days after completing cleaning.
- B. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

1.8.4 Contractor should design to prevent efflorescence and include construction specifications for moisture protection during construction for all masonry. Designs shall prevent moisture from entering finished masonry walls with flashing and avoid unprotected horizontal sills. Designs shall seal out moisture, and every feature should drain or dry without absorbing moisture. Design wall systems with appropriate measures to prevent moisture transfer from building interiors. Include initial cleaning of masonry by the mason or contractor after first winter after building acceptance in contract specifications.

1.8.5 (NOT USED)

1.8.6 Masonry work that does not conform to the following tolerances shall be repaired or replaced as directed by the Owner and/or Design Professional. (Tolerances are based on ACTUAL. Project shall not be limited to tolerances provided herein, Contractor must also apply additional tolerances in accordance with all applicable standards):

- A. Variation from Plumb: For vertical lines and surfaces, do not exceed ¼ inch in 10 feet (6 mm in 3m), 3/8 inch in 20 feet (10 mm in 6 m), or ½ inch in 40 feet (12 mm in 12 m) or more. For external corners, expansion joints, control joints, and other conspicuous lines, do not exceed ¼ inch in 20 feet (6 mm in 6 m) or ½ inch in 40 feet (12 mm in 12 m) or more.
- B. Variation from Level or grade: For bed joints and lines of exposed lintels, sills, parapets, horizontal grooves, and other conspicuous lines, do not exceed ¼ inch in 20 feet (6 mm in 6 m) or ½ inch in 40 feet (12 mm in 12 m) or more or as indicated on contract drawings.
- C. For external corners, control joints and other conspicuous lines: in any story or 20 feet maximum - ¼"; in 40 feet or more - ½".
- D. For exposed lintels, sills, parapets, horizontal grooves and other conspicuous lines: in any bay or 20 feet maximum - ¼"; in 40 feet or more - ½".
- E. Variation of the linear building lines from established position in plan and related portion of columns, walls and partitions.
- F. In any bay or 20 feet maximum - ½"; in 40 feet or more - ¾"
- G. Variation in cross-sectional dimensions of columns and in the thickness of walls is plus or minus ¼".
- H. All joints for rectified stone shall be 1/16" or less unless otherwise noted.

PART 2 PRODUCTS

2.1 MANUFACTURERS

2.1.1 Acceptable manufacturer/supplier as specified in contract drawings set and specifications or an Owner approved equal. Substitutions to be approved by Project Manager.

2.1.2 Single Source Responsibility for Stone: Obtain stone from a single quarry source and from one designated section or area of that quarry with consistent color range and texture throughout Work with resources to provide the quantity of materials required in the specified consistent quality.

2.2 APPLICATIONS/SCOPE

2.2.1 The Drawings and Specifications establish requirements for aesthetics and performance of cut stone assemblies. Aesthetics are indicated by dimensions, color range, arrangement, alignment and profiles of components and assemblies as they relate to sight lines and relationships to one another and to adjoining work. Performance is indicated by requirements specified.

2.2.2 Aesthetics, are subject to the Architect's approval and only to the extent exclusively needed to comply with performance requirements. Where modifications are proposed, submit data to the Architect for review and approval.

2.3 STONE

2.3.1 Stone Materials: Stone shall be standard grade, free of crack or seam which may impair its structural integrity or function and shall comply with industry standards and practices specified.

2.3.2 Provide stone with matching type, color, shape, size, texture, finish-profile, and compressive strength of the existing historic stone units in the Crystal Lake Recreation Area. Where new masonry is installed adjacent to existing period masonry, select stone that matches the existing period masonry as closely as possible.

2.4 MORTAR

2.4.1 Portland Cement: ASTM C 150, Type I or II. Provide natural color, white, or a blend to produce mortar color indicated.

2.4.2 Low-Alkali Cement: Portland cement for use with limestone shall contain not more than 0.60 percent total alkali when tested according to ASTM C 114.

2.4.3 Masonry Cement: ASTM C 91. For pigmented mortars, use premixed, colored masonry cements of formulation required to produce color indicated, or if not indicated, as selected from manufacturer's standard formulations. Pigments shall not exceed 5 percent of masonry cement by weight for mineral oxides nor 1 percent for carbon black. Where new masonry is installed adjacent to existing period masonry, select mortar that matches the existing period masonry as closely as possible.

2.4.4 Hydrated Lime - ASTM C207, Type S.

2.4.5 Mortar Sand - ASTM C144, free of deleterious materials, well graded and 100 percent passing No. 16 sieve.

2.4.6 Colored Aggregates - White natural sand, ground stone or other sound stone, color
- As required for grout, well graded and 100 percent passing No. 16 sieve.

2.4.7 Setting Bed Sand - ASTM C136, 100 percent passing No. 4 sieve.

2.4.8 Water - Potable, clean and free of deleterious materials which would impair Work.

2.4.9 Liquid Latex Additive - As required.

2.4.10 Grout Additive - As required.

2.4.11 Factory-prepared and Blended Grout Powders per approve submittal.

2.5 MISCELLANEOUS MASONRY ACCESSORIES

2.5.1 Joint Sealer: Use as specified by Architect

2.5.2 Metal Lath: ASTM C847, 18-gauge expanded lath galvanized steel.

2.5.3 Cleavage Membrane: Design membrane system as required and provide per approved shop drawings.

2.5.4 Stainless Steel Anchor Bolts, Nuts and Washers - Type 304, sizes as required. Anchors or ties (including veneer anchors) embedded within masonry systems shall be galvanized and placed in such a way that they are completely covered with mortar. Anchors and ties will be designed for steel stud, concrete and concrete masonry unit walls or per architectural drawings. Veneer back-up for concrete masonry units, or structural steel studs will include a 3/4" substrate/backerboard (equal to or better than "WonderBoard®") or as specified by Architect.

2.5.5 Stainless Steel Shapes and Plates - Type 304, ASTM A240 and ASTM A276.
Adjustable Inserts - Stainless Steel, Type 304 of size and type as required.

2.5.6 Expansion Anchors - Stainless steel, Type 304, of type, size as required. Flashing Provide designs for through-wall concealed flashing at all shelf angles, lintels, ledges and other obstructions to cause downward flow of moisture within the wall. Inspection will be required prior to covering over flashing to confirm proper placement. Flashing above doors, mechanical room louvers, and windows to be seamless and end dammed. Detail all through wall flashing to prevent contact with sealant.

2.5.7 Weepholes: Contractor shall specify at a minimum ¼ inch diameter by four inch long polyethylene plastic tubing for weep holes or as specified by Architect.

2.5.8 Dowels - Type 304 stainless steel of sizes as required.

2.5.9 Shims - As required.

2.5.10 Caulking and Sealants Architect/Contractor to specify waterproofing sealer with a minimum of five years guarantee for performance without breakdown from UV exposure. All joints that require a caulking should receive special attention during construction. Architect/Contractor to indicate that all joints be filled as soon as possible during construction and noted on the as built plans.

2.6 MASONRY CLEANERS

2.6.1 Use cleaners as recommended by manufacturer/vendor

2.7 MORTAR SETTING BED AND GROUT MIX

2.7.1 Comply with referenced standards and with manufacturers' written instructions for mix proportions, mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures needed to produce mortar of uniform quality and with optimum performance characteristics.

2.7.2 Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated. Do not use calcium chloride.

2.7.3 Mixing: Combine and thoroughly mix cementitious materials, water, and aggregates in a mechanical batch mixer, unless otherwise indicated. Discard mortar when it has reached initial set.

2.7.4 Mortar Setting Bed - Non-staining sand mixed with liquid latex additive in quantity recommended by manufacturer.

2.7.5 Grout - Color - Per approved submittal. Where new stone masonry is built adjacent to existing period masonry, grout color to match original as closely as possible.

2.7.6 Grout Fill at Vertical stone - Comply with ASTM C476 with minimum compressive strength of 2,000 psi at 28 days.

2.7.7 Performance Requirements - Meet following physical performance requirements:
Portland cement bond coat and plastic mortar setting bed - Resistant to chemical attack by urine, dilute acids and alkalis, sugar, brine and food wastes:

Compressive Strength	4,000 psi min.
Ozone Resistance (200 hr @ 200 ppm)	Not affected
Flame Contribution Factor	0
Smoke Contribution Factor	0

2.7.8 Mortar for Scratch Coat over Unit Masonry: Mix consisting of 1 part Portland cement, 1 part lime, 7 parts loose damp sand, and enough water to produce a workable consistency.

PART 3 EXECUTION

3.1 EXAMINATION

3.1.1 Do not begin installation until surfaces to receive stonework have been properly prepared.

3.1.2 Verify locations of weld-plates and embeds for connection of stone skin or its system.

3.1.3 If preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.1.4 Examine surfaces to receive stone masonry veneer, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of stone masonry veneer. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATIONS

3.2.1 Clean surfaces thoroughly prior to installation.

3.2.2 Prepare surfaces using the methods conforming to best industry practices for achieving the best result for the substrate under the project conditions.

3.2.3 Clean stone surfaces which are dirty or stained prior to setting. Clean stones by scrubbing with fiber brushes and drenching with clear water. Use only mild cleaning compounds that contain no acid, caustic or abrasives

3.3 INSTALLATION

3.3.1 Erect stone in accordance with industry standards and approved shop drawings. Setting and handling shall be done by competent setter, riggers, and handlers, thoroughly experienced in work of this type and scope.

3.3.2 Set stone in accordance with approved setting drawings. Provide anchors, supports, fasteners and other attachments shown or necessary to secure stonework in place and keep stone in level, plumb and square position with uniform joints.

3.3.3 Completely fill holes, slots and other sinkages for anchors with mortar or caulking during setting of stone.

3.3.4 Use skilled mechanics and skilled stone fitters at the site to do necessary field cutting as stones are set. Use power saws to cut stones; for exposed edges, produce edges which are cut straight and true. Mallet and chisel cutting will be permitted provided craftsmen are skilled in their use.

3.3.5 Provide chases, reveals, reglets, openings and other spaces as indicated for accommodating contiguous work. Close up openings in stonework after other work is in place with stonework which matches that already set.

3.3.6 Set stones to comply with requirements indicated on drawings and shop drawings. Install anchors, supports, fasteners and other attachments indicated or necessary to secure stonework in place.

3.3.7 Shim and adjust anchors, supports and accessories to set stones accurately in locations indicated with uniform joints of widths indicated and with edges and faces aligned according to established relationships and indicated tolerances.

3.3.8 For stones supported on clip or continuous angles, set stones on non-corrosive and non-staining shim material in sufficient area to support the load. Mortar may be used in lieu of shims provided that setting pads are provided to maintain joint sizes if stone weight squeezes out mortar.

3.3.9 Place setting buttons of adequate size, in sufficient quantity, and of same thickness as indicated joint width, to prevent mortar from squeezing out and to maintain uniform joint widths. Hold buttons back from face of stone to provide space for backer rope and sealant.

3.3.10 The joint between bottom of relieving angles and top surface of stones below angles shall be free of mortar or shims to avoid load transfer.

3.3.11 Install concealed flashing at continuous shelf angles, lintels, ledges and similar obstructions to the downward flow of water to divert water to the exterior.

3.3.12 Keep cavities open where unfilled space is indicated between back of stone veneer and backup wall; do not fill cavities with mortar or grout.

3.3.13 Place weepholes/vents in joints where moisture may accumulate including base of cavity walls, above shelf angles and flashing. Locate weepholes/vents at intervals not exceeding 2 feet and those serving as vents only, at intervals not exceeding 5 feet horizontally and 20 feet vertically.

3.3.14 Provide expansion and contraction joints, control joints and pressure-relieving joints of widths and at locations indicated or required. Expansion joints shall not be covered with mortar, grout or other rigid material. Expansion joint are to be located prior to cutting and setting anchors.

3.3.15 Joint sealants and backing materials: Rake out mortar from joints to depths required to receive sealants and sealant backings. Advise installers or other work about specific requirements for placement of reinforcement, anchors, ties, flashing, and similar items to be built into stone masonry veneer.

3.3.16 Install metal lath securely to receive scratch coat. Score scratch coat to allow for better mortar adherence.

3.3.17 Arrange stones for good fit, in pattern indicated, with joint widths within tolerances indicated. Arrange stones for uniformity of appearance, with color and size variations uniformly dispersed for an evenly blended appearance.

3.3.18 Maintain uniform joint widths, except for variations due to stone size variations and minor variations required to maintain bond alignment, if any. Install flashing under coping or cap stone of retaining and free-standing walls.

3.3.19 Clean units before setting.

3.3.20 Rake out joints and point with mortar. Tool joints slightly concave.

3.3.21 Grout joints full with cement grout. Finish joint flush with top of stone and tool slightly concave.

3.3.22 Remove excess grout from face of stone units.

3.4 PROTECTION, CLEANING AND REPAIRS

3.4.1 Remove and replace stone masonry veneer of the following description:

- A. Broken, chipped, stained, or otherwise damaged stone. Stone may be repaired if the methods and results are approved by Architect.
- B. Defective joints.
- C. Stone masonry veneer and joints not matching approved samples and mockups.
- D. Stone masonry veneer not complying with other requirements indicated.

3.4.2 Replace in a manner that result in stone masonry matching approved samples and mockups, complying with other requirements, and showing no evidence of replacement.

3.4.3 In-Progress Cleaning: Clean stone masonry veneer as work progresses. Remove mortar fins and smears before tooling joints.

- A. Final Cleaning: After mortar is thoroughly set and cured, clean stone masonry veneer as follows:
- B. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.

3.4.4 Test cleaning methods on mockup; leave one-half of panel un- cleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.

3.4.5 Prevent foot traffic minimum 48 hours to permit initial set of grout and sealants.

3.4.6 Cleaning - Clean exposed stone surfaces in accordance with BIA recommendations.

3.4.7 Apply sealer or Anti-Graffiti-Coating, if required, per manufacturer's instructions.

3.4.8 Do not use cleaning materials or processes which could change the character of the exposed finishes.

3.4.9 Protect and maintain stonework through construction period.

3.4.10 Protection: Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer that ensure stone masonry.

END OF SECTION

DIVISION 05 - METALS
SECTION 05 12 00
STRUCTURAL STEEL FRAMING

PART 1 GENERAL

Application and construction procedures shall conform with requirements of the "Greenbook" Standard Specifications for Public Works Construction, Latest Edition, and any supplements.

1.1 RELATED WORK

- A. Remaining metal work covered by Division 5.
- B. Concrete construction for the project is included in other subcontracts. Coordinate all details of structural metal fabrication and erection with the work of other Contractors.

1.2 QUALITY ASSURANCE

- A. Fabricator/Erector's Qualifications: Must have facilities and personnel sufficient to fabricate and erect structural metal framing as indicated on drawings; must have minimum of 5 years experience and be able, upon request, to show framing of similar size materials and scope of work of this contract; must be approved by the Structural Engineer.
- B. Material: Provide only structural steel certified as conforming with specified requirements and fabricated especially to the requirements of this contract.
- C. Tolerances: Unless otherwise noted on drawings or specified, provide structural steel work in accordance with the following minimum tolerances:
 - 1. Fabrication Tolerances: In accordance with requirements of AISC Specifications.
 - 2. Erection Tolerances: Maximum deviation from plumb level and alignment shall not exceed AISC Specifications.
- D. Inspection: All tests and inspections required for shop and field quality control shall be performed by an inspection agency.
- E. Welders: Certified and qualified in accordance with requirements of the American Welding Society, for the particular materials and methods being used. The welder's certification papers shall be available on the first trip by the inspector.
- F. Welding Materials and Methods: For fabrication and erection shall be in accordance with the requirements of the American Welding Society.
- G. Codes and Standards: Comply with provisions of following, except as otherwise indicated:
 - 1. AISC "Code of Standard Practice for Steel Buildings and Bridges".
 - 2. AISC "Specifications for the Design, Fabrications, and Erection of Structural Steel for Buildings" includes "Commentary" and Supplements thereto as issued.
 - 3. AISC "Specifications for Architecturally Exposed Structural Steel".
 - 4. AISC "Specifications for Structural Joints using ASTM A-325 or A-490 Bolts" approved by the Research Council on Riveted and Bolted Structural Joints of the Engineering Foundation.
 - 5. American Welding Society (AWS) D1.1 "Structural Welding Code - Steel".
 - 6. ASTM A-6 "General Requirements for Delivery of Rolled Steel Plates, Shapes, Sheet Piling and Bars for Structural Use".

1.3 REFERENCES

- A. American Society for Testing and Materials (ASTM).
- B. American Institute of Steel Construction (AISC): "Manual of Steel Construction"
 - 1. Load and Resistance Factor Design (LRFD) - Third Edition
- C. Steel Structures Paint Council (SSPC): "Steel Structures Paint Manual, Volume 1 and Volume 2, Systems and Specifications, by Steel Structures Painting Council.

1.4 SUBMITTALS

- A. Shop Drawings: Submit prior to commencing any fabrication of structural metal; show dimensions, connections with adjoining materials and construction, finishes, welds, bolts, and fasteners, anchoring all fabrication or erection accessories required; show field welds, cuts, holes and fasteners; verify all dimensions and correlate with adjoining construction and materials; indicate size, type and grade of all members.
 - 1. Prior to the commencement of steel erection, the erector shall carefully inspect all anchor bolts and leveling plates installed under other subcontracts and shall notify the general contractor of defects. If the anchor bolt, leveling plate and base plate placement are acceptable to him he shall notify the general contractor of the same and proceed with erection of the structural steel.
 - 2. The approval of the shop drawings is limited to design intent only. No responsibility for a detailed check of member length, size, spacing, or similar detail information is assumed by the Structural Engineer by virtue of such approval.
- B. Shop drawings shall not be a reproduction of the contract drawings. Corrections or revisions to the shop drawings required to coordinate them with the contract documents and other shop drawings shall be made at no additional cost.
- C. All steel connection design shall be completed by a design professional hired by the contractor, and satisfy the load requirements specified in the contract documents. Prior to submission of steel shop drawings, the steel fabricator shall submit sample calculations (prepared by a registered structural engineer) for all typical beam to beam and beam to column connections, which are proposed to be used on this project. After these typical calculations and connections are accepted, the fabricator shall prepare and submit the shop drawings for this project. Only these typical sample calculations are required to be sealed by a registered structural engineer. The material necessary for the fabrication of all connections shall be the responsibility of the contractor.
- D. Mill test reports - see paragraph 3.4.A.

1.5 PRODUCT HANDLING AND STORAGE

- A. Deliver to the project site materials to be installed by other contractors in time to be installed before the start of work by trade affected. Specifically, anchor bolts and other anchorage devices, which are embedded in cast-in-place concrete or masonry construction. Provide setting drawings, templates, and directions for the installation of the anchor bolts and other devices.
- B. Store all steel in such manner as to prevent distortion to the members and injury to the paint, and supported free from the ground and kept clean. Where shop coat becomes damaged during handling, touch up paint. In the event that the shop coat of paint is damaged or rusted

due to storage, repaint steel prior to erection with same paint used as shop coat.

PART 2 - PRODUCTS

2.0 MATERIALS

All structural steel shall conform to ASTM A-36 except as follows:

- A. Wide Flange Shapes: CORTEN STEEL ASTM A588 (Fy=50 ksi)
- B. Hollow Structural Sections (HSS):
 - 1. Square and Rectangular: Corten Steel ASTM A588 (Fy=50 ksi)
 - 2. Plates and Bars: Corten Steel (ASTM A588 (Fy=50 ksi)
- C. Anchor Bolts:
 - 1. Bolts and threaded rods are ASTM F-1554 GRADE 36 (UNO), bars and plates are ASTM A572 grade 50 material.
 - 2. Nuts and washers shall comply with ASTM A563 AND F436, respectively. Material grade shall be compatible with anchor material.
 - 3. Provide bolt grip and projection as required.
- D. Bolts & Nuts:
 - 1. All bolts shall be ASTM F3125 group A (A325-N) high strength (H.S.) bolts installed and tested in accordance with CBC 2213A.1.
 - 2. Anchor rods and bolts into concrete or masonry shall conform to ASTM F-1554.
 - 3. Machine bolts (M.B.) where specified, shall conform to ASTM A307.
 - 4. Bolts holes shall be no more than 1/16 Inch greater than the bolt diameter, except base plate anchor bolt holes may be drilled to a diameter not to exceed those listed in AISC specifications TABLE J3.3 For 'oversized' holes. Where hole size is exceeded provide a 1/4"x3"x3" weld Washer with 1/4" fillet weld all around.
- E. Electrodes for Welding: Comply with AWS Code.
 - 1. Covered mild steel electrodes complying with AWS Code and ASTM A-233, Series E70. Use E70 Series, Grade SAW-1 for welding ASTM A-36 steel. Use E70 Low Hydrogen Series, Grade SAW-2 for welding ASTM A-992, Grade 50 steel.
 - 2. All electrodes having low hydrogen type coverings shall be dried for at least 2 hours between 450 degrees F. and 500 degrees F. before they are used. Electrodes may be stored immediately after drying in storage ovens held at a temperature of at least 250 degrees F. Electrodes that are not used within 4 hours after removal from a drying or storage oven shall be redried before use. Electrodes which have been wet shall not be used.
- F. Structural Steel Primer Paint: Use one of the following:
 - 1. For interior building steel not receiving fireproofing
 - a. No. 769 Grey Primer manufactured by Rust-Oleum Corporation.
 - b. No. 99 Grey Primer manufactured by Tnemec Company.
 - c. Wetsall Primer manufactured by Farboil Company.
 - d. Or approved equal
- G. Structural Steel Protective Coating: All structural steel exposed to the weather or embedded in exterior walls shall be hot-dip galvanized in accordance with ASTM A123-84.

H. Non-Shrink Grout: CRD C-588, factory pre-mixed grout. Products are subject to compliance with requirements, provide one of the following Type D, Non-metallic grouts:

1. "Masterflow 713"; Master Builders
2. "SonogROUT"; Sonneborn - Contect.
3. "Euco-NS"; Euclid Chemical Company.
4. "Five Star Grout"; U.S. Grout Company
5. "DuragROUT"; L & M Construction Chemical Company

I. Diamond Steel Plate by Lucas or approved equal.

2.1 FABRICATION

A. General: Fabricate items of structural steel in accordance with AISC Specifications and as indicated on the final shop drawings. Properly mark and matchmark all materials for field assembly. Fabricate for delivery sequence which will expedite erection and minimize field handling. Provide camber in structural members where indicated.

B. Temporary Field Connections: Temporary erection connections shall consist of at least one clip angle and two 3/4" diameter bolts, remote from or compatible with the field welded connections. The Contractor shall be responsible for the design, function and use of all temporary erection connections. Remove temporary connections if they interfere with architectural finishes.

C. Permanent Field Connections: High-strength bolts, for use in permanent slip-critical or bearing type connections with threads in shear planes, shall conform to ASTM A-325.

1. Shear web connections: "Double angle connections" as described in Table 10-1, 10-2, & 10-3 of AISC Steel Construction Manual, LRFD Third Edition, with shop welds and permanent field high strength bolts. However, in no case shall the shear web connections be designed for less than the beam reactions shown in paragraphs 2.2.C.5 and 2.2.C.6 below, or as shown on the contract documents.
2. Single angle connections may be used in the webs of beams, provided that the connection is designed for the eccentric load, except as otherwise noted on the drawings.
3. Connections: Made with at least 3/4" diameter high strength bolts in slip-critical, pre-tension, or snug-tightened connections with threads in shear planes. All high-strength bolts shall be installed in accordance with Section 8.1 for snug-tightened connections, and section 8.2 for pre-tensioned and slip-critical connections of the AISC Specifications for Structural Joints Using ASTM A-325 or A-490 bolts, as approved by the Research Council on Structural Connections dated 06/30/2004. At all slip-critical connections, faying surfaces shall meet the requirements of section 3.2.2. All pre-tensioned bolts shall be twist-off type tension control bolt assemblies.
4. Unless otherwise specified in the contract documents, all beam, joist, joist girder and column connections shall be as follows:
 - a. Beam to Beam Connections: Snug-tightened joints.
 - b. Beam to Column Connections: Snug-tightened joints.
 - c. Joist to Column Connections: Snug-tightened joints.
 - d. Connections Subjected to Stress Reversal Conditions (Braced Frames, Moment Frames, etc.):
 - 1) Bolts In Standard Holes: Pre-tensioned joints.
 - 2) Bolts In Oversized or Slotted Holes: Slip-critical joints.
5. All shear connections shall develop the end reaction (Ultimate LRFD Load) $\phi_b W_c / 2L$, where " $\phi_b W_c$ " is the uniform load constant in kip-foot, and where "L" is the span in feet, as shown in the tables "Uniform Load Constants for Beams" (laterally supported) for

- given shape and steel specified, LRFD Manual 3rd Edition, unless otherwise specified.
6. All seated beam connections shall be designed so that the stiffener is clear of the finished ceiling and column encasement. The width of the stiffened seat shall not exceed 9". Beam web stiffeners shall be added as necessary to satisfy web yielding and web crippling code requirements.
 7. All base plates bearing on concrete or masonry shall bear on minimum 1.5 Inches of non-metallic non-shrink grout conforming to ASTM C1107 with a Minimum compressive strength of 6,000 psi. The grout shall be poured to at Least 1/16 inch above the bottom of base plate surface.
 8. All structural steel below grade or otherwise adjacent to earth or gravel Shall have a minimum of 4" concrete cover reinforced with minimum #3 bars at 12" OC
- D. Holes for Other Work: Provide holes required for securing other work to structural steel framing and for the passage of other work through steel framing members as indicated. Provide threaded nuts welded to framing, and other specialty items as shown to receive other work.
1. Cut, drill or punch holes perpendicular to metal surfaces. Do not flame cut holes or enlarge holes by burning. Drill holes in bearing plates.

2.2 SHOP PAINTING

- A. General: Shop paint all structural steel work unless otherwise specified, except members or portions of members to be embedded in concrete, mortar, or sprayed on fireproofing. Paint embedded steel on exposed portions and initial 2" of embedded areas only.
1. Do not paint contact surfaces which are to be welded or high-strength bolted.
 2. Apply a minimum of 2 coats of paint to surfaces, which are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.
- B. Surface Preparation: After inspection and before shipping, clean steel work to be painted. Remove loose rust, loose mill scale and spatter, slag or flux deposits. Comply with Steel Structures Painting Council (SSPC) as follows:
1. SP-1 "Solvent Cleaning" for removing oil, grease and similar contaminates.
 2. SP-2 "Hand Tool Cleaning" for general cleaning.
 3. SP-3 "Power Tool Cleaning" for general cleaning.
- C. Application:
1. Immediately after surface preparation, apply structural steel primer paint in accordance with manufacturer's instructions and at a rate to provide a uniform minimum dry film thickness of 2.0 mils. Use painting methods which will result in full coverage of joints, corners, edges, and all exposed surfaces.
 2. Provide a one-coat shop applied paint system complying with Steel Structures Painting Council (SSPC)-Paint System Guide No. 7.00.
 3. Immediately after surface preparation, apply the hot-dip galvanizing in accordance with ASTM A123-84 at the coating weight required by Table 1 to provide a uniform mil dry film thickness of 3.4 mils. Use galvanized methods which will result in full coverage of joints, corners, edges and all exposed surfaces.

PART 3 - EXECUTION

3.0 INSPECTION

- A. Erector must examine the areas and conditions under which structural steel work is to be installed including all anchor bolts and leveling plates installed under other contracts, and notify the Owner in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the Erector.

3.1 ERECTION

- A. General: Comply with the AISC Specifications and Code of Standard Practice, and as herein specified. Maintain work in a safe and stable condition during erection.

- 1. Structural steel with finished topcoat paint and galvanized steel shall be handled using nylon slings and wood dunnage to minimize damage.

- B. Anchor Bolts: Furnish anchor bolts and other connectors required for securing structural steel to foundations and other in-place work.

- C. Furnish templates and other devices as necessary for presetting bolts and other anchors to accurate locations.

- 1. Refer to Division 3 sections for anchor bolts installation in concrete.

- D. Setting Leveling Plates:

- 1. Clean concrete bearing surfaces and roughen to improve bond. Clean the bottom surface of leveling plates.
 - 2. Set loose leveling plates for structural members on wedges, or other adjusting devices.
 - 3. Tighten anchor bolts after the plates have been positioned and leveled to proper elevation. Do not remove wedges or shims, but if protruding, cut off flush with the edge of the base plate prior to packing with grout.
 - 4. Pack grout solidly between bearing surfaces and bases or plates to ensure that no voids remain. Finish exposed surfaces, protect installed materials, and allow to cure.

- E. Temporary Shoring and Bracing: Provide, as required, with connections of sufficient strength to bear imposed loads. Remove temporary members and connections when permanent members are in place and final connections are made. Provide temporary guy lines to achieve proper alignment of the structures as erections proceeds.

- 1. Provide temporary planking and working platforms as necessary to effectively complete the work.

- F. Field Assembly: Set structural members to the lines and elevations indicated. Align and adjust the various members forming a part of a complete frame or structure before permanently fastening. Clean bearing surfaces and other surfaces which will be in permanent contact before assembly. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.

- 1. Splice members only where indicated.

2. Do not enlarge unfair holes in members by burning or by the use of drift pins, except in secondary bracing members. Ream holes that must be enlarged to admit bolts.
3. Do not use gas cutting torches in the field for correcting fabrication errors in the structural framing. Cutting will be permitted only on secondary members which are not under stress as acceptable to the Structural Engineer. Finish gas-cut sections equal to a sheared appearance when permitted.

G. Touch-Up Painting:

1. Immediately after erection, clean field welds, bolted connections, and abraded areas of the shop paint, and paint all exposed areas with the same material as used for shop painting. Apply by brush or spray to provide the minimum dry film thickness as previously specified.
2. Steel which is abraded and rusty shall have primer and topcoat reapplied. Steel which is only abraded shall have topcoat reapplied.
3. Immediately after erection, clean field welds, bolted connections, and abraded areas of the hot-dip galvanized coating, and coat all exposed areas per ASTM A780-80. Apply coating to provide a minimum dry film thickness of 3.4 mils as previously specified.

3.2 SHOP AND FIELD WELDING

A. Welding: Where structural joints are made by welding, the details of all joints, the technique of welding employed, the appearance and quality of welds made and the methods used in correcting defective work shall conform to requirements of the AISC Specification for the Design, Fabrication and Erection of Structural Steel for Buildings and the Structural Welding Code D1.1 of the American Welding Society. In addition welds shall be made only by operators who have been previously qualified by tests as prescribed in the Standard Qualification Procedure of the American Welding Society, to perform the type of work required. The Contractor shall pay all costs for the qualification of welders. All welding equipment shall be direct current reverse polarity type.

3.3 INSPECTION AND TESTING

A. Mill Inspection: The Contractor shall furnish Morabito Consultants, Inc. and the inspection agency a copy of the certified mill test reports of the chemical analysis and physical tests for each member and each beam number.

B. Shop Inspection: The Owner shall employ an inspection agency approved by the Structural Engineer to inspect the steel in the shop. This inspection shall include the joining of parts, punching, bolting, welding painting, etc. The inspection agency shall submit to the Structural Engineer, prior to the delivery of the steel to the job site, certified reports showing the results of these inspections. The shop inspection shall include the type and manufacturer of the paint used.

C. Field Inspection: The Owner shall employ an inspection agency approved by the Structural Engineer to inspect the erected steel in the field. This inspection shall include alignment, position of member, bolting, welding, painting, etc. The inspection agency shall also submit to the Structural Engineer, prior to the Contractor's request for payment for the erected steel, certified reports showing results of these inspections.

D. Costs: The cost of all the tests and inspections are to be borne by the Owner.

E. Shop Inspection shall include, but is not limited to:

1. Examination of mill certificates in reference to material being fabricated.

2. All welding procedures including certification of welders and electrode identification.
3. All shop connections.
4. Shop preparation for butt welds.
5. Location of all clips, seats, holes and other accessories.
6. Type and quality of shop paint and painting.

F. Field Inspection shall include, but is not to be limited to:

1. See that all steel is properly stored and protected.
2. Vertical and horizontal alignment of all beams and columns before and after welding.
3. Temporary guying of building.
4. All joints, prior to welding, for required clearances and preparation.
5. Type of material and equipment used to make connections.
6. Preheat requirements due to type of steel and weather conditions.
7. All welded and bolted field connections.
8. Check field touch-up painting prior to covering by architectural materials.
9. Inspection shall mark all connections when they are finally approved.
10. Welding of steel floor deck.
11. Welding and/or screwing of steel roof deck.
12. Perform visual inspection of all welds.

G. Reports: Mill certificates shall be reviewed and approved by the Inspection Agency and Structural Engineer prior to fabrication.

1. Certified shop inspection reports indicating that the steel as fabricated meets all the requirements of the Contract Documents shall be submitted to the Structural Engineer prior to shipment.
2. Certified field reports, indicated that the steel as erected meets all of the requirements of the Contract Documents, shall be submitted to the Structural Engineer prior to starting of other work preventing access for any possible repairs.

H. Notification: It shall be the responsibility of the Contractor to see that the inspection agency is supplied with a complete set of Contract Drawings and Specifications and approved shop drawings before the work is started. It shall be the Contractor's responsibility to notify the inspection agency before the start of fabrication and before the start of erection of steel, a sufficient time before such work is started in order that the inspector may properly schedule the required inspections. If material is shipped prior to shop inspection, any additional costs of inspection and repair shall be borne by Contractor.

3.4 CONTRACTOR'S RESPONSIBILITY

- A. Acceptance of the shop and field inspection done by the testing agency pertaining to the structural steel does not relieve the Contractor of his responsibility to insure that the project has the proper sizes, strength, fabrication and erection procedures and any other requirements of the Contract Documents.
- B. If the installed structural steel is not erected in accordance with the contract documents and approved shop drawings, the contractor shall hire a professional engineer registered in the state of the project to prepare corrective calculations and details which shall be submitted to the engineer for approval prior to completing any corrections in the field. All costs incurred by the contractor to complete this corrective design and field repairs shall be paid by the contractor.
- C. Submit copies of all reports indicating conformance and exceptions to contract documents in a timely fashion to General Contractor for distribution to design consultants, owner,

subcontractors and other interested parties.

- D. Final Report: The Inspection Agency shall prepare a written report that summarizes the work inspected during the course of the project, and certifies that the work meets the requirements of the contract documents, specifications, and all governing agencies.

END OF SECTION

DIVISION 05 - METALS

SECTION 05 52 00 METAL RAILINGS

PART 1 GENERAL

1.1 REFERENCES

This specification is adapted from United Facilities Guide Specification UFGS-12 93 00 (August 2017). For a list of references for Section 05 52 00 for Metal Handrails see <https://www.wbdg.org/ffc/dod/unified-facilities-guide-specifications-ufgs/ufgs-05-52-00>

1.2 SUBMITTALS

Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

Shop Drawings

Welder Qualification

1.3 QUALITY CONTROL

1.3.1 Welder Qualification

Submit certified welder qualification by tests in accordance with AWS D1.1/D1.1M, or under an equivalent approved qualification test.

PART 2 PRODUCTS

2.1 FABRICATION

- A. Preassemble items in the shop to the greatest extent possible. Disassemble units only to the extent necessary for shipping and handling. Clearly mark units for reassembly and coordinated installation.
- B. For the fabrication of work exposed to view, use only materials that are smooth and free of surface blemishes, including pitting, seam marks, roller marks, rolled trade names, and roughness. Remove blemishes by grinding, or by welding and grinding, before cleaning, treating, and applying surface finishes, including zinc coatings.
- C. Provide railing and handrail detail plans and elevations at not less than 1 inch to 1 foot. Provide details of sections and connections at not less than 3 inches to 1 foot. Also detail setting drawings, diagrams, templates for installation of anchorages, including concrete inserts, anchor bolts, and miscellaneous metal items having integral anchors.
- D. Use materials of size and thicknesses indicated or, if not indicated, of the size and thickness necessary to produce adequate strength and durability in the finished product for its intended use. Work the materials to the dimensions indicated on approved detail drawings, using proven details of fabrication and support. Use the type of materials indicated or specified for the various components of work.
- E. Form exposed work true to line and level, with accurate angles and surfaces and straight sharp edges. Ensure that all exposed edges are eased to a radius of approximately 1/32 inch. Bend metal corners to the smallest radius possible without causing grain separation or otherwise impairing the work. Weld corners and seams continuously and in accordance with the recommendations of AWS D1.1/D1.1M. Grind exposed welds smooth and flush to match and blend with adjoining surfaces. Form the exposed connections with hairline joints that are flush and smooth, using concealed fasteners wherever possible.

- F. Use exposed fasteners of the type indicated or, if not indicated, use countersunk Phillips flathead screws or bolts. Provide anchorage of the type indicated and coordinated with the supporting structure. Fabricate anchoring devices and space as indicated and as required to provide adequate support for the intended use of the work.
- G. Use hot-rolled steel bars for work fabricated from bar stock unless work is indicated or specified to be fabricated from cold-finished or cold-rolled stock.

2.1.2 Steel Handrails

Fabricate joint posts, rail, and corners by one of the following methods:

- A. Flush-type rail fittings of commercial standard, welded and ground smooth, with railing splice locks secured with 3/8 inch hexagonal-recessed-head setscrews.
- B. Mitered and welded joints made by fitting post to top rail and intermediate rail to post, mitering corners, groove-welding joints, and grinding smooth. Butt railing splices and reinforce them by a tight-fitting interior sleeve not less than 6 inches long.
- C. Railings may be bent at corners in lieu of jointing, provided that bends are made in suitable jigs and the pipe is not crushed.

2.1.3 Protective Coating

Shop-prime the steelwork, if indicated, in accordance with Section 09 90 00 PAINTS AND COATINGS except the following:

- A. steel surfaces encased in concrete
- B. steel surfaces for welding
- C. high-strength bolt-connected contact surfaces

Provide hot-dipped galvanized steelwork as indicated in accordance with ASTM A123/A123M. Touch up abraded surfaces and cut ends of galvanized members with zinc-dust, zinc-oxide primer, or an approved galvanizing repair compound.

2.2 COMPONENTS

2.2.1 Structural Steel Plates, Shapes And Bars

Provide structural-size shapes and plates, except plates to be bent or cold-formed, conforming to ASTM A36/A36M, unless otherwise noted. Provide steel plates, to be bent or cold-formed, conforming to ASTM A283/A283M, Grade C. Provide steel bars and bar-size shapes conforming to ASTM A36/A36M, unless otherwise noted.

2.2.2 Structural-Steel Tubing

Provide structural-steel tubing, hot-formed, welded or seamless, conforming to ASTM A500/A500M, Grade B, unless otherwise noted.

2.2.3 Hot-Rolled Carbon Steel Bars

Provide bars and bar-size shapes conforming to ASTM A575, grade as selected by the fabricator.

2.2.4 Cold-Finished Steel Bars

Provide cold-finished steel bars conforming to ASTM A108, grade as selected by the fabricator.

2.2.5 Cold-Drawn Steel Tubing

Provide tubing conforming to ASTM A512, sunk-drawn, butt-welded, cold-finished, and stress-relieved.

2.2.6 Steel Pipe

Provide pipe conforming to ASTM A53/A53M, type as selected, Grade B; primed finish, unless galvanizing is required; standard weight (Schedule 40).

2.2.7 Weathering Steel Pipe

Weathering steel shall be required when designated on the drawings.

2.2.10 Steel Railings and Handrails

Design handrails to resist a concentrated load of 200 lb in any direction at any point of the top of the rail or 50 lb per foot applied horizontally to the top of the rail, whichever is more severe. NAAMM AMP 521, provide the same size rail and post.

Provide pipe collars of the same material and finish as the handrail and posts.

2.2.10.1 Steel Handrails

Provide steel handrails, including inserts in concrete, of 1 ½ inch nominal size.

PART 3 EXECUTION

3.1 PREPARATION

Adjust stair railings and handrails before securing in place in order to ensure proper matching at butting joints and correct alignment throughout their length. Space posts as shown in drawings or not more than 8 feet on center. Plumb posts in each direction. Secure posts as follows:

- A. Anchor posts in concrete by means of pipe sleeves set and anchored into concrete. Provide sleeves of galvanized, standard-weight, steel pipe, not less than 12 inches long, and having an inside diameter not less than 1/2 inch greater than the outside diameter of the inserted pipe post. Provide steel plate closure secured to the bottom of the sleeve, with closure width and length not less than 1 inch greater than the outside diameter of the sleeve. After posts have been inserted into sleeves, fill the annular space between the post and sleeve with nonshrink grout or a quick-setting hydraulic cement. Cover anchorage joint with a round steel flange welded to the post.
- B. Anchor posts to soil as shown in drawings.
- C. Anchor posts to bedrock as shown in drawings.

3.2 INSTALLATION

Handrail

Install metal handrails and railings as indicated and in accordance with the drawings, using workers skilled and experienced in the installation of the type of work involved. Install handrail in pipe sleeves embedded in concrete and filled with nonshrink grout or quick-setting anchoring cement with anchorage covered with standard pipe collar pinned to post.

3.2.3 Touchup Painting

Immediately after installation, clean field welds, bolted connections, abraded areas of the shop paint, and exposed areas painted with the paint used for shop painting. Apply paint by brush or spray to provide a minimum dry-film thickness of 2 mils.

3.3 FIELD QUALITY CONTROL

3.3.1 Field Welding

Ensure that procedures of manual shielded metal arc welding, appearance and quality of welds made, and methods used in correcting welding work comply with AWS D1.1/D1.1M.

END OF SECTION

DIVISION 09 - FINISHES

SECTION 09 90 00 PAINTS AND COATINGS

PART 1 GENERAL

1.1 REFERENCES

For a list of references for Section 09 90 00 Paints and Coatings see
<https://www.wbdg.org/FFC/DOD/UFGS/UFGS%2009%2090%2000.pdf>

1.2 SUBMITTALS

Submit the following in accordance with Section 01 33 00 Submittal Procedures

1. The Contractor will provide one quart samples of the selected paint or other coating materials to the Project Manager.
2. Product Data: For each variety of paint and coating used.

1.5 QUALITY ASSURANCE

1.5.1.1 Sampling Procedure

The Contractor will provide one quart samples of the selected paint materials to the Project Manager.

1.6 REGULATORY REQUIREMENTS

1.6.1 Environmental Protection

In addition to requirements specified elsewhere for environmental protection, provide coating materials that conform to the restrictions of the local Air Pollution Control District and regional jurisdiction. Notify Project Manager of any paint specified herein which fails to conform.

1.6.2 Lead Content

Do not use coatings having a lead content over 0.06 percent by weight of nonvolatile content.

1.6.3 Chromate Content

Do not use coatings containing zinc-chromate or strontium-chromate.

1.6.4 Asbestos Content

Provide asbestos-free materials.

1.6.5 Mercury Content

Provide materials free of mercury or mercury compounds.

SECTION 09 90 00 Page 17

1.6.6 Silica

Provide abrasive blast media containing no free crystalline silica.

1.6.7 Human Carcinogens

Provide materials that do not contain ACGIH 0100 confirmed human carcinogens (A1) or suspected human carcinogens (A2).

1.7 PACKAGING, LABELING, AND STORAGE

Provide paints in sealed containers that legibly show the contract specification number, designation name, formula or specification number, batch number, color, quantity, date of manufacture, manufacturer's formulation number, manufacturer's directions including any warnings and special precautions, and name and address of manufacturer. Furnish pigmented paints in containers not larger than 20 liters 5 gallons. Store paints and thinners in accordance with the manufacturer's written directions, and as a minimum, stored off the ground, under cover, with sufficient ventilation to prevent the buildup of flammable vapors, and at temperatures between 4 to 35 degrees C 40 to 95 degrees F. Do not store paint, polyurethane, varnish, or wood stain products with materials that have a high capacity to adsorb VOC emissions. Do not store paint, polyurethane, varnish, or wood stain products in occupied spaces.

1.8 SAFETY AND HEALTH

Apply coating materials using safety methods and equipment in accordance with the following. Comply with applicable Federal, State, and local laws and regulations.

1.8.1 Safety Methods Used During Coating Application Comply with the requirements of SSPC PA Guide 3.

1.8.2 Toxic Materials

To protect personnel from overexposure to toxic materials, conform to the most stringent guidance of:

a. The applicable manufacturer's Safety Data Sheets (SDS) or local regulation.

b. 29 CFR 1910.1000.

c. ACGIH 0100, threshold limit values.

d. The appropriate OSHA standard in 29 CFR 1910.1025 and 29 CFR 1926.62 for surface preparation on painted surfaces containing lead. Removal and disposal of coatings which contain lead is specified in Section 02 83 00 LEAD REMEDIATION. Additional guidance is given in SSPC Guide 6 and SSPC Guide 7. Refer to drawings for list of hazardous materials located on this project. Coordinate paint preparation activities with this specification section.

e. The appropriate OSHA standards in 29 CFR 1910.1001 for surface preparation of painted surfaces containing asbestos. Removal and disposal of coatings which contain asbestos materials is specified in Section 02 82 00 ASBESTOS REMEDIATION. Refer to drawings for list of hazardous materials located on this project. Coordinate paint preparation activities with this specification section. Submit manufacturer's Safety Data Sheets for coatings, solvents, and other potentially hazardous materials, as defined in FED-STD-313.

1.9 ENVIRONMENTAL CONDITIONS

Comply, at minimum, with manufacturer recommendations for space ventilation during and after installation.

1.9.1 Coatings

Do not apply coating when air or substrate conditions are:

a. Less than 3 degrees C 5 degrees F above dew point;

b. Below 10 degrees C 50 degrees F or over 35 degrees C 95 degrees F, unless specifically pre-approved by the Project Manager and the product manufacturer. Do not, under any circumstances, violate the manufacturer's application recommendations.

1.11 COLOR SELECTION

Provide colors of finish coats as indicated or specified. Allow the Angeles National Forest staff to select colors not indicated or specified. Manufacturers' names and color identification are used for the purpose of color identification only. Named products are acceptable for use only if they conform to specified requirements. Products of other manufacturers are acceptable if the colors approximate colors indicated and the product conforms to specified requirements. Tint each coat progressively darker to enable confirmation of the number of coats. Provide color, texture, and pattern of wall coating systems as indicated. Submit manufacturer's samples of paint colors. Cross reference color samples to color scheme as indicated. Submit color stencil codes.

1.12 LOCATION AND SURFACE TYPE TO BE PAINTED

1.12.1 Painting Included

Where a space or surface is indicated to be painted, include the following unless indicated otherwise.

a. Surfaces behind portable objects and surface mounted articles readily detachable by removal of fasteners, such as screws and bolts.

b. New factory finished surfaces that require identification or color coding and factory finished surfaces that are damaged during performance of the work.

c. Existing coated surfaces that are damaged during performance of the work.

1.12.1.1 Exterior Painting

Includes new surfaces, existing coated surfaces, of the building[s] and appurtenances. Also included are existing coated surfaces made bare by cleaning operations.

1.12.3.1 Fire Extinguishing Sprinkler Systems (NOT USED)

1.12.5 MISCELLANEOUS PAINTING (NOT USED)

PART 2 PRODUCTS

2.1 MATERIALS

Conform to the coating specifications and standards referenced in PART 3. Submit product data sheets for specified coatings and solvents. Provide preprinted cleaning and maintenance instructions for all coating systems. Submit Manufacturer's Instructions on Mixing: Detailed mixing instructions, minimum and maximum application temperature and humidity, potlife, and curing and drying times between coats. Provide certification of Indoor Air Quality for paints and primers.

PART 3 EXECUTION

3.1 PROTECTION OF AREAS AND SPACES NOT TO BE PAINTED

Prior to surface preparation and coating applications, remove, mask, or otherwise protect hardware, hardware accessories, machined surfaces, radiator covers, plates, lighting fixtures, public and private property, and other such items not to be coated that are in contact with surfaces to be coated. Following completion of painting, reinstall removed items by workmen skilled in the trades. Restore surfaces contaminated by coating materials, to original condition and repair damaged items.

3.2 REPUTTYING AND REGLAZING (NOT USED)

3.3 RESEALING OF EXISTING EXTERIOR JOINTS (NOT USED)

3.4 SURFACE PREPARATION

Remove dirt, splinters, loose particles, grease, oil, disintegrated coatings, and other foreign matter and substances deleterious to coating performance as specified for each substrate before application of paint or surface treatments. Remove oil and grease prior to mechanical cleaning. Schedule cleaning so that dust and other contaminants will not fall on wet, newly painted surfaces. Spot-prime exposed ferrous metals such as nail heads on or in contact with surfaces to be painted with water-thinned paints, with a suitable corrosion-inhibitive primer capable of preventing flash rusting and compatible with the coating specified for the adjacent areas.

3.4.1 Additional Requirements for Preparation of Surfaces With Existing Coatings

Before application of coatings, perform the following on surfaces covered by soundly-adhered coatings, defined as those which cannot be removed with a putty knife:

- a. Test existing finishes for lead before sanding, scraping, or removing. If lead is present, refer to paragraph Toxic Materials.
- b. Wipe previously painted surfaces to receive solvent-based coatings, except stucco and similarly rough surfaces clean with a clean, dry cloth saturated with mineral spirits, ASTM D235. Allow surface to dry. Wipe immediately preceding the application of the first coat of any coating, unless specified otherwise.
- c. Sand existing glossy surfaces to be painted to reduce gloss. Brush, and wipe clean with a damp cloth to remove dust.
- d. The requirements specified are minimum. Comply also with the application instructions of the paint manufacturer.
- e. Thoroughly clean previously painted surfaces [specified to be repainted] [damaged during construction] of all grease, dirt, dust or other foreign matter.
- f. Remove blistering, cracking, flaking and peeling or otherwise deteriorated coatings.
- g. Remove chalk so that when tested in accordance with ASTM D4214, the chalk resistance rating is no less than 8.
- h. Roughen slick surfaces. Repair damaged areas such as, but not limited to, nail holes, cracks, chips, and spalls with suitable material to match adjacent undamaged areas.
- i. Feather and sand smooth edges of chipped paint.
- j. Clean rusty metal surfaces as per SSPC requirements. Use solvent, mechanical, or chemical cleaning methods to provide surfaces suitable for painting.
- k. Provide new, proposed coatings that are compatible with existing coatings.

3.4.2 Existing Coated Surfaces with Minor Defects

Sand, spackle, and treat minor defects to render them smooth. Minor defects are defined as scratches, nicks, cracks, gouges, spalls, alligatoring, chalking, and irregularities due to partial peeling of previous coatings.

3.4.3 Removal of Existing Coatings

Remove existing coatings from the following surfaces:

- a. Surfaces containing large areas of minor defects;
- b. Surfaces containing more than 20 percent peeling area; and
- c. Surfaces designated by the Project Manager, such as surfaces where rust shows through existing coatings.

3.4.4 Substrate Repair

- a. Repair substrate surface damaged during coating removal;
- b. Sand edges of adjacent soundly-adhered existing coatings so they are tapered as smooth as practical to areas involved with coating removal; and
- c. Clean and prime the substrate as specified.

3.5 PREPARATION OF METAL SURFACES

- a. Ferrous Surfaces including Shop-coated Surfaces and Small Areas That Contain Rust, Mill Scale and Other Foreign Substances: Solvent clean or detergent wash in accordance with SSPC SP 1 to remove oil and grease. Where shop coat is missing or damaged, clean according to [SSPC SP 2,] [SSPC SP 3,] [SSPC SP 6/NACE No.3,] or [SSPC SP 10/NACE No. 2]. Brush-off blast remaining surface in accordance with SSPC 7/NACE No.4; Water jetting to SSPC SP 12/NACE No.5 WJ-4 may be used to remove loose coating and other loose materials. Use inhibitor as recommended by coating manufacturer to prevent premature rusting. Protect shop-coated ferrous surfaces from corrosion by treating and touching up corroded areas immediately upon detection.
- b. Surfaces With More Than 20 Percent Rust, Mill Scale, and Other Foreign Substances: Clean entire surface in accordance with [SSPC SP 6/NACE No.3/SSPC SP 12/NACE No.5 WJ-3][SSPC SP 10/NACE No. 2/SSPC SP 12/NACE No.5 WJ-2].

3.6 PREPARATION OF CONCRETE AND CEMENTITIOUS SURFACE (NOT USED)

3.7 PREPARATION OF WOOD AND PLYWOOD SURFACES

3.7.1 New and Existing Coated Plywood and Wood

Surfaces, Except Floors:

- a. Clean wood surfaces of foreign matter.

Surface Cleaning: Verify that surfaces are free from dust and other deleterious substances and in a condition approved by the Project Manager prior to receiving paint or other finish. Do not use water to clean uncoated wood. Scrape to remove loose coatings. Lightly sand to roughen the entire area of previously enamel-coated wood surfaces.

- b. Removal of Fungus and Mold: Wash existing coated surfaces with a solution composed of 0.2 liter 3 ounces (2/3 cup) trisodium phosphate, 0.1 liter 1 ounce (1/3 cup) household detergent, 1.6 liters 1 quart 5 percent sodium hypochlorite solution and 4.8 liters 3 quarts of warm water. Rinse thoroughly with fresh water.

- c. Do not exceed 12 percent moisture content of the wood as measured by a moisture meter in accordance with ASTM D4444, Method A, unless otherwise authorized.

- d. Prime or touch up wood surfaces adjacent to surfaces to receive water-thinned paints before applying water-thinned paints.

- e. Cracks and Nailheads: Set and putty stop nailheads and putty cracks after the prime coat has dried.

- f. Cosmetic Repair of Minor Defects:

(1) Knots and Resinous Wood and Fire, Smoke, Water, and Color Marker Stained Existing Coated Surface: Prior to application of coating, cover knots and stains with two or more coats of 1.3-kg-cut 3-pound-cut shellac varnish, plasticized with 0.14 liters 5 ounces of castor oil per liter gallon. Scrape away existing coatings from knotty areas, and sand before treating. Prime before applying any putty over shellacked area.

(2) Open Joints and Other Openings: Fill with whiting putty, linseed oil putty. Sand smooth after putty has dried.

(3) Checking: Where checking of the wood is present, sand the surface, wipe and apply a coat of pigmented orange shellac. Allow to dry before paint is applied.

- g. Prime Coat For New Exterior Surfaces: Prime coat wood doors, windows, frames, and trim before wood becomes dirty, warped, or weathered.

3.7.2 Wood Floor Surfaces, Natural Finish (NOT USED)

3.7.3 Interior Wood Surfaces, Stain Finish

Sand interior wood surfaces to receive stain. Fill oak and other open-grain wood to receive stain with a coat of wood filler not less than 8 hours before the application of stain; remove excess filler and sand the surface smooth.

3.8 APPLICATION

3.8.1 Coating Application

Comply with applicable federal, state and local laws enacted to insure compliance with Federal Clean Air Standards. Apply coating materials in accordance with SSPC PA 1. SSPC PA 1 methods are applicable to all substrates, except as modified herein.

At the time of application, paint must show no signs of deterioration. Maintain uniform suspension of pigments during application. Unless otherwise specified or recommended by the paint manufacturer, paint may be applied by brush, roller, or spray. Use trigger operated spray nozzles for water hoses. Use rollers for applying paints and enamels of a type designed for the coating to be applied and the surface to be coated. Wear protective clothing and respirators when applying oil-based paints or using spray equipment with any paints.

Only apply paints, except water-thinned types to surfaces that are completely free of moisture as determined by sight or touch. Thoroughly work coating materials into joints, crevices, and open spaces. Pay special attention to ensure that all edges, corners, crevices, welds, and rivets receive a film thickness equal to that of adjacent painted surfaces.

Apply each coat of paint so that dry film is of uniform thickness and free from runs, drops, ridges, waves, pinholes or other voids, laps, brush marks, and variations in color, texture, and finish. Completely hide all blemishes. Touch up damaged coatings before applying subsequent coats. Broom clean and clear dust from interior areas before and during the application of coating material.

a. Drying Time: Allow time between coats, as recommended by the coating manufacturer, to permit thorough drying, but not to present topcoat adhesion problems. Provide each coat in specified condition to receive next coat.

b. Primers, and Intermediate Coats: Do not allow primers or intermediate coats to dry more than 30 days, or longer than recommended by manufacturer, before applying subsequent coats. Follow manufacturer's recommendations for surface preparation if primers or intermediate coats are allowed to dry longer than recommended by manufacturers of subsequent coatings. Cover each preceding coat or surface completely by ensuring visually perceptible difference in shades of successive coats.

c. Finished Surfaces: Provide finished surfaces free from runs, drops, ridges, waves, laps, brush marks, and variations in colors.

d. Thermosetting Paints: Topcoats over thermosetting paints (epoxies and urethanes) should be applied within the overcoating window recommended by the manufacturer.

e. Floors: For nonslip surfacing on level floors, as the intermediate coat is applied, cover wet surface completely with almandite garnet, Grit No. 36, with maximum passing U.S. Standard Sieve No. 40 less than 0.5 percent. When the coating is dry, use a soft bristle broom to sweep up excess grit, which may be reused, and vacuum up remaining residue before application of the topcoat.] [For nonslip surfacing on ramps, provide MPI 77 with non-skid additive, applied by roller in accordance with manufacturer's instructions.

3.8.2 Mixing and Thinning of Paints

Reduce paints to proper consistency by adding fresh paint, except when thinning is mandatory to suit surface, temperature, weather conditions, application methods, or for the type of paint being used. Obtain written permission from the Project Manager to use thinners. Verify that the written permission includes quantities and types of thinners to use. When thinning is allowed, thin paints immediately prior to application with not more than 1 pint of suitable thinner per gallon. The use of thinner does not relieve the Contractor from obtaining complete hiding, full film thickness, or required gloss. Thinning cannot cause the paint to exceed limits on volatile organic compounds. Do not mix paints of different manufacturers.

3.8.3 Two-Component Systems

Mix two-component systems in accordance with manufacturer's instructions. Follow recommendation by the manufacturer for any thinning of the first coat to ensure proper penetration and sealing for each type of substrate.

3.8.4 Coating Systems

- a. Systems by Substrates: Apply coatings that conform to the respective specifications listed in the following Tables: Table Division 6. Interior Wood Paint Table
- b. Minimum Dry Film Thickness (DFT): Apply paints, primers, varnishes, enamels, undercoats, and other coatings to a minimum dry film thickness of 1.5 mil each coat unless specified otherwise in the Tables. Coating thickness where specified, refers to the minimum dry film thickness.
- c. Coatings for Surfaces Not Specified Otherwise: Coat surfaces which have not been specified, the same as surfaces having similar conditions of exposure.
- d. Existing Surfaces Damaged During Performance of the Work, Including New Patches In Existing Surfaces: Coat surfaces with the following:
 - (1) One coat of primer.
 - (2) One coat of undercoat or intermediate coat.
 - (3) One topcoat to match adjacent surfaces.
- e. Existing Coated Surfaces To Be Painted: Apply coatings conforming to the respective specifications listed in the Tables herein, except that pretreatments, sealers and fillers need not be provided on surfaces where existing coatings are soundly adhered and in good condition. Do not omit undercoats or primers.

3.9 COATING SYSTEMS FOR METAL

- a. Apply specified ferrous metal primer on the same day that surface is cleaned, to surfaces that meet all specified surface preparation requirements at time of application.
- b. Inaccessible Surfaces: Prior to erection, use one coat of specified primer on metal surfaces that will be inaccessible after erection.
- c. Shop-primed Surfaces: Touch up exposed substrates and damaged coatings to protect from rusting prior to applying field primer.
- d. Surface Previously Coated with Epoxy or Urethane: Apply MPI 101, 1.5 mils DFT immediately prior to application of epoxy or urethane coatings.
- e. Pipes and Tubing: The semitransparent film applied to some pipes and tubing at the mill is not to be considered a shop coat. Overcoat these items with the specified ferrous-metal primer prior to application of finish coats.
- f. Exposed Nails, Screws, Fasteners, and Miscellaneous Ferrous Surfaces. On surfaces to be coated with water thinned coatings, spot prime exposed nails and other ferrous metal with latex primer MPI 107.

3.10 COATING SYSTEMS FOR CONCRETE AND CEMENTITIOUS SUBSTRATES (NOT USED)

3.11 COATING SYSTEMS FOR WOOD AND PLYWOOD

- a. Prior to erection, apply two coats of specified primer to treat and prime wood [and plywood] surfaces which will be inaccessible after erection.
- b. Apply stains in accordance with manufacturer's printed instructions.
- c. Wood Floors to Receive Natural Finish: Thin first coat 2 to 1 using thinner recommended by coating manufacturer. Apply all coatings at rate of 30 square meters per 4 liters 300 to 350 square feet per gallon. Apply second coat not less than 2 hours and not over 24 hours after first coat has been applied. Apply with lambs wool applicators or roller as recommended by coating manufacturer. Buff or lightly sand between intermediate coats as recommended by coating manufacturer's printed instructions.

3.13 INSPECTION AND ACCEPTANCE

In addition to meeting previously specified requirements, demonstrate mobility of moving components, including swinging and sliding doors, cabinets, and windows with operable sash, for inspection by the Project Manager. Perform this demonstration after appropriate curing and drying times of coatings have elapsed and prior to invoicing for final payment.

3.14 WASTE MANAGEMENT

As specified in the Waste Management Plan and as follows. Do not use kerosene or any such organic solvents to clean up water-based paints. Properly dispose of paints or solvents in designated containers. Close and seal partially used containers of paint to maintain quality as necessary for reuse. Store in protected, well-ventilated, fire-safe area at moderate temperature. Place materials defined as hazardous or toxic waste in designated containers. Coordinate with manufacturer for take-back program. Set aside scrap to be returned to manufacturer for recycling into new product. When such a service is not available, contact local recyclers to reclaim the materials. Set aside extra paint for future color matches or reuse by the Government. Where local options exist for leftover paint recycling, collect all waste paint by type and provide for delivery to recycling or collection facility for reuse by local organizations.

3.15 PAINT SELECTION

VOC compliant materials may be selected, based on:

1. Regional air quality regulations for the site location,
2. The applicable rule, and
3. Any specialty or exemption category. Environmentally acceptable coatings may be further ensured by avoiding hazardous materials and including, as a minimum, requirements in purchase order or bill of materials to prohibit coatings containing materials listed in paragraph entitled "Environmental Protection." ACGIH A1 confirmed human carcinogens include asbestos, benzene, chromates, and coal tar. ACGIH A2 suspected human carcinogens include cadmium and certain chromates. Specify new galvanized steel, in appropriate section, to be without hexavalent chromium stain inhibitors.

Where only topcoating for cosmetic purposes is required, a compatible topcoat that hides substrate should be selected. There are proposed rules limiting VOC content in states other than California. These rules are for architectural and industrial maintenance paints and coatings. Check local and State regulations concerning allowable VOC limits. The most stringent govern. Water-based paints and acrylic latex paints are lower in VOCs than solvent-based paints. Water-based paints are generally safer to handle and can be cleaned up with water, reducing health risks to workers and minimizing or avoiding hazardous waste.

END OFSECTION

DIVISION 09 – PAINTS & COATINGS

SECTION 09 96 23 GRAFFITI RESISTANT COATING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Permanent anti-graffiti coating system.

1.2 QUALITY ASSURANCE

- A. Contractor Qualifications: Installer shall be a firm with not less than three years of successful experience in application of coatings of type required on substrates similar to those of this project. The firm shall be approved by the manufacturer of the coating for installation of their product.
- B. Manufacturer's representative shall inspect substrate conditions including alkalinity and moisture content. Obtain written approval from representative before proceeding with work.
- C. Meets ASTM-D7089 with Cleanability at least Level 2.
- D. Meets ASTM-D6578 with Cleanability at least Level 9.

1.3 SUBMITTALS

- A. Submit in accordance with Section 01 33 00.
- B. Instructions: Provide instructions bearing manufacturer's name, coating type, and recommended installation procedures. Provide methods and material instruction for graffiti removal. Include adhesive-backed graffiti removal instruction label suitable for application to interior surface.
- C. Submit proof of purchase (Invoice of materials purchased) and proof of delivery of coating materials.
- D. Manufacturer's Warranty: Submit one copy of manufacturer's warranty for specified materials.
- E. Field Sample: Apply graffiti resistant coating to field mock-up sample representing exterior wall surface to be coated. Apply coating system over a minimum 3 ft x 3 ft test area and test removal of applied spray paint in presence of Construction Manager for approval using removal methods recommended by the manufacturer.

1.4 EXTRA MATERIALS

- A. Furnish the following to building owner upon completion of the Project.
 - 1. Provide four containers of removal products as recommended by the manufacturer accompanied by removal instructions.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Transport, handle, store, and protect products.

- B. Paint orders to the manufacturer or supplier shall identify the store number, location, and address of project. Contractor shall require a record keeping account be established and maintained by the paint supplier which records graffiti resistant paint type, brand, and quantity purchased, for the specific project.
- C. Deliver coating materials in sealed original labeled containers, bearing manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and/or reducing.
- D. Store materials at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F in ventilated area and as required by manufacturer's instructions.
- E. Prevent fire hazards and spontaneous combustion.

1.6 WARRANTY

- A. Provide manufacturers written warranty guaranteeing effective graffiti removal for not less than 10 years and warrant that treated surfaces can be effectively and repeatedly cleaned of graffiti without damage or loss of effectiveness of the graffiti resistant coating. Manufacturer shall, for the duration of the warranty period, guarantee replacement of product where graffiti removal has shown to be ineffective.

1.7 PROJECT CONDITIONS

- A. Environmental Requirements: Follow manufacturer's recommendations for temperature range in which coating may be applied.

PART 2 - PRODUCTS

2.1 GRAFFITI RESISTANT COATING

- A. Graffiti resistant coating shall be a clear, non-sacrificial graffiti resistant coating which provides protection for exterior vertical surfaces from permanent graffiti staining and damage caused by spray paint and marking pens. Coating shall be suitable for application to painted and unpainted surfaces including masonry, concrete, metals, and EIFS. Product shall be of type such that recoating with the underlying paint is possible without removal of the graffiti resistant coating. Product shall be a coating that dries clear, non-yellowing, with a low luster.
 - 1. Manufacturer:
 - a. VandlGuard Non-Sacrificial Graffiti Coating (Three Coats) by Rainguard International, Newport Beach, CA 888-765-7070.
 - B. Micro-Seal Water Repellant (One Coat) by Rainguard International, Newport Beach, CA 888-765-7070. (For first coat on unpainted concrete and masonry surfaces): As specified in Section 07 19 00.
 - C. Graffiti Remover: VandlClean Super graffiti remover by Rainguard International, Newport Beach, CA 888-765-7070.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify all surfaces are ready to receive coating in accordance with manufacturer's printed requirements. Beginning of installation indicates acceptance of substrate.
- B. Unpainted Concrete and Masonry: Verify water repellent has been applied in accordance with Section 07 19 00 to new or non-painted concrete and masonry surfaces prior to the application of the anti-graffiti coating.

3.2 PREPARATION

- A. Surface shall be free of dirt, dust, contaminants such as curing compounds, hardeners, bond breakers, and form release. Allow painted surfaces to cure properly. Do not water blast painted surfaces. Assure surfaces are clean and dry.
- B. Mask or otherwise protect adjacent surfaces not scheduled to receive coating. If applied on unscheduled surfaces such as glass, remove immediately, by approved method.
- C. Protect landscaping, property, and vehicles from over spray and drift.

3.3 APPLICATION

- A. Apply coating in accordance with manufacturer's published instructions.
- B. Application Rate: Apply each coat at the manufacturers published application rate.

3.4 SURFACES TO BE COATED

- A. Apply graffiti resistant coating to all exterior exposed building surfaces visible from the ground level, including concrete, masonry, metal doors and frames, sheet metal items, downspouts, EIFS, stucco, wood, painted metal bollards, pneumatic tubing, and metal railing. Apply coating to painted and unpainted surfaces. Exclude horizontal surfaces subject to wheel or foot traffic.
- B. Apply to exterior non-building vertical surfaces including solid or semi-solid fencing, segmental block or concrete panel retaining walls, and masonry screening as applicable.
- C. On building surfaces, apply coating system to first definitive continuous horizontal demarcation including change in paint color or surface material but not less than 12 feet above finish grade. Apply to full height of exterior overhead or coiling door surfaces. Apply to top of building if no definitive continuous horizontal demarcation lines exist. Exclude wall and door surfaces behind fenced enclosures such as Garden Center, Battery Storage, or Compressor House Enclosure.

3.5 MAINTENANCE

- A. Deliver cleaning products to Store Manager for storage and subsequent use for graffiti removal. Apply cleaning instructions label to interior wall location as directed by the Construction Manager.

3.6 FIELD QUALITY CONTROL:

- A. Verify application rate by periodic on-site inspection and calculation of area covered compared to consumption of coating material used. Document inspections showing total area covered and number and volume of coating containers used.

END OF SECTION

DIVISION 10 - SPECIALTIES

SECTION 10 14 00.10 EXTERIOR SIGNAGE

PART 1 GENERAL

Drawings will indicate location, dimensions, elevations, schedules, content, details and such other information as required to indicate the extent of the work. The same terminology or titles used in the specification, for the different types of signage, will be used on the drawings and schedules. Designer must coordinate and incorporate existing signage policy and designs, as required, for new projects on existing facilities.

1.1 REFERENCES

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

1.2 GENERAL REQUIREMENTS

All exterior signage must be provided by a single manufacturer. Exterior signage must be of the design, detail, sizes, types, and message content shown on the drawings, must conform to the requirements specified, and must be provided at the locations indicated. Signs must be complete with lettering, framing as detailed, and related components for a complete installation. Each sample must consist of a complete sign panel with letters and symbols. Samples may be installed in the work, provided each sample is identified and location recorded. Print samples of artwork are to be approved by Project Manager and Landscape Architect.

1.2.2 Character Proportions and Heights

Letters and numbers on indicated signs for handicapped-accessible buildings must have a width-to-height ratio between 3:5 and 1:1 and a stroke-width-to-height ratio between 1:5 and 1:10. Characters and numbers on indicated signs must be sized according to the viewing distance from which they are to be read. The minimum height is measured using an upper case letter "X". Lower case characters are permitted.

1.3 SUBMITTALS

Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

Product Data

Print Samples for approval

Operation and Maintenance Data

1.4 QUALIFICATIONS

Signs, plaques, and dimensional letters must be the standard product of a manufacturer regularly engaged in the manufacture of the products. Items of equipment must essentially duplicate equipment that has been in satisfactory use at least 2 years prior to bid opening.

1.5 DELIVERY AND STORAGE

Materials must be wrapped for shipment and storage, delivered to the jobsite in manufacturer's original packaging, and stored in a clean, dry area in accordance with manufacturer's instructions.

1.6 WARRANTY

Manufacturer's standard performance guarantees or warranties that extend beyond a one year period must be provided.

2.1 MODULAR EXTERIOR SIGNAGE SYSTEM

Exterior signage must consist of a system of coordinated directional, identification, and regulatory type signs located where shown. Dimensions, details, materials, message content, and design of signage must be as shown. Submit manufacturer's descriptive data and catalog cuts.

2.2 ILLUMINATION (NOT USED)

2.3 GRAPHICS FOR EXTERIOR SIGNAGE SYSTEMS (NOT USED)

2.4 METAL PLAQUES

Design, method of fabrication, mounting and location of cast metal or chemically etched plaques must be as indicated on the drawings.

2.5 DIMENSIONAL BUILDING LETTERS (NOT USED)

2.6 ALUMINUM ALLOY PRODUCTS

Aluminum alloy products must conform to ASTM B209M ASTM B209 for sheet or plate, ASTM B221M ASTM B221 for extrusions and ASTM B26/B26M or ASTM B108/B108M for castings. Aluminum extrusions must be provided at least 1/8 inch thick and aluminum plate or sheet at least 16 gauge thick. Welding for aluminum products must conform to AWS C1.1M/C1.1.

2.7 ANODIC COATING

Anodized finish must conform to AA DAF45 as follows:

Clear (natural) designation AA-M10-C22-A31, Architectural Class II to be 0.010 mm 0.4 mil or thicker.

Integrated color anodized designation AA-M10-C22-A32, to be Architectural Class 0.010 to 0.018 mm 0.4 to 0.7 mil.

Electrolytically deposited color - anodized designation AA-M10-C22-A34, to be Architectural Class II 0.010 to 0.018 mm 0.4 to 0.7 mil

2.8 ORGANIC COATING

Clean, prime and give surfaces a semi-gloss baked enamel or two-component acrylic polyurethane finish in accordance with NAAMM AMP 500, AMP 505, with total dry film thickness not less than 1.2 mils.

2.9 STEEL PRODUCTS

Structural steel products must conform to ASTM A36/A36M. Sheet and strip steel products must conform to ASTM A1011/A1011M. Welding for steel products must conform to AWS D1.2/D1.2M.

2.10 CAST BRONZE

Fabricate components with sharp corners, flat faces, and accurate profiles. Remove and polish burrs and rough spots. Finish faces to a uniform high luster. Cast bronze must be in accordance with ASTM B62.

2.11 VINYL SHEETING FOR GRAPHICS

Vinyl sheeting must be 5 to 7 year premium type and must be in accordance with the flammability requirements of ASTM E84 and must be a minimum 0.003 inch film thickness. Film must include a precoated pressure sensitive adhesive backing, Class 1, or positionable pressure sensitive adhesive backing, Class 3.

2.12 GLASS

Glass must be in accordance with ASTM C1036, Type I, Class 1, Quality q3 and ANSI Z97.1.

2.13 FIBER-REINFORCED POLYESTER (FRP) PANELS

Fiber-reinforced polyester (FRP) must be in accordance with ASTM D3841, Type II, Grade 1, Class 124.

2.14 ACRYLIC SHEET

Acrylic sheet must be in accordance with the flammability requirements of ASTM E84 and must conform to ANSI Z97.1.

2.15 POLYCARBONATE SHEET

Polycarbonate sheet must conform to SAE AMS3611.

2.16 ANCHORS AND FASTENERS

Exposed anchor and fastener materials must be compatible with metal to which applied and must match in color and finish and must be non-rusting, non-corroding, and non-staining. Exposed fasteners must be tamper-proof.

2.17 SHOP FABRICATION AND MANUFACTURE

2.17.1 Factory Workmanship

Work must be assembled in the shop, as far as practical, ready for installation at the site. Work that cannot be shop assembled must be given a trial fit in the shop to ensure proper field assembly. Holes for bolts and screws must be drilled or punched. Drilling and punching must produce clean, true lines and surfaces. Welding to or on structural steel must be in accordance with AWS D1.1/D1.1M. Welding must be continuous along the entire area of contact. Exposed welds must be ground smooth. Exposed surfaces of work must have a smooth finish and exposed riveting must be flush. Fastenings must be concealed where practical. Items specified to be galvanized must be by hot-dip process after fabrication if practical. Galvanization must be in accordance with ASTM A123/A123M and ASTM A653/A653M, as applicable. Other metallic coatings of steel sheet must be in accordance with ASTM A924/A924M. Joints exposed to the weather must be formed to exclude water. Drainage and weep holes must be included as required to prevent condensation buildup.

2.17.2 Dissimilar Materials

Where dissimilar metals are in contact, or where aluminum is in contact with concrete, mortar, masonry, wet or pressure-treated wood, or absorptive materials subject to wetting, the surfaces must be protected with a coat of asphalt varnish or a coat of zinc-molybdate primer to prevent galvanic or corrosive action.

2.17.3 Shop Painting

Surfaces of miscellaneous metal work, except nonferrous metal, corrosion resisting steel, and zinc-coated work, must be given one coat of zinc-molybdate primer or an approved rust-resisting treatment and metallic primer in accordance with manufacturer's standard practice. Surfaces of items to be embedded in concrete must not be painted. Upon completion of work, damaged surfaces must be recoated.

2.18 COLOR, FINISH, AND CONTRAST

Color must be as indicated on the drawings.

PART 3 EXECUTION

3.1 INSTALLATION

Signs, plaques, or dimensional letters must be installed in accordance with approved manufacturer's instructions at locations shown on the approved detail drawings; submit drawings showing elevations of each type of sign; dimensions, details, and methods of mounting or anchoring; shape and thickness of materials; and details of construction. A schedule showing the location, each sign type, and message must be included. Signs must be installed plumb and true at mounting heights indicated, and by method shown or specified. Signs mounted on other surfaces must not be installed until finishes on such surfaces have been completed. Submit manufacturer's installation instructions and cleaning instructions.

3.1.1 Anchorage

Anchorage and fastener materials must be in accordance with approved manufacturer's instructions for the indicated substrate. Anchorage not otherwise specified or indicated must include slotted inserts, expansion shields, and powder-driven fasteners when approved for concrete; toggle bolts and through bolts for masonry; machine carriage bolts for steel; lag bolts and screws for wood.

3.1.2 Protection and Cleaning

The work must be protected against damage during construction. Hardware and electrical equipment must be adjusted for proper operation. Glass, frames, and other sign surfaces must be cleaned in accordance with manufacturer's instructions. After signs are completed and inspected, cover all project identification, directional, and other signs which may mislead the public. Covering must be maintained until instructed to be removed by the Project Manager or until the facility is to be opened for business. Submit digital copies of maintenance instructions listing routine maintenance procedures, possible breakdowns and repairs, and troubleshooting guides. The instructions must include simplified diagrams for the equipment as installed. Signs must be cleaned, as required, at time of cover removal.

3.2 FIELD PAINTED FINISH

Miscellaneous metals and frames must be field painted in accordance with Section 09 90 00 PAINTS AND COATINGS. Anodized metals, masonry, and glass must be protected from paint. Finish must be free of scratches or other blemishes.

END OF SECTION

DIVISION 12 – FURNISHINGS

SECTION 12 93 00 SITE FURNISHINGS

PART 1 GENERAL

The following information will be shown on the drawings:

1. Location and configuration of all furniture and furnishings.
2. All sizes and dimensions.
3. Special fastenings, attachments or anchoring.
4. Location and size of expansion shields larger than 3/8 inch in diameter.
5. Location of products to be galvanized.
6. Connection details, other than manufacturer's standard.

1.1 REFERENCES

This specification is adapted from United Facilities Guild Specification UFGS-12 93 00 (August 2017). For a list of references for Section 12 93 00 for Site Furnishings see <https://www.wbdg.org/ffc/dod/unified-facilities-guide-specifications-ufgs/ufgs-12-93-00>.

1.2 SUBMITTALS

Submit the following in accordance with Section Submittal Procedures

Shop drawings

Product Data

Tables

Benches

Waste Receptacles

Samples

Finish

1.3 CERTIFICATIONS

1.3.1 Certified Sustainably Harvested Wood

Use certified sustainably harvested wood where suitable for application and cost effective. Provide wood certified as sustainably harvested by FSC STD 01 001[ATFS STANDARDS, CSA Z809-08, SFI 2015-2019, or other third party program certified by PEFC ST 2002:2013]. Provide a letter of Certification of Sustainably Harvested Wood signed by the wood supplier. Identify certifying organization and their third party program name and indicate compliance with chain-of-custody program requirements. Submit sustainable wood certification data; identify each certified product on a line item basis. Provide current product certification documentation from certification body. Submit copies of invoices bearing certification numbers.

1.4 QUALITY ASSURANCE

Qualify welders in accordance with AWS D1.1/D1.1M using procedures, materials, and equipment of the type required for the work.

1.4.1 Fabrication Drawings

Submit fabrication drawings showing layout(s), connections to structural system, and anchoring details as specified in AISC 303.

1.4.2 Installation Drawings

Submit templates, erection and installation drawings indicating thickness, type, grade, class of metal, and dimensions. Show construction details, reinforcement, anchorage, and installation.

1.4.3 Assembly Instruction Drawings

Submit assembly instruction drawings showing layout(s), connections, bolting and anchoring details in accordance with manufacturer's standards. Submit drawings showing scaled details of proposed site furnishings, elevations for each type of site furnishing; dimensions, details, and methods of mounting or anchoring; shape and thickness of materials; and details of construction.

1.5 DELIVERY, STORAGE, AND HANDLING

Ship items knocked-down (KD) ready for site assembly. Packaged components must be complete including all accessories and hardware. Materials must be delivered, handled, and stored in accordance with the manufacturer's recommendations. Site furnishings must be inspected upon arrival at the job site for conformity to specifications and quality in accordance with paragraph MATERIALS. Protect from corrosion, staining, and other types of damage. Store items in designated area free from contact with soil and weather. Remove and replace damaged items with new items.

PART 2 PRODUCTS

2.1 MATERIALS

Provide materials which are the standard products of a manufacturer regularly engaged in the manufacture of such products. The materials provided shall be of a type with proven satisfactory usage for at least 2 years.

2.1.1 Metals

Furnish metal components with factory drilled holes and free of excess weld and spatter. Metal components with holes that will not be filled by hardware or hidden by other components will be rejected. Structural steel products must conform to ASTM A36/A36M, ASTM A500/A500M and ASTM A501/A501M. Provide Steel Components with a minimum of 70 percent recycled content. Provide data identifying percentage of recycled content for steel components.

2.1.2 Structural Tubing

ASTM A500/A500M

2.1.3 Steel Pipe and Fittings

Steel pipe must conform to ASTM A53/A53M, Type E or S, Grade B; standard malleable iron fittings must conform to ASTM A47/A47M.

2.1.4 Gray Cast Iron (NOT USED)

2.1.8 Anchors and Hardware

Provide anchors, where necessary, for fastening site furnishings securely in place and in accordance with approved manufacturer's instructions. Anchoring devices that may be used, when no anchors are otherwise specified or indicated, include anchor bolts, slotted inserts, expansion shields for concrete; toggle bolts and through bolts for masonry; machine carriage bolts for steel; and lag bolts and screws for wood. Anchor bolts must conform to ASTM A307. Hardware must be [stainless steel] [brass] [zinc-plated] [zinc-chromate plated] [or] [galvanized steel] in accordance with ASTM A153/A153M and compatible with the material to which applied. All exposed hardware must match in color and finish. Mounting hardware must be concealed, recessed, and plugged.

2.1.8.1 Threaded Inserts and Expansion Anchors

Provide inserts recessed not less than 2.5 inches into concrete or masonry. Pullout 198 pounds in concrete with f'c of 3,000 psi, as tested in accordance with ASTM E488/E488M. Expansion shields must conform to CID A-A-1925, group II, type 4, class 1. Provide embedment required by manufacturer.

2.1.8.2 Lag Screws and Bolts

ASME B18.2.1, type and grade best suited for the purpose.

2.1.8.3 Toggle Bolts

ASME B18.2.1.

2.1.8.4 Bolts, Nuts, Studs and Rivets

ASME B18.2.2 or ASTM A307.

2.1.8.5 Power Driven Fasteners

Follow safety provisions of ASSP A10.3.

2.1.8.6 Screws

ASME B18.2.1, ASME B18.6.2, and ASME B18.6.3.

2.1.8.7 Washers

Provide plain washers to conform to ASME B18.22M ASME B18.21.1. Provide beveled washers for American Standard beams and channels, square or rectangular, tapered in thickness, and smooth. Provide lock washers to conform to ASME B18.21.2M ASME B18.21.1.

2.1.9 Ounce Metals

Bronze, copper, and other ounce metals must conform to ASTM B62.

2.1.10 Concrete

Ready-mixed concrete must conform to ASTM C94/C94M, using 3/4 inch maximum size aggregate, and having minimum compressive strength of 3000 psi at 28 days. Portland cement must conform to ASTM C150/C150M. Cast-in-place concrete materials and products must conform to Section 03 30 00 CAST-IN-PLACE CONCRETE.

Precast concrete material and products must conform to Section 03 45 33 PRECAST [PRESTRESSED] STRUCTURAL CONCRETE. Reinforcing steel must conform to ASTM A615/A615M. Welded wire fabric must conform to ASTM A1064/A1064M.

2.1.11 Masonry (NOT USED)

2.1.14 Lumber

Provide premium grade wood free of knots; boards with eased edges and ends; and wood components with factory drilled holes. Components with holes that will not be filled by hardware or hidden by other components will be rejected. Wood products must be selected to withstand the climatic conditions of the region in which the site is located.

Provide certified sustainably harvested lumber. Lumber grades must meet manufacturers standards of the grading rules under which they are manufactured. Where no standards exist the following must be the minimum acceptable grades for species used.

- a. WWPA G-5 grading rules, [Douglas Fir] [Western Cedars],[Choice & Btr,]
[Select or A & Btr.] in accordance with special western red cedar rules.
- b. WCLIB 17 standard grading rules, [Douglas Fir] [Western Cedars], A & Btr.
- c. SPIB 1003 grading rules, Southern Pine, C & Btr.
- d. NHLA Rules standard specification, Cypress, C-Select.
- e. RIS Grade Use standard specifications, Redwood, [Clear] [Clear All Heart].
- f. NHLA Rules rules, [Cypress] [Teak], [B Finish] [Select or Btr.].

2.1.14.1 Moisture Content

Air-dry or kiln-dry lumber. Kiln-dry treated lumber after treatment. Maximum moisture content of wood products at time of delivery must be in accordance with manufacturers standard. If no manufacturer's standard exists, then moisture content must be based on requirements for the product, grade and intended use.

2.1.14.2 Treatment

Wood that is not naturally rot and insect resistant must be treated in accordance with AWPA U1, as applicable, and inspected in accordance with AWPA M2. Provide treatment of wood in accordance with ASTM F1487.

2.1.14.3 Wood Seats and Table Tops

Not less than 1-5/8 inches thick with rounded edges.

2.2 PRETREATMENT, PRIMING AND PAINTING

Apply pretreatment, primer, and paint in accordance with manufacturer's printed instructions.

2.2.1 Nonferrous Metal Surfaces

Protect by plating, anodic, or organic coatings.

2.3 COATINGS AND FINISHES

The content of volatile organic compounds (VOC), and marking, must be in compliance with air quality regulations for the type of application and jurisdiction where used.

2.3.1 Galvanizing

Hot-dip galvanize items specified to be zinc-coated, after fabrication where practicable. Galvanizing must conform to ASTM A123/A123M, ASTM A153/A153M or ASTM A653/A653M, as applicable. Tailings and sharp protrusions formed as a result of the hot-dip process must be removed and exposed edges burnished. Galvanize anchor bolts, grating fasteners, washers and parts or devices necessary for proper installation, unless otherwise indicated.

2.3.2 Polyester Powder

Powder-coated surfaces must receive electrostatic zinc coating prior to painting. Powder coating must be electrostatically applied and oven cured. Polyester powder coating must be resistant to ultraviolet (UV) light.

2.3.4 Finish

Finish must be as specified by the manufacturer or as indicated. Exposed surfaces and edges must be rounded, polished, or sanded. Finish must be non-toxic, non-glare, and resistant to corrosion. Exposed surfaces must be smooth and splinter-free exposed surfaces. Submit three sets of color data for each furnishing displaying manufacturer's color selections and finishes, and identifying those colors and finishes proposed for use.

2.3.4.1 Wood Sealants

Exposed wood surfaces must have, as a minimum, two shop coats of paint, varnish, sealer, or other approved preservative. Sealants must seal all applied surfaces from air.

2.3.4.2 Paint

Paint must be factory applied with a minimum of 2 coats. Paint must be weather-resistant and resistant to cracking, peeling and fading.

2.3.4.3 Color

Color of site furnishing components must be in accordance with the drawings.

2.4 SITE STANDARDS

Site furnishings must be furnished with the dimensions and requirements indicated. Site furnishings placed in children's outdoor play areas must meet the safety requirements of ASTM F1487 for entrapment; sharp points, edges, and protrusions; entanglement; pinch, crush, and shear points. Site furnishings to be included in children's outdoor play areas must be free from sharp vertical edges and any protruding elements and designed with a minimum radius of 1/2 inch on all vertical edges; this includes, but is not limited to, seat walls, containment curbs and planters. Where practical, horizontal edges exposed to children's activities must be rounded.

2.5 BENCHES AND CHAIRS

Furnish benches and chairs according to the drawings and following manufacturer's instructions.

- a. Height: The height above finished grade or specified surface must be between 18-20 inches and level.
- b. Seat: The seat surface must be pitched or slotted to shed water; the seat depth must be between 12-18 inches and pitched down at the back at a 0-5 degree angle. Seat must have a minimum width of 24 inches per person, and must overhang the support base by a minimum of 4 inches for heel space and to facilitate rising from a seating position.
- c. Back Rest: When back rests are required, the height must be between 15-18 inches from the top of the seat and the connection must be at a 90-110 degree angle to the seat.
- d. Arm Rest: When arm rests are required, a minimum of 6 inches height from the seat and a minimum arm rest width of 1-1/2 inches must be provided.
- e. Weight Limit: Seats must support a minimum 300 lbs for each person they are designed to accommodate.

2.5.1 Precast Units (NOT USED)

2.5.2 Wood Units

Provide manufacturer's standard wood units with wood, metal, fiberglass or concrete pedestals as indicated. Provide fasteners and accessories required for onsite assembly. Kiln dry and pressure treat wood components to manufacturer's standards. Pre-treat metal components and provide manufacturer's standard primer and powder coat finish complying with ASTM D3451, color as selected. Provide fiberglass non-fading gel coat color as indicated. Provide manufacturer's standard exposed aggregate or sandblasted finish and protection coating on concrete pedestals.

Provide certified sustainably harvested wood for wood benches and chairs.

- a. Design wood benches to sustain a live load of not less than 200 pounds per square foot.
- b. Provide kiln dried, surfaced four sides (S4S), clear all sides wood slats of species and sizes indicated.

(1) Species: Western red cedar

(2) Nominal wood slat sizes: Per drawings.

2.5.2.1 Support Pedestals

Provide steel support pedestals in accordance with manufacturer's standard.

2.5.2.1.4 Wood

Match in species, grade, grain, color and finish of the wood slats.

2.5.6 Accessories

Provide manufacturer's standard materials and accessories as required for assembly of units and as indicated on the assembly drawings. Provide unexposed aluminum, stainless steel or steel plates, angles

and supports as required for complete assembly. Separate dissimilar materials to prevent electrolytic action.

2.5.7 Fasteners

Provide concealed fasteners except where specifically approved; types as required for specific usage.

2.5.8 Anchoring Brackets

Provide 1/4 inch zinc plated steel angle anchoring brackets, 1-7/8 inch wide by 2 inches deep by 63 mm 2-1/2 inches high 1-7/8 inch wide by 3-1/2 inch deep by 6 inch high, pre-drilled for bolting benches to substrate.

2.8 WASTE RECEPTACLES

Provide for waste receptacles as directed in drawings and install according to manufacturer's instructions.

2.8.1 Height

Trash and litter deposit openings must be between 30-40 inches above the ground.

2.8.2 Liners

Trash and litter receptacles must be furnished with [disposable inner-linings] [removable/reusable inner containers]. Self-dumping type designs to include hinged bottom, top or sides will be rejected.

2.8.3 Anchors

Trash and litter receptacles that can be anchored to resist overturning by typical use, high winds, or animals must be furnished and anchored in accordance with the manufacturer's recommendations.

2.8.4 Openings

Openings for trash and litter insertion must be a minimum of 4 inches in diameter. Edges of the openings must be crimped, rounded and smoothed.

2.10 TABLES

Picnic tables must be furnished as directed in drawings and install according to manufacturer's instructions.

2.10.1 Height

Between 29-48 inches from the finished grade to the lowest surface of the top, or as noted.

2.10.2 Clearance

A minimum vertical clearance of 9 inches between the seat top and the bottom edge of the table top must be provided. A minimum of 18 inches of leg space under tables, measured from the inside edge of the seat top to the nearest table support, must be provided. A minimum of 18 inches from the end of the table top to the nearest support leg must be provided.

2.10.3 Top

Table top surfaces must not contain recesses that might hold water or food particles. The table top width must be a minimum of 18 inches when utilized from one side only, and a minimum of 900 mm 36 inches when utilized from two sides. The table top length must be a minimum of 610 mm 24 inches per person.

2.10.4 Wheelchair Access

A minimum clear space of 29 inches from the finished grade to the underside of the table must be provided for persons with disability to be able to pull a wheelchair beneath the table top at the end of the table; the minimum clear width must be 34 inches.

2.10.8 Wood Tables

Provide manufacturer's standard wood tables as indicated. Provide fasteners and accessories required for onsite assembly. Kiln dry and pressure treat wood components to manufacturer's standard, maximum 19 percent moisture content.

PART 3 EXECUTION

3.2 INSTALLATION

Verify that finished grades and other operations affecting mounting surfaces have been completed prior to the installation of site furnishings. Site furnishings must be installed plumb and true, at locations indicated, in accordance with the approved manufacturer's instructions.

3.2.1 Assembly and Erection of Components

New parts must be acquired from the manufacturer; substitute parts will not be accepted unless approved by the manufacturer. When the inspection of parts has been completed, the site furnishings must be assembled and anchored according to manufacturer's instructions or as indicated. When site furnishings

are assembled at the site, assembly must not interfere with other operations or pedestrian and vehicular circulation.

3.2.2 Anchorage, Fastenings, and Connections

Furnish metal work, mounting bolts or hardware in ample time for securing into concrete or masonry as the work progresses. Provide anchorage where necessary for fastening furniture or furnishings securely in place. Provide, for anchorage not otherwise specified or indicated, slotted inserts, expansion shields, and power-driven fasteners, when approved for concrete; toggle bolts and through bolts for masonry; machine and carriage bolts for steel; through bolts, lag bolts, and screws for wood. Do not use wood plugs in any material. Provide non-ferrous attachments for non-ferrous metal. Make exposed fastenings of compatible materials, generally matching in color and finish the fastenings to which they are applied. Conceal fastenings where practicable.

3.3 WELDING

Perform welding, welding inspection, and corrective welding, in accordance with AWS D1.1/D1.1M. Use continuous welds on all exposed connections. Grind visible welds smooth in the finished installation.

3.4 TESTING

Test each site furnishing to ascertain a secure and correct installation. A correct installation must be according to the manufacturer's recommendations and by the following procedure: Measure the physical dimensions and clearance of each installed site furnishing for compliance with manufacturer's recommendations and as indicated. Site furnishings which do not comply must be reinstalled. Fasteners and anchors determined to be non-compliant must be replaced. Submit a written report describing the results of the testing and a report of post-installation test results.

3.5 FINISHES

3.5.1 Field Finishes

Where indicated, field finishes must be applied in accordance with Section 09 90 00 PAINTS AND COATINGS. Where dissimilar metals are in contact, protect surfaces with a coat conforming to SSPC Paint 25 to prevent galvanic or corrosive action. Where aluminum is in contact with concrete, mortar, masonry, wood, or absorptive materials subject to wetting, protect with ASTM D1187/D1187M, asphalt-base emulsion.

3.5.2 Repair of Zinc-Coated Surfaces

Repair damaged surfaces with galvanizing repair method and paint conforming to ASTM A780/A780M or by the application of stick or thick paste material specifically designed for repair of galvanizing, as approved by the Contracting Officer. Clean areas to be repaired and remove the slag from the welds. Heat surfaces to which stick or paste material is applied, with a torch to a temperature sufficient to melt the metallics in stick or paste; spread the molten material uniformly over surfaces to be coated and wipe the excess material off.

3.6 BOLLARDS

Install in pipe sleeves embedded in concrete and filled with non-shrink grout or quick setting anchoring cement.

3.9 RESTORATION AND CLEAN UP

When the installation has been completed, clean up and protect the site. Existing areas that have been damaged from the installation operation must be restored to original condition at Contractor's expense.

3.9.1 Clean Up

The site must be cleaned of all materials associated with the installation. Site furnishing surfaces must be cleaned of dirt, stains, filings, and other blemishes occurring from shipment and installation. Cleaning methods and agents must be according to manufacturer's instructions or as indicated.

3.9.2 Protection

The area must be protected as required or directed by providing barricades and signage. Signage must be in accordance with Section 10 14 00.10 EXTERIOR SIGNAGE.

3.9.3 Disposal of Materials

Excess and waste material must be removed and disposed off Government property

3.10 RE-INSTALLATION

Where re-installation is required, the following must be accomplished:

- a. Re-install the product as specified. Material acquisition of replacement parts is the responsibility of the Contractor. Provide replacement materials that are new and supplied by the original manufacturer to match.
- b. Damage caused by the failed installation must be repaired.

END OF SECTION

DIVISION 31 – EARTHWORK

SECTION 31 00 00 EARTHWORK

PART 1 GENERAL

The following information will be provided or indicated on the project drawings: Location of borrow and disposal area.

1.1 RELATED WORK:

- A. BMPs and Erosion Control: 00 31 24.01 ANF CE Checklist & BMPs
- B. General Requirements: Section 01 11 01 USFS GENERAL REQUIREMENTS
- C. Environmental Protection: Section 01 57 19, TEMPORARY ENVIRONMENTAL CONTROLS.

1.2 REFERENCES

This specification is adapted from United Facilities Guild Specification UFGS-31 00 00 (November 2017). For a list of references for Section 31 00 00 EARTHWORKS see [https://www.wbdg.org/ffc/dod/unified-facilities-guide-specifications-ufgs/ufgs-31 00 00](https://www.wbdg.org/ffc/dod/unified-facilities-guide-specifications-ufgs/ufgs-31-00-00).

1.3 DEFINITIONS

For list of applicable terms and definitions see [https://www.wbdg.org/ffc/dod/unified-facilities-guide-specifications-ufgs/ufgs-31 00 00](https://www.wbdg.org/ffc/dod/unified-facilities-guide-specifications-ufgs/ufgs-31-00-00).

1.4 SUBMITTALS

No submittals are required for this work.

PART 2 PRODUCTS

2.1 REQUIREMENTS FOR OFFSITE SOILS

Test offsite soils brought in for use as backfill for Total Petroleum Hydrocarbons (TPH), Benzene, Toluene, Ethyl Benzene, and Xylene (BTEX) and full Toxicity Characteristic Leaching Procedure (TCLP) including ignitability, corrosivity and reactivity. Backfill shall contain a maximum of 100 parts per million (ppm) of total petroleum hydrocarbons (TPH) and a maximum of 10 ppm of the sum of Benzene, Toluene, Ethyl Benzene, and Xylene (BTEX) and shall pass the TCPL test. Determine TPH concentrations by using EPA 600/4-79/020 Method 418.1. Determine BTEX concentrations by using EPA SW-846.3-3 Method 5030/8020. Perform TCLP in accordance with EPA SW-846.3-3 Method 1311. Provide Borrow Site Testing for TPH, BTEX and TCLP from a composite sample of material from the borrow site, with at least one test from each borrow site. Do not bring material onsite until tests have been approved by the project manager.

PART 3 EXECUTION

3.2 GENERAL EXCAVATION

Perform excavation of every type of material encountered within the limits of the project to the lines, grades, and elevations indicated and as specified. Perform the grading in accordance with the typical sections shown and the tolerances specified in paragraph FINISHING. Transport satisfactory excavated materials and place in fill or embankment within the limits of the work. Excavate unsatisfactory materials encountered within the limits of the work below grade and replace with satisfactory materials as directed. Include such excavated material and the satisfactory material ordered as replacement in excavation. Dispose surplus satisfactory excavated material not required for fill or embankment in areas approved for surplus material storage or designated waste areas. Dispose unsatisfactory excavated material in designated waste or spoil areas. During construction, perform excavation and fill in a manner and

sequence that will provide proper drainage at all times. Excavate material required for fill or embankment in excess of that produced by excavation within the grading limits from the borrow areas indicated or from other approved areas selected by the Contractor as specified.

3.2.1 Underground Utilities

The Contractor is responsible for movement of construction machinery and equipment over pipes and utilities during construction. Perform work adjacent to non-Government utilities as indicated in accordance with procedures outlined by utility company. For work immediately adjacent to or for excavations exposing a utility or other buried obstruction, excavate by hand. Start hand excavation on each side of the indicated obstruction and continue until the obstruction is uncovered or until clearance for the new grade is assured. Support uncovered lines or other existing work affected by the contract excavation until approval for backfill is granted by the Project manager. Report damage to utility lines or subsurface construction immediately to the Project manager.

3.2.2 Structural Excavation

Ensure that footing subgrades have been inspected and approved by the Project manager prior to concrete placement. Excavate to bottom of pile cap prior to placing or driving piles, unless authorized otherwise by the Project manager. Backfill and compact over excavations and changes in grade due to pile driving operations to 95 percent of ASTM D698 maximum density.

3.3 SELECTION OF BORROW MATERIAL

NOTE: Where a substantial quantity of borrow excavation is anticipated, the drawings and specifications will indicate the location or locations within the project site, and the conditions under which borrow may be obtained. Obtain borrow material from the borrow designated by the Angeles National Forest. Consider necessary clearing, grubbing, and satisfactory drainage of borrow pits and the disposal of debris thereon related operations to the borrow excavation.

3.5 SHORING

3.5.1 General Requirements

When scope of work requires excavations which are greater than 5 feet or where it is known that in-situ soils lack the stability to hold near vertical faces. Where sufficient room is available, the Contractor may slope back trench walls rather than having to use a shoring system. However, the Contractor should not be given the opportunity to slope the faces of excavations in lieu of providing shoring unless all the following conditions are met:

1. The excavation is less than 20 feet in depth.
2. There are no adjacent structures, roads, or pavements that will affect the excavation.
3. No equipment, stored material, or overlying material will affect the excavation.
4. Vibration from equipment, traffic, or blasting will not affect the excavation.
5. There will be no ground water problems.
6. Surcharges will not affect the excavation.
7. Station operational considerations permit laying back the slopes of the excavation.

3.6 GRADING AREAS

Where indicated, divide work into grading areas within which satisfactory excavated material will be placed in embankments, fills, and required backfills. Do not haul satisfactory material excavated in one grading area to another grading area except when so directed in writing. Place and grade stockpiles of satisfactory [and unsatisfactory] [and wasted materials] as specified. Keep stockpiles in a neat and well drained condition, giving due consideration to drainage at all times. Clear, grub, and seal by rubber-tired equipment, the ground surface at stockpile locations; separately stockpile excavated satisfactory and unsatisfactory materials. Protect stockpiles of satisfactory materials from contamination which may destroy the quality and fitness of the stockpiled material. If the Contractor fails to protect the stockpiles, and any material becomes unsatisfactory, remove and replace such material with satisfactory material from approved sources.

3.7 FINAL GRADE OF SURFACES TO SUPPORT CONCRETE

Do not excavate to final grade until just before concrete is to be placed. Only use excavation methods that will leave the foundation rock in a solid and unshattered condition. Roughen the level surfaces, and cut the sloped surfaces, as indicated, into rough steps or benches to provide a satisfactory bond. Protect shales from slaking and all surfaces from erosion resulting from ponding or water flow.

3.8 GROUND SURFACE PREPARATION

3.8.1 General Requirements

Remove and replace unsatisfactory material with satisfactory materials, as directed by the project manager, in surfaces to receive fill or in excavated areas. Scarify the surface to a depth of 6 inches before the fill is started. Plow, step, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so that the fill material will bond with the existing material. When subgrades are less than the specified density, break up the ground surface to a minimum depth of 6 inches, pulverizing, and compacting to the specified density. When the subgrade is part fill and part excavation or natural ground, scarify the excavated or natural ground portion to a depth of 12 inches and compact it as specified for the adjacent fill.

3.8.2 Frozen Material

Do not place material on surfaces that are muddy, frozen, or contain frost. Finish compaction by sheepsfoot rollers, pneumatic-tired rollers, steel-wheeled rollers, or other approved equipment well suited to the soil being compacted. Moisten material as necessary to provide the moisture content that will readily facilitate obtaining the specified compaction with the equipment used.

3.9 UTILIZATION OF EXCAVATED MATERIALS

Dispose unsatisfactory materials removing from excavations into designated waste disposal or spoil areas. Use satisfactory material removed from excavations, insofar as practicable, in the construction of fills, embankments, subgrades, shoulders, bedding (as backfill), and for similar purposes. Submit procedure and location for disposal of unused satisfactory material. Submit proposed source of borrow material. Do not waste any satisfactory excavated material without specific written authorization. Dispose of satisfactory material, authorized to be wasted, in designated areas approved for surplus material storage or designated waste areas as directed. Clear and grub newly designated waste areas on Government-controlled land before disposal of waste material thereon. Stockpile and use coarse rock from excavations for constructing slopes or embankments adjacent to streams, or sides and bottoms of channels and for protecting against erosion. Do not dispose excavated material to obstruct the flow of any stream, endanger a partly finished structure, impair the efficiency or appearance of any structure, or be detrimental to the completed work in any way.

3.10 BURIED TAPE AND DETECTION WIRE

3.10.1 Buried Warning and Identification Tape

Provide buried utility lines with utility identification tape. Bury tape 12 inches below finished grade; under pavements and slabs, bury tape 6 inches below top of subgrade.

3.10.2 Buried Detection Wire

Bury detection wire directly above non-metallic piping at a distance not to exceed 12 inches above the top of pipe. Extend the wire continuously and unbroken, from manhole to manhole. Terminate the ends of the wire inside the manholes at each end of the pipe, with a minimum of 3 feet of wire, coiled, remaining accessible in each manhole. Furnish insulated wire over its entire length. Install wires at manholes between the top of the corbel and the frame, and extend up through the chimney seal between the frame and the chimney seal. For force mains, terminate the wire in the valve pit at the pump station end of the pipe.

3.11 BACKFILLING AND COMPACTION

Place backfill adjacent to any and all types of structures, in successive horizontal layers of loose material not more than 8 inches in depth. Compact to at least 90 percent laboratory maximum density for cohesive materials or 95 percent laboratory maximum density for cohesionless materials, to prevent wedging action or eccentric loading upon or against the structure. Backfill material must be within the range of -2 to +2 percent of optimum moisture content at the time of compaction. Prepare ground surface on which backfill is to be placed and provide compaction requirements for backfill materials in

conformance with the applicable portions of paragraphs GROUND SURFACE PREPARATION. Finish compaction by sheepsfoot rollers, pneumatic-tired rollers, steel-wheeled rollers, vibratory compactors, or other approved equipment.

3.11.1 Trench Backfill

Backfill trenches to the grade shown. Backfill the trench to 2 feet above the top of pipe prior to performing the required pressure tests. Leave the joints and couplings uncovered during the pressure test.

3.11.2 Replacement of Unyielding Material

Replace unyielding material removed from the bottom of the trench with select granular material or initial backfill material.

3.11.3 Replacement of Unstable Material

Replace unstable material removed from the bottom of the trench or excavation with select granular material placed in layers not exceeding 6 inches loose thickness.

3.11.4 Bedding and Initial Backfill

Place initial backfill material and compact it with approved tampers to a height of at least one foot above the utility pipe or conduit. Bring up the backfill evenly on both sides of the pipe for the full length of the pipe. Take care to ensure thorough compaction of the fill under the haunches of the pipe. Except as specified otherwise in the individual piping section, provide bedding for buried piping in accordance with AWWA C600, Type 4, except as specified herein. Compact backfill to top of pipe to 95 percent of ASTM D698 maximum density. Provide plastic piping with bedding to spring line of pipe. Provide materials as follows: 3.11.1.3.1 Class I Angular, 0.25 to 1.5 inch, graded stone, including a number of fill materials that have regional significance such as coral, slag, cinders, crushed stone, and crushed shells.

3.11.5 Class II Coarse sands and gravels with maximum particle size of 1.5 inch, including various graded sands and gravels containing small percentages of fines, generally granular and noncohesive, either wet or dry. Soil Types GW, GP, SW, and SP are included in this class as specified in ASTM D2487.

3.11.6 Sand

Clean, coarse-grained sand classified as well-graded sand (SW) ASTM D2487 for bedding and backfill.

3.11.7 Gravel and Crushed Stone

Clean, coarsely graded natural gravel, crushed stone or a combination thereof identified as well-graded gravel (GW) ASTM D2487 for bedding and backfill.

3.11.8 Final Backfill

Fill the remainder of the trench, except for special materials for roadways, railroads and airfields, with satisfactory material. Place backfill material and compact as follows:

3.11.9 Roadways, Railroads, and Airfields

Place backfill up to the required elevation as specified. Do not permit water flooding or jetting methods of compaction.

3.11.10 Sidewalks, Turfed or Seeded Areas and Miscellaneous Areas Deposit backfill in layers of a maximum of 12 inches loose thickness, and compact it to 85 percent maximum density for cohesive soils and 90 percent maximum density for cohesionless soils. Do not permit compaction by water flooding or jetting. Apply this requirement to all other areas not specifically designated above.

3.11.11 Backfill for Appurtenances

After the manhole, catchbasin, inlet, or similar structure has been constructed [and the concrete has been allowed to cure for a minimum of 3 days, place backfill in such a manner that the structure is not be damaged by the shock of falling earth. Deposit the backfill material, compact it as specified for final backfill, and bring up the backfill evenly on all sides of the structure to prevent eccentric loading and excessive stress.

3.12 SPECIAL REQUIREMENTS

Special requirements for both excavation and backfill relating to the specific utilities are as follows:

3.12.1 Water Lines

Excavate trenches to a depth that provides a minimum cover of 2 feet from the existing ground surface, or from the indicated finished grade, whichever is lower, to the top of the pipe.

3.12.2 Electrical Distribution System

Provide a minimum cover of 24 inches from the finished grade to direct burial cable and conduit or duct line, unless otherwise indicated.

3.12.3 Porous Fill

Provide backfill material consisting of clean crushed rock or gravel having a gradation No. 4 for coarse aggregate in ASTM C33/C33M.

3.12.4 Cover

Filter fabric as indicated.

3.12.5 Bore Holes

Mechanically bore holes and case through the soil with a cutting head on a continuous auger mounted inside the casing pipe. Weld lengths of pipe together in accordance with AWS D1.1/D1.1M. Do not use water or other fluids in connection with the boring operation.

3.12.6 Cleaning

Clean inside of the pipeline casing of dirt, weld splatters, and other foreign matter which would interfere with insertion of the piped utilities by attaching a pipe cleaning plug to the boring rig and passing it through the pipe.

3.12.7 End Seals

After installation of piped utilities in pipeline casing, provide watertight end seals at each end of pipeline casing between pipeline casing and piping utilities. Provide watertight end seals as indicated.

3.12.8 Bedding Placement

Spread filter fabric on prepared subgrade as indicated.

3.12.8 Stone Placement

Place rock for rip-rap on prepared bedding material to produce a well graded mass with the minimum practicable percentage of voids in conformance with lines and grades indicated. Distribute larger rock fragments, with dimensions extending the full depth of the rip-rap throughout the entire mass and eliminate "pockets" of small rock fragments. Rearrange individual pieces by mechanical equipment or by hand as necessary to obtain the distribution of fragment sizes specified above. [For grouted rip-rap, hand-place surface rock with open joints to facilitate grouting and do not fill smaller spaces between surface rock with finer material. Provide at least one "weep hole" through grouted rip-rap for every 4.65 square meters 50 square feet of finished surface. Provide weep holes with columns of bedding material, 100 mm 4 inches in diameter, extending up to the rip-rap surface without grout.]

3.12.10 Grouting

Prior to grouting, wet rip-rap surfaces. Grout rip-rap in successive longitudinal strips, approximately 3 m 10 feet in width, commencing at the lowest strip and working up the slope. Distribute grout to place of final deposit and work into place between stones with brooms, spades, trowels, or vibrating equipment. Take precautions to prevent grout from penetrating bedding layer. Protect and cure surface for a minimum of 7 days.

END OF SECTION

DIVISION 32 - EXTERIOR IMPROVEMENTS

SECTION 32 12 16.19 COLD-MIX ASPHALT PAVING

PART 1 GENERAL

1.1 REFERENCES

This specification is adapted from United Facilities Guild Specification UFGS-04 03 00 (November 2017). For a list of references for Section 32 12 16.19 Cold-Mix Asphalt Paving www.wbdg.org/ffc/dod/unified-facilities-guide-specifications-ufgs/ufgs-32-12-16-19

1.2 SUBMITTALS

Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

1. Truck load tickets for aggregate base and asphalt concrete at the time of delivery.
2. Technical data of asphalt to be used for tack coat.
3. Technical data of asphalt to be used in Job Mix Formula (JMF).
4. Gradation data for asphalt concrete aggregates.
5. Test results (see 3.14 FIELD QUALITY CONTROL AND TESTING)

1.3 SAFETY

Do not permit smoking or open flames within 25 ft of heating, distributing or transferring operations of bituminous materials other than bituminous emulsions.

1.4 QUALITY ASSURANCE

- A. No variations to the Specification or drawings to be made without approval. Submit details of any reasons for the proposed variations from this Specification, the drawings, and the Engineer's written or drawn instructions for approval.
- B. Perform all sampling, laboratory and site tests by an Independent Testing Agency/Laboratory.
- C. Carry out all tests and checks on site in the presence of or as directed by the Engineer and as required by the Specification.
- D. All visual inspections for concrete, asphalt and utility work shall be coordinated with the Forest Engineer for quality assurance (QA).

1.5 DELIVERY, STORAGE, AND HANDLING

1.5.1 Mineral Aggregates

Deliver mineral aggregates to the site and stockpile them in such a manner to preclude fracturing of aggregate particles, segregation, contamination or intermingling of different materials in the stockpiles or cold feed hoppers. Before stockpiling material, clear, drain, level, and dry the storage areas if needed. Deliver and store mineral filler in a manner to preclude exposure to moisture or other detrimental conditions.

1.5.2 Bituminous Materials

Submit certified copies of the bituminous material manufacturer's test reports indicating compliance with specified requirements, not less than 30 days before the material is required in the work. Maintain bituminous material at appropriate temperature during storage but do not heat it by application of direct flame to walls of storage tanks or transfer lines. Clean storage tanks, transfer lines, and weigh bucket before a different type or grade of bitumen is introduced into the system. Heat the bituminous material to allow satisfactory pumping of the material; however, maintain the storage temperature below degrees F.

1.6 ENVIRONMENTAL REQUIREMENTS

Construct bituminous courses only when the base course or existing pavement is dry and when the weather is not foggy or rainy. Unless otherwise directed, do not construct such courses when the atmospheric temperature is below 60 degrees F.

PART 2 PRODUCTS

2.1 PLANT, EQUIPMENT, MACHINES, AND TOOLS

2.1.1 General Requirements

Maintain plant, equipment, machines, and tools used in the work in a satisfactory condition and are subject to approval. Provide equipment that is adequate for placing the bituminous mixtures at a rate equal to the plant output and that is capable of producing the required compaction, meeting grade controls, thickness control and smoothness requirements.

2.1.2 Mixing Plant

Use an automatic or semi-automatic controlled mixing plant, commercially manufactured unit designed and operated to consistently produce a mixture within the JMF. Use a plant with a minimum capacity of 2000-lb tons per hour.

2.1.3 Rollers

Provide rollers that are self-propelled, weigh not less than 2000-lb tons and have a maximum contact pressure of 90 psi. Equip wheels on the roller with adjustable scrapers and water sprinkling apparatus to keep the wheels and prevent the adherence of bituminous material. Use a sufficient number of rollers on the work so that one roller is in continuous operation for 1 hour on each 100 square yd of completed pavement, operating at a speed of not more than 3 mph.

2.1.4 Power Brooms and Power Blowers

Provide brooms and blowers for cleaning surfaces of the bases and the bituminous course.

2.1.5 Straightedge

Provide and maintain at the site, in good condition, one 12 ft straightedge for each bituminous paver for use in testing the finished surface. Construct the straightedges of aluminum or other approved lightweight metal with blades of box girder cross section and with flat bottom, reinforced to insure rigidity and accuracy. Equip straightedges with handles for operation on pavement.

2.2 MATERIALS

2.2.1 Bituminous Material

Provide bituminous material conforming to AASHTO R 66 (2016) Standard Practice for Sampling Asphalt Materials ASTM D977, Grade SS-1h or CSS-1h. Allow use of medium set, high float, or other emulsions with open graded mixtures or in instances where previous experience with these emulsions has provided good results.

2.2.1.1 Emulsified Asphalt

Provide emulsified asphalt conforming to ASTM D977. Select the type of emulsified asphalt according to ASTM D3628.

2.2.2 Aggregates

Provide aggregates consisting of crushed stone, crushed gravel, crushed slag, screening, sand, and mineral filler, as required. Coarse aggregate is the portion of materials retained on the No. 4 sieve. Fine aggregate is the portion passing the No. 4 sieve and retained on the No. 200 sieve. Mineral filler is the portion passing the No. 200 sieve. Use a combined recycled aggregate gradation in accordance with ASTM C117 and ASTM C136/C136M.

2.2.2.1 Coarse Aggregates

Provide coarse aggregates consisting of clean, sound, durable particles conforming to ASTM D692/D692M and meeting the following requirements:

- a. Do not allow the percentage of loss to exceed 40 after 500 revolutions as determined in accordance with ASTM C131/C131M.
- b. Do not allow percentage of loss to exceed [] after five cycles performed in accordance with ASTM C88 using magnesium sulfate.
- c. Do not allow the dry weight of crushed slag to be less than 75 lbs per cubic ft, as determined in accordance with ASTM C29/C29M.
- d. Determine the percentage of coarse aggregate that consists of fractured particles in accordance with ASTM D5821.
- e. Particle shape of crushed aggregates are to be cubical. Do not allow the quantity of flat and elongated particles in any sieve size to exceed 20 percent by weight when determined in accordance with ASTM D4791.

2.2.2.2 Fine Aggregate

Provide fine aggregate consisting of clean, sound, durable particles of natural sand, crushed stone, slag or gravel conforming to ASTM D1073 and that meets the requirements for abrasion resistance and soundness specified for coarse aggregate. Do not allow the quantity of natural sand to be added to the wearing and intermediate course mixtures to exceed 25 percent by weight of coarse and fine aggregate and mineral filler. Provide natural sand that is clean and free from clay and organic matter.

2.2.2.3 Mineral Filler

Use mineral filler in accordance with ASTM D242/D242M. Determine grain size in accordance with ASTM D422.

2.2.3 Recycling Agents

Use bituminous recycling agent consisting of either foamed asphalt or emulsified asphalt. Submit notification on sources from which recycling agent are to be obtained within 15 days after Contract award. Allow cement, lime slurry and corrective aggregates to be used as recycling additives to improve CCPR mix properties.

2.2.4 Liquifiers

The use of liquefiers as anti-stripping agent is subject to prior approval by the Project Manager.

2.2.5 Water

Use water in accordance with ASTM C1602/C1602M. Do not use hot water unless approved by a Project Manager. Prior to construction, mix a sample of the water intended for use on the job with a sample of the emulsion at the ratio to be used in the project. If adverse effect is observed on the emulsion, use a new source of water

2.3 JOB MIX FORMULA (JMF)

Do not produce bituminous mixtures until a JMF has been determined and approved by the Project Manager. Submit the JMF, at least 30 days before it is to be used, notification on the selection of aggregate source, and notification on the selection of bituminous materials source. Indicate the gradation of the aggregate and a definite percentage of water, recycling agent and asphalt to be added to the mixture.

The JMF is allowed the tolerances given in TABLE III. Allow the aggregate gradation and bitumen content to be adjusted, as directed, within the limits specified to improve paving mixtures. Determine the proportions established in the JMF using ASTM D4215.

TABLE III. JOB-MIX TOLERANCES

Liquefier Material Tolerance: Plus or Minus 0.20 percent

TABLE III. JOB-MIX TOLERANCES

Temperatures: 25 degrees F

2.3.1 Gradation Tolerances

The tolerances allowed on the aggregate gradation - coarse aggregate, fine aggregate and mineral filler combined are presented in Table IV.

TABLE IV. GRADATION TOLERANCES	
Material	Tolerance, Plus or Minus
Aggregate passing 4.75 mm No. 4 sieve	4 percent
Aggregate passing 2.36, 1.18, 0.6 and 0.3 mm Nos. 8, 16, 30, and 50 sieves	3 percent
Aggregate passing 0.15 and 0.075 mm Nos. 100 and 200 sieves	1 percent

2.3.2 Asphalt Content

The JMF is allowed an asphalt content tolerance of plus or minus 0.3 percent. Select the optimum asphalt content to provide the tabulated properties when samples are compacted 250 degrees F with 50 blows of standard Marshall hammer on each side of the specimen, prepared in accordance with ASTM D6925.

2.3.3 Water Content

Select the water content to provide maximum dry density when samples are prepared at the optimum asphalt content and compacted with 50 blows of standard Marshall hammer on each side of the

specimen, according to the test procedure in ASTM D6926. When no asphalt binder is added to the mixture, select the water content to provide maximum dry density. Prepare samples with water contents, in 0.5 percent intervals, from 0 to 2.5 percent (increase water content to achieve maximum density). After compaction, place the samples in an oven at 140 degrees F for 96 hours. After cooling to ambient temperature, determine the dry density according to ASTM D6925.

3.1 SURFACE PREPARATION

3.1.1 Base Course

Clean the surface of the base course of loose and foreign material. Correct ruts or soft yielding spots, areas having inadequate compaction, and deviations of surface from requirements specified for the base course by loosening affected areas, removing unsatisfactory material, adding approved material where required, reshaping, and recompacting to line and grade to specified density requirements. Spray the surface with bituminous material conforming to Section 32 12 13 BITUMINOUS TACK AND PRIME COATS.

3.1.2 Existing Pavement

Clean the existing pavement of loose and foreign matter. Clean cracks 1/4 in in width and larger and fill with crack filler material. Repair deteriorated areas of the pavement as directed. Spray the surface with a thin coat of bituminous material conforming to Section 32 12 13 BITUMINOUS TACK AND PRIME COATS.

3.2 GRADE CONTROL

Confirm the finished and completed surface course (whether a base course or existing pavement) conform to the lines, grades, cross sections, and dimensions as indicated in the drawings. Place line and grade stakes at the site of the work, in accordance with the SPECIAL CONTRACT REQUIREMENTS, to maintain indicated lines and grades.

3.3 MIXING

3.3.1 Preparation of Mineral Aggregates

Place each component of various sizes of aggregates blended in preparing bituminous mixtures in separate stockpiles in such manner that separate sizes are not intermixed. Feed aggregate into the cold elevator by means of separate mechanical feeders to produce a total aggregate graded within requirements specified.

3.3.2 Preparation of Bituminous Mixtures

Measure aggregates and convey into the mixer in proportionate quantities of each aggregate size required to meet the JMF. Introduce materials into the mixer in the following order: aggregate, [lime,] [flux oil,] [liquefier,] and bituminous material, unless otherwise directed. Check that the temperature of the bituminous material is [] at the time of mixing. Do not allow the temperature of the aggregate and mineral filler in the mixer to exceed [] when the bituminous material is added. If slag aggregate is used, spray the liquefier over slag after coating with bituminous material. [Use the percentage of hydrated lime in the mix ranging from 0.5 to 1.5 percent by weight, as directed.] Mix aggregates and other ingredients for 35 seconds or longer to coat particles with bituminous material. Do not permit the finished mixture to vary from the approved JMF without prior approval of the Project Manager.

3.3.3 Construction Methods

3.3.3.1 Central Plant Mixing

Introduce the required amount of bituminous material for each batch, or calibrated amount of continuous mixing, into the mixer to meet the requirements of the JMF. Provide a uniform dispersion of the emulsified asphalt and water to achieve a coating (visually) of aggregate particles. If this process requires excessive mixing, resulting in premature breaking of the emulsified asphalt, shorten the mixing times as directed by the Project Manager. As a minimum, when the recycled mixture contains fine particles passing the 4.75 mm No. 4 sieve, provide a coating of these particles.

3.3.3.2 In-Place-Mixing

Produce a uniform blend of the RAP, aggregate (when required), asphalt emulsion, water, and a mixture containing the required amounts of emulsified asphalt and water as given in the JMF when using the in-place recycling process.

3.4 TRANSPORTATION OF BITUMINOUS MIXTURES

Transport mixtures to the site in trucks having tight, clean, smooth bodies. Schedule deliveries so that the spreading and rolling of mixtures delivered to the site are completed during daylight unless approved artificial light is provided.

3.5 CONTROL STRIP

Prior to the start of the recycling project, prepare a sufficient quantity of mixture to construct a control strip at least 15 m 50 ft long, two spreader widths wide and of thickness to be used in the project. Place, spread, and roll the mixture with the equipment to be used in the project and in accordance with requirements specified above. Test and evaluate the control strip as a lot conforming to specification requirements. If approved by the Project Manager, allow the control strip to be located in one of the less critical areas of the project pavement construction. Otherwise, allow it to be located outside the project paving. If tests results are satisfactory, allow the control strip to remain in place as part of the completed pavement if constructed in the project pavement area. If tests indicate that the pavement does not conform to specification requirements, remove the control strip and the material disposed of offsite. Make necessary adjustments to the plant operations and rolling procedures immediately, and construct another control strip, all at no additional cost to the Government. Construct and sample other additional control strips and test for conformance with specification requirements. Do not start full production with the recycled mixture without approval of the Project Manager.

3.6 PLACEMENT

3.6.1 Thickness of Layer

Spread the mixture in a layer not greater than 50 mm 2 in in thickness. Allow each layer to cure at least 12 hours or longer, if required to achieve proper curing before placing a succeeding layer.

3.6.2 General Requirements for Use of Motor Grader

When approved motor graders are used for spreading the mixture, place the material on the roadbed in a windrow so that the proper amount of material is available to cover a predetermined width to the indicated compacted thickness. Allow use of the motor grader to aerate the mixture by working it back and forth across the roadbed in order to get the mixture to the proper condition for compaction.

3.6.3 General Requirements for Use of Mechanical Spreader

When mechanical spreaders are used, dump the bituminous mixture into an approved mechanical spreader and placed as nearly continuous as possible. Adjust the speed of placing to permit proper rolling.

3.6.4 Offsetting Joints Between Succeeding Courses

Place a succeeding course in such a manner that the longitudinal joints of the succeeding course do not coincide with joints of the previous course and are offset from joints in the previous course by at least 300 mm 1 ft. Offset transverse joints in the succeeding course by at least 600 mm 2 ft from transverse joints in the previous course.

3.6.5 Special Requirements for Laying Strips Succeeding Initial Strip In laying each succeeding strip after the initial strip has been spread and compacted as specified, overlap the blade of the motor grader or the screed of the mechanical spreader of the previously placed strip 75 to 100 mm 3 to 4 in at a height required for compaction to produce a smooth, dense joint.

3.6.6 Shoveling, Raking, and Tamping After Machine Spreading Follow the spreading machine with shovelers and rakers, raking, removing, and adding mixture as required to obtain a course that, when completed, conforms to specified requirements. Do not permit excessive handwork and broadcasting or fanning of mixture.

3.6.7 Hand Spreading in Lieu of Machine Spreading

In areas where the use of machine spreading is impractical, spread the mixture by hand. Spreading a manner to prevent segregation. Spread mixture uniformly in a loose layer of thickness that, when rolled, is in accordance with the required thickness.

3.7 COMPACTION

Allow the mixture an adequate amount of time for aeration and curing. After curing, shape the mixture approximately to the specified lines and grades and loosened to its full depth and width. Begin rolling as soon after placing as the mixture bears the roller without undue displacement.] Begin rolling at the outside edge of the surface and proceed to the center, overlapping on successive trips at least one-half the width of the roller. Use alternate trips of the roller that are slightly different lengths. Operate the roller at a speed

that displacement of the material does not occur. Check that the density of the compacted mixture is at least 96 percent of that of laboratory specimens of the same mixture [subjected to 50 blows of the standard Marshall hammer according to the test procedure in ASTM D6926.

3.7.1 Operation of Rollers and Tampers

Provide the sufficient number, weight, and type of rollers to obtain the required density. Begin initial rolling of the recycled mixture as the emulsion is starting to break. Where lift thicknesses exceed 75 mm 3 in, accomplish breakdown rolling with a large 25 to 30-lb tons pneumatic roller. Use either a pneumatic or a steel-wheel roller to breakdown roll thinner lifts. Equip rollers with watering devices to prevent material adhesion; however, do not permit excess water. Allow vibratory rolling to achieve required density. Use finish rolling with a steel-wheel roller to remove existing roller marks.

3.7.2 Correcting Deficient Areas

Remove mixture that becomes contaminated with foreign material or is defective, to the full thickness of the course. Cut the hole with sides vertical and perpendicular to each other, with one pair parallel to the direction of traffic. Do not permit rolled areas to be skin patched to correct low areas and to be planed to correct high areas. Place fresh paving mixture in holes in sufficient quantity to produce a finished surface conforming to grade and smoothness requirements. Aerate paving mixture and compact to the density specified. Provide workmen capable of performing work incidental to the correction of deficiencies and defects.

3.8 EDGES OF PAVEMENT

Compact the edges of the pavement to the required density and straight and true to required lines. Place approved material along the edges of the pavement in such quantity to compact to the thickness of the course being constructed, or to the thickness of each layer in a multiple-layer course, allowing at least a 300 mm 1 ft width of the shoulder to be rolled and compacted simultaneously with the rolling and compacting of each layer of the pavement as directed.

3.9 FINISHING

Finish the surface of the top layer to grade and cross section shown in the drawings. Provide a finished surface with a uniform texture. Allow light blading during rolling for the finished surface to conform to the lines, grades, and cross sections in the drawings. If the surface becomes rough, corrugated, uneven in texture, or traffic-marked prior to completion, scarify, rework, relay or replace such unsatisfactory portion as directed. If the course, when laid, becomes water-soaked, remove that portion immediately, and place the mix in a windrow, aerated, and then spread, shaped, and rolled as specified. If required, this will be at no additional expense to the Government.

3.10 CURING

After compaction has been achieved and prior to opening the pavement layer to traffic, apply a fog seal, if required, to the pavement surface. Use a fog seal composed of [ASTM D2397/D2397M CSS-1H][ASTM D977 SS-1h] emulsified asphalt diluted up to 50 percent by volume with water or an engineered emulsion diluted up to 60 percent by volume with water. Apply the fog seal at a rate of 0.2 to 0.7 L per square m 0.05 to 0.15 gal/square yd. When sand blotter is required, apply it to the surface at approximately 1 to 5 kg per square m 2 to 3 lbs per square yd. Use sand free from clay or organic material. Determine the application rates of the fog seal and sand blotter and be such that a stable and safe roadway surface can be maintained until the surface course is placed.

3.11 THICKNESS REQUIREMENTS

Confirm the compacted thickness of the pavement is within 13 mm 1/2 in of the thickness indicated in the drawings. Where measured thickness of the pavement is more than 13 mm 1/2 in deficient, correct such areas by scarifying, adding new material of proper gradation, reblading, and recompacting as directed at no additional expense to the Government. Where the measured thickness of the pavement is more than 13 mm 1/2 in thicker than indicated, consider the pavement as conforming to the specified thickness requirements.

3.12 SURFACE-SMOOTHNESS REQUIREMENTS

3.12.1 Intermediate Courses

Check the surface of each intermediate course longitudinally with a 12 ft straightedge and checked transversely with a template conforming to the specified cross section. Do not allow the surface of the layer, after rolling to deviate more than 1/4 in from the 12 ft straightedge nor 1/4 in from the template. Correct irregularities by loosening and reshaping the aggregate, removing or adding aggregate as required, and rerolling such areas.

3.12.2 Finished Surfaces

3.12.2.1 Roads and Streets

Check the surface of the finished pavement longitudinally with a 12 ft straightedge and transversely with a template cut to the specified cross section. Do not allow the finished surface of the surface course to deviate more than 1/8 in from the 12 ft straightedge or from the template. Correct surface irregularities exceeding those specified as directed.

3.12.2.2 Other Than Roads and Streets

Check the surface of the finished pavement longitudinally and transversely with a 12 ft straightedge. Do not allow the finished surface of the finished pavement to deviate more than 1/4 in from the 12 ft straightedge. Correct surface irregularities exceeding tolerances specified as directed.

3.13 JOINTS

Make joints having the same texture, density, and smoothness as other sections of the course. Make joints between old and new pavements or between successive days' work carefully to insure continuous bond between old and new sections of the course. Apply a thin, uniform coat of bituminous material, conforming to Section 32 12 13 BITUMINOUS TACK AND PRIME COATS, just before the fresh mixture is placed to contact surfaces of previously constructed pavements.

3.13.1 Transverse Joints

Pass the roller over the unprotected end of the freshly laid mixture only when the laying of the course is discontinued. Cut back the edge of the previously laid course to expose an even, vertical surface for the full thickness of the course. Rake the fresh mixture against the joints, tamp and then roll.

3.13.2 Longitudinal Joints

When the edges of the longitudinal joints are irregular, honeycombed, or poorly compacted, cut back unsatisfactory sections of the joint to expose an even, vertical surface for the full thickness of the course. Where required, rake fresh mixture against the joint, tamp, and then roll.

3.14 FIELD QUALITY CONTROL AND TESTING

3.14.1 Testing

Perform field tests in sufficient numbers to assure that the specifications are being met. Perform testing by an approved commercial laboratory. The following number of tests, if performed at the appropriate time, are the minimum acceptable for each type of operation.

3.14.1.5 Smoothness

Take measurements, for deviation from grade and cross section shown in the drawings, in successive positions parallel to the road centerline, with a 12 ft straightedge. Check the surface of each course transversely with a template cut to the specified cross section a 12 ft straightedge placed perpendicular to the road centerline at 20 ft intervals.

3.14.1.6 Thickness

Determine the thickness of the pavement every 20 ft along the finished surface. Make measurements in 3 in diameter test holes penetrating the pavement. Refill the holes to conform to these specifications.

3.15 PROTECTION OF PAVEMENT

Maintain the pavement in a satisfactory condition until accepted by the Project Manager.

3.16 TRAFFICKING

Do not allow trafficking on newly placed recycled mixtures prior to completion of compaction and the curing period.

3.17 MAINTENANCE

After opening to traffic and prior to placing the surface course, maintain the surface of the recycled pavement in a condition suitable for the safe movement of traffic. Protect and maintain the recycled

surface from nuisance water, other deleterious substances, and/or other damage. Repair damage to the completed recycled material prior to placement of the surface course.

END OF SECTION

DIVISION 32 - EXTERIOR IMPROVEMENTS

SECTION 32 12 36 CHIP SEAL PAVING

PART 1 GENERAL

1.1 DESCRIPTION

- A. The Contractor shall furnish all labor, equipment, material, supplies, environmental protection, raised markers, signage, traffic control, secondary sweeping, and other incidentals necessary to provide an application of polymerized emulsified asphalt, and cover coat aggregate to a newly placed asphaltic parking surface.
- B. The parking lot drive lanes, aisles and parking spaces to be newly constructed asphalt with Chip Seal surface.

1.2 REFERENCES

- A. The American Standard Test Methods (ASTM) defines the measurement and calculation of albedo (ASTM C1549), emissivity (ASTM C1371) and SRI (ASTM E1980-01).

1.3 SUBMITTALS

- A. Submit the following in accordance with "Submittal Procedures."
- B. Manufacturer's printed product data of asphaltic binder, emulsions and sealers clearly marked to indicate selected products.
- C. Submit chip sample for approval prior to application.

1.4 QUALITY ASSURANCE/QUALITY CONTROL

- A. Pre-Installation Conference: Schedule and administer pre-installation conference to review chip seal materials and techniques with project manager, reinforcement manufacturer's representative, concrete supplier, and concrete finishing subcontractor.
- B. Preliminary Responsibilities
 - 1. Project review
 - 2. Document review
 - 3. Material checks
- C. Pre-Application Inspection
 - 1. Surface preparation
 - 2. Equipment inspection
 - 3. Asphalt distributor
 - 4. Chip spreader
 - 5. Haul trucks
 - 6. Rollers
 - 7. Brooms
 - 8. Weather requirements
 - 9. Determining application rates
 - 10. Checking application rates
 - 11. Traffic control plan and setup
- D. Project Inspection
 - 1. Asphalt application

2. Aggregate application
 3. Truck operation
 4. Rolling
 5. Longitudinal joints
 6. Transverse joints
 7. Brooming
- E. Post-Application Inspection
1. Cleanup
 2. Opening to traffic

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Supplier Southwest Boulder & Stone, (760) 451-3333 has provide a product information for DESERT GOLD CRUSHED ROCK AGGREGATE indicating the material's Solar Reflectance Index (SRI) is 31.

2.2 RAPID SET (RS) EMULSION - ASPHALT BINDER

- A. Latex Modified Emulsion: Latex Modified Cationic Rapid Set emulsion (CRS-2R) shall be an emulsified blend of asphalt, water, emulsifiers, and latex polymer. The emulsion shall contain a minimum of three percent (3.0%) styrene-butadiene latex rubber (SBR) solids by weight of asphalt cement. The SBR polymer dispersion shall be co-milled during the emulsification process such that a bicontinuous polymer-asphalt network is formed upon curing of the finished emulsion. The emulsion shall be pumpable and suitable for application through a distributor truck. The emulsified asphalt shall conform to the following requirements:

Tests on CRS-2R Emulsion	Minimum	Maximum	Test Method
Viscosity, Saybolt Furol, 50 C, sec, (a)	50	450	ASTM D 244
Storage Stability Test, 24-h, % (a)		1.0	ASTM D 6930
Demulsibility, 35 ml, 0.8% Dioctyl Sodium Sulfosuccinate, %	40		ASTM D 6936
Particle Charge Test	Positive		ASTM D 244
Sieve Test, % (a)		0.1	ASTM D 6933
Distillation: (b)			AASHTO T 59
Oil Distillate, by Volume of Emulsion, %		3.0	AASHTO T 59
Residue, %	65		AASHTO T 59
Tests on Residue (b)			
Penetration, 25 °C, 100g , 5s, dmm	70	150	ASTM D 5
Ductility, 4 °C, 5 cm/min, cm	40		ASTM D 113
Solubility in Trichloroethylene, % (c)	97.5		ASTM D 2042
Toughness, in-lb	90		ASTM D 5801
Tenacity, in-lb	60		ASTM D 5801

The specification for CRS-2R is in accordance with the material properties and test methods as specified by ASTM, AASHTO, and CDOT.

1. This test requirement on representative samples is waived if successful application of the material has been achieved in the field.
2. Residue by evaporation is intended to provide rapid determination of the percent residue and to provide material for tests on residue. If the percent residue or any test on the residue fails to meet specifications, the tests will be repeated using the distillation test specified by AASHTO T59. For polymer modified emulsions, the

distillation and evaporation tests will be modified to include 400F maximum temperature to be held for 15 minutes.

3. If the solubility of the residue is less than 97.5%, the base asphalt binder for the emulsion shall be tested. The solubility of the base asphalt binder shall be greater than 99 percent.

- B. Polymer Pre-Modified Base Emulsion: Polymer Modified Cationic Rapid Set emulsion (CRS-2P) shall be an emulsified blend of polymer modified asphalt, water, and emulsifiers. The emulsion shall contain a minimum of three percent (3.0%) styrene-butadiene (SB) or styrene-butadiene-styrene (SBS) polymer by weight of asphalt cement. The asphalt cement shall be polymer modified prior to emulsification using a block SB or SBS co-polymer. The emulsion standing undisturbed for a minimum of 24 hours shall show no white, milky separation but shall be smooth and homogeneous throughout. The emulsion shall be pumpable and suitable for application through a distributor.

Tests on CRS-2P Emulsion	Minimum	Maximum	Test Method
Viscosity, Saybolt Furol, 50°C, sec, (a)	50	450	ASTM D 244
Storage Stability, 24-hr, % (a)		1.0	ASTM D 6930
Demulsibility, 35 ml, 0.8% Dioctyl Sodium Sulfosuccinate, %	40		ASTM D 6936
Particle Charge	Positive		ASTM D 244
Sieve, % (a)		0.1	ASTM D 6933
Distillation: (b)			AASHTO T 59
Oil Distillate by Volume of Emulsion, %		3.0	AASHTO T 59
Residue, %	65		AASHTO T 59
Tests on Residue (b)			
Penetration, 25 °C, 100g, 5s, dmm	70	150	ASTM D 5
Solubility in Trichloroethylene, % (c)	97.5		ASTM D 2042
Toughness, in-lb	70		ASTM D 5801
Tenacity, in-lb	45		ASTM D 5801

The specification for CRS-2P is in accordance with the material properties and test methods as specified by ASTM, AASHTO, and CDOT.

1. This test requirement on representative samples is waived if successful application of the material has been achieved in the field.
2. Residue by evaporation is intended to provide rapid determination of the percent residue and to provide material for tests on residue. If the percent residue or any test on the residue fails to meet specifications, the tests will be repeated using the distillation test specified by AASHTO T 59. For polymer modified emulsions, the distillation and evaporation tests will be modified to include 400F maximum temperature to be held for 15 minutes.
3. If the solubility of the residue is less than 97.5%, the base asphalt binder for the emulsion shall be tested. The solubility of the base asphalt binder shall be greater than 99 percent.

2.3 COVER COAT MATERIAL – “CHIP”

- B. The Chip Seal is to be a light color aggregate and light color or clear emulsion to achieve LEED SSC 7.1 Heat Island Effect.
- C. Supplier Southwest Boulder & Stone, (760) 451-3333 has provide a product information for DESERT GOLD CRUSHED ROCK AGGREGATE indicating the material's Solar Reflectance Index (SRI) is 31.
- D. The chip or cover coat aggregate shall be washed, hard, durable, clean rock and free from coatings or deleterious material.
- E. All of the aggregate shall be crushed ” DESERT GOLD” rock with 100% fractured faces.
- F. DESERT GOLD aggregate shall be supplied by SOUTH WEST BOULDER AND STONE

- G. The aggregate shall have maximum loss of 20% when tested with the LA Abrasion procedure as defined by AASHTO T96.
- H. The maximum amount of flat and elongated aggregate with a ratio of 3:1 shall not exceed 12% as determined by ASTM D4791. Only one source of aggregate shall be used and shall conform to the following gradations.

Gradation Table - Cover Coat Aggregate (percent passing)

Sieve Size	½" Chip	3/8" Chip	1/4" Chip
1/2"	95-100	100	100
3/8"	0-60	95-100	100
1/4"	0-10	0-35	95-100
No. 8	0-3	0-3	0-3
No. 200	0-1.5	0-1.5	0-1.5

- I. Submit chip sample for approval prior to application.

PART 3 EXECUTION

3.1 CONSTRUCTION REQUIREMENTS

- A. Equipment: The size and condition of all equipment shall be approved prior to construction. Should equipment be unsatisfactory for whatever cause, the Contractor shall remove and replace the equipment without delay or cost. The equipment shall conform to the following minimum requirements.
- B. Bituminous Distributor: A minimum of two like distributors shall be used on this project. The distributors shall be self-powered and capable of providing a uniform application rate of emulsion varying from .05-1.00 gallons per square yard over a variable width up to twenty feet in a single pass. The uniformity of the distributors shall not vary by more the two-hundredths gallons per square yard. The distributors shall be equipped with a variable power unit for the pump and full circulation spray bars, which are adjustable laterally and vertically. The nozzle angle and bar height shall be set to provide one hundred percent of double coverage in a single pass. Where multiple passes will be required to complete the full width, the four inches adjacent to the second pass may be left with fifty percent coverage so that the next pass will complete the full application rate specified. Distributors shall be self-powered and include a computerized application controls, a tachometer, pressure gauges, accurate volume devices, calibrated tank, and a thermometer for measuring temperatures of the emulsion in the tank.
- C. Aggregate Spreader: The aggregate spreader shall be self-propelled and supported by at least four tires on two axles capable of providing a uniform application rate of aggregate from five to fifty pounds per square yard over a variable width up to 20 feet in a single pass. The uniformity of this machine shall not vary by more than one pound per square yard. The aggregate spreader shall be equipped with the means of applying the cover coat material to the surface with computerized application controls so that the required amount of material will be deposited uniformly over the full width of the bituminous material. A computer rate controlled aggregate spreader shall be required.
- D. Rollers: A minimum of two self-propelled pneumatic tired rollers shall be used on the project unless otherwise requested by the Project Manager. The rubber tired rollers shall have a gross load adjustable to apply 200 – 250 pounds per inch of rolling width. Tire pressure shall be specified for the pneumatic tire rollers and shall not vary more than plus or minus 5.0 psi. Depending on the speed of the Chip Seal operation and the width of coverage, additional rollers may be required. At no time shall the rollers travel more than 10 miles per hour.

- E. Sweepers: A minimum of two vacuum designed sweepers having only negative air pressure at the road surface capable of removing excess aggregate and debris material shall be used on this project. The body hoppers of the vacuum sweepers shall be a minimum capacity of ten cubic yards, and the negative air pressure at the intake shall be rated at 46 inches of negative water pressure. Sweepers shall meet applicable U.S. Environmental Protection Agency Standards. No mechanical pick-up brooms will be allowed on the project. Any areas adjacent to the project where a vacuum broom cannot access, shall be removed by the use of a blow pack. No mechanical pick-up brooms will be allowed on the project.

MATERIAL APPLICATION RATES

Material	1/2" Chip Seal	3/8" Chip Seal	1/4" Chip Seal
CRS-2P Chip Seal	.38-.46 Gal/SY	.34-.40 Gal/SY	.28-.34 Gal/SY
Cover Coat Aggregate	25 lbs/SY Minimum	23 lbs/SY Minimum	20 lbs/SY

Minimum

The specific emulsion and cover aggregate application rate shall be determined using factors such as surface temperature, traffic volume, existing road condition and time of year. The Contractor may alter the application rate at any time during the course of the construction upon approval by the Project Manager.

- F. Manholes, Valve Boxes and Existing Thermo Markings: Manholes, valve boxes and thermo markings shall be covered with an approved material during the operation and shall be removed immediately after the street has been Chip Sealed and Fog Sealed. The Contractor is responsible for locating all exposed manholes, valve boxes and thermo markings prior to Chip Sealing.
- G. Weather Limitations: The Chip Seal shall not be applied when the pavement is moist, or when the weather is or may be detrimental. Detrimental weather is defined as rain showers, cool temperatures, moist pavements, threat of rain showers, or other environmental factors which could affect the performance of the Chip Seal construction. No Chip Seal shall be applied if either the pavement or air temperature is below 55°F (10°C) and falling, but may be applied when both pavement and air temperatures are above 50°F (7°C) and rising.
- H. Surface Preparation: The Contractor shall be responsible for all measures required providing a thoroughly clean and dry pavement surface including vegetation removal and sweeping prior to the Chip Seal application.
- I. The Contractor shall observe the condition of the pavement prior to bidding to determine the work necessary to provide a clean, dry pavement for construction and shall include.

3.2 SURFACE PREPARATION

- A. Asphalt pavement is to be newly installed and unused
- B. The Contractor shall be responsible for all measures required providing a thoroughly clean and dry pavement surface including vegetation removal and sweeping prior to the Chip Seal application.
- C. The Contractor shall observe the condition of the pavement prior to bidding to determine the work necessary to provide a clean, dry pavement for construction and shall include the work necessary in the bid.
- D. Clean existing pavement
- E. Start and stop application on mat

3.2 TRAFFIC CONTROL

- A. Contractor to restrict vehicles and activities in work area.

3.3 APPLICATION OF BITUMINOUS MATERIALS

- A. Application of Bituminous Materials: The application of the emulsion shall be performed by means of a pressure distributor in a manner to achieve a uniform and continuous spread over the asphalt surface. The temperature of the emulsion shall be a minimum of 160° F. The quantity of emulsion per square yard shall be as specified herein and agreed upon with the Project Manager. The distributor shall be moving forward at the proper application speed at the time the spray bar is opened. If at any time a nozzle becomes clogged or not spraying a proper pattern, the operation shall be immediately halted until repairs are made. Repairs shall be made immediately after deficiencies are noted and prior to the aggregate placement at all times during construction. The width of the emulsion application shall be no greater than the width of the aggregate spreader except where additional passes are required then the emulsion shall be four inches beyond the aggregate spread at a fifty percent application rate. At no time shall the emulsion be allowed to break, chill, setup, harden, or otherwise impair the aggregate retention before the aggregate has been properly applied and rolled.
- B. Application of Bituminous Materials to be Triple Overlap

3.4 SPREAD AGGREGATE

- A. Application of Cover Coat Aggregate: The aggregate shall be applied immediately following the emulsion application by the approved aggregate spreader. The quantity of cover coat aggregate per square yard shall be specified herein and agreed upon with the Project Manager. The Contractor, prior to start of work, shall calibrate the aggregate spreader to achieve the design application rate of the cover coat aggregate. Spreading shall be accomplished in such a manner that the tires of the trucks and aggregate spreader never contact the newly applied bituminous material. The width of the aggregate spreader shall be equal to the width of the emulsion spread, except where additional passes are required. Areas, which are deficient in aggregate, shall be covered immediately with additional material.
- B. Application Rate
 - 1. Single chip layer
 - 2. No more than 10% excess chips
 - 3. 70% Enbedment recommended

3.5 ROLLING

- A. Initial rolling shall begin immediately after the application of cover coat aggregate. Rollers shall work in tandem and complete a minimum of three passes with a sufficient overlap. Should the rolling operation be delayed, the aggregate and emulsion spreading shall be halted until the operation regains proper sequencing and timing. The maximum speed of the rolling operations shall be 10 miles per hour.
 - 1. Pneumatic-tired rollers
 - 2. No fewer than three passes
 - 3. Full coverage necessary before asphalt cures or cools

3.6 ALLOW BINDER TO CURE OR COOL

- A. Curing of emulsion
 - 1. Time depends on temperature and relative humidity
 - 2. Emulsion break should begin just after first roller pass
 - 3. Open to traffic in about 2 hours
- B. Cooling of hot binder
 - 1. Time depends on temperature and relative humidity
 - 2. Binder should be cured prior to open to traffic. Time frame is more like 3 to 6 hours depending on climatic conditions

3.7 SWEEPING LOOSE AGGREGATE

- A. Within 24 hours of curing, excess aggregate shall be swept from the roadway and adjacent areas. Excess aggregate that is clean may be stockpiled and re-used in subsequent locations at the discretion of the Project Manager.
- B. Sweeping of loose chips shall be repeated again at a later date if required.

3.9 CLEAN UP

- A. Contractor is responsible for protection of all manholes and valve covers. All manholes and valve covers shall be marked with non - permanent orange paint and protected with cardboard (or equally effective material) prior to chip sealing.

END OF SECTION

DIVISION 32 - EXTERIOR IMPROVEMENTS
SECTION 32 13 13.13
EXPOSED AGGREGATE CONCRETE PAVING

PART 1 GENERAL

Application and construction procedures shall conform with requirements of the "Greenbook" Standard Specifications for Public Works Construction, Latest Edition, and any supplements.

1.1 DESCRIPTION

Furnish all labor, materials, equipment, and services necessary for the installation of cast-in-place concrete, including mixing, delivery and placement; finishing, curing, and sealing; and tests, reports, and records of inspection as required.

1.2 RELATED WORK

- A. BMPs and Erosion Control: Section 00 31 24.01 ANF CE Checklist & BMPs
- B. General Requirements: Section 01 11 01 USFS GENERAL REQUIREMENTS
- C. Misc. Cast in Place Concrete: Sections 03 30 53 MISC. CAST-IN-PLACE CONCRETE

1.3 SYSTEM DESCRIPTION

- A. Where indicated on plan, new concrete slab and stairs are to be constructed.

1.4 REGULATORY REQUIREMENTS

- A. Hauling Routes and Restriction: Comply with requirements of governing authorities having jurisdiction over the Work.
- B. Fees: Pay fees and post bonds for import or export of earth and rock materials as required by authorities having jurisdiction over the Work.
- C. Provide bill of lading for all import and/or export of soil, earth, rock and trash from site.

1.4 SUBMITTALS

Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

- A. Truck load tickets for aggregate base and concrete at the time of delivery.
- B. Technical data of concrete to be used.
- C. A sample (5 gallons) of the aggregate base.
- D. Gradation data for concrete aggregates.
- E. A sample (5 gallons) of asphalt concrete aggregates.
- F. Test results (see 3.14 FIELD QUALITY CONTROL AND TESTING)
- G. Mock-up Panels: Prepare one mock-up panel at the project site to demonstrate proficiency of the workmen, and define the degree of aggregate exposure. Mock-up panels shall be a minimum of 3'-0" x 3'-0". Contractor shall use the methods and materials proposed for use on the final installation. Uniformity in appearance of each panel shall be the responsibility of the Contractor. The approved mock-up shall serve as a standard of appearance for the final work. Project Manager to approve finish before continuing the work. See image below for desired finish.

1.5 QUALITY ASSURANCE

- A. Comply with the "Greenbook" Standard Specifications for Public Works Construction, Latest Edition, except as modified herein.
- B. Pre-Installation Conference: Schedule and administer pre-installation conference to review finishing techniques of concrete, use of additives, application of curing compounds, and use of fibrous concrete reinforcement with attending Architect, job superintendent, reinforcement manufacturer's representative, concrete supplier, and concrete finishing subcontractor.

PART 2 PRODUCTS

2.1 CONCRETE

- A. Natural grey concrete.
- B. Aggregates to be specified by Landscape Architect.

PART 3 EXECUTION

3.1 CONCRETE MIXING

- A. Ready-Mixed Concrete:
 - 1. Use only ready-mixed concrete obtained from plant approved by the Architect, mixed and delivered in conformance with the approved design mix. Obtain a delivery ticket for each batch of concrete delivered to the job.
 - 2. Maintain a file of all delivery tickets at the job site, in good order, available for inspection by Architect at all times. Include the following information: Name of ready-mix batch plant; serial number of ticket; date and truck number; Contractor's name; job name, and location (address); and name and type of admixtures.

3.2 CONCRETE FINISHING

- A. General: Do not use tools such as jitterbugs that force the aggregate away from surface.
 - 1. After screeding and consolidating concrete slabs, do not work surface until ready for floating.
 - 2. As soon as concrete will support the mason on knee-boards, float the surface to bring grout to the surface, completely surrounding the aggregate and filling all surface voids. Float to a uniform appearance.
- B. Exposing Aggregate: Proceed as soon as the surface grout can be removed by simultaneous brushing and flushing with water without overexposing or dislodging the aggregate. Avoid traffic on the concrete during this operation. High pressure water may be used if desired finish is more easily achieved without harm to the concrete. Use same method of exposure, either with or without retarder, throughout the job.
- C. Liquid Chemical Hardener Finish: Apply chemical hardener finish after complete curing and drying of the concrete surface.
 - 1. Dilute liquid hardener with water, and apply in three (3) coats; first coat, 1/3 strength; second coat, 1/2 strength; third coat, 2/3 strength. Evenly apply each coat, and allow 24 hours for drying between coats.

2. Apply proprietary chemical hardeners, in accordance with manufacturer's printed instructions.
3. After final coat of chemical hardener solution is applied and dried, remove surplus hardener by scrubbing and mopping with water.

3.2 CLEANUP

- A. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

END OF SECTION

DIVISION 32 – EXTERIOR IMPROVEMENTS

SECTION 32 15 00 AGGREGATE SURFACING

PART 1 GENERAL

1.1 REFERENCES

This specification is adapted from United Facilities Guide Specification UFGS-12 93 00 (August 2017). For a list of references for Section 32 15 00 for Aggregate Surfacing see <https://www.wbdg.org/ffc/dod/unified-facilities-guide-specifications-ufgs/ufgs-32-15-00>.

1.3 DEGREE OF COMPACTION

Degree of compaction required, except as noted in the second sentence, is expressed as a percentage of the maximum laboratory dry density obtained by the test procedure presented in ASTM D1557 abbreviated as a percent of laboratory maximum dry density. Since ASTM D1557 applies only to soils that have 30 percent or less by weight of their particles retained on the ¾ inch sieve, the degree of compaction for material having more than 30 percent by weight of their particles retained on the ¾ inch sieve will be expressed as a percentage of the laboratory maximum dry density in accordance with AASHTO T 180 Method D and corrected with AASHTO T 224.

1.4 SUBMITTALS

Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

Product Data

Plant, Equipment, and Tools

Waybills And Delivery Tickets

Test Reports

Initial Tests

In-Place Tests

1.5 EQUIPMENT, TOOLS, AND MACHINES

All plant, equipment, and tools used in the performance of the work will be subject to approval by the Contracting Officer before the work is started. Maintain all plant, equipment, and tools in satisfactory working condition at all times. Submit a list of proposed equipment, including descriptive data. Provide adequate equipment having the capability of minimizing segregation, producing the required compaction, meeting grade controls, thickness control, and smoothness requirements as set forth herein.

1.6 QUALITY ASSURANCE

Sampling and testing are the responsibility of the Contractor. Perform sampling and testing using a laboratory approved in accordance with Section 01 45 00.00 1001 45 00.00 2001 45 00.00 40 QUALITY CONTROL. Work requiring testing will not be permitted until the testing laboratory has been inspected and approved. Test the materials to establish compliance with the specified requirements and perform testing at the specified frequency. The Contracting Officer may specify the time and location of the tests. Furnish copies of test results to the Contracting Officer within 24 hours of completion of the tests.

1.6.1 Sampling

Take samples for laboratory testing in conformance with ASTM D75/D75M. When deemed necessary, the sampling will be observed by the Contracting Officer.

1.6.2 Testing

1.6.2.1 Sieve Analysis

Perform sieve analysis in conformance with ASTM C117 and ASTM C136/C136M using sieves conforming to ASTM E11.

1.6.2.2 Liquid Limit and Plasticity Index

Determine liquid limit and plasticity index in accordance with ASTM D4318.

1.6.2.3 Moisture-Density Determinations

Determine the laboratory maximum dry density and optimum moisture content in accordance with paragraph DEGREE OF COMPACTION.

1.6.2.4 Field Density Tests

Measure field density in accordance with ASTM D1556/D1556M, ASTM D2167 or ASTM D6938. For the method presented in ASTM D1556/D1556M use the base plate as shown in the drawing. For the method presented in ASTM D6938 check the calibration curves and adjust them, if necessary, using only the sand cone method as described in paragraph Calibration, of the ASTM publication. Tests performed in accordance with ASTM D6938 result in a wet unit weight of soil and ASTM D6938 will be used to determine the moisture content of the soil. Also check the calibration curves furnished with the moisture gauges along with density calibration checks as described in ASTM D6938. Make the calibration checks of both the density and moisture gauges using the prepared containers of material method, as described in paragraph Calibration of ASTM D6938, on each different type of material being tested at the beginning of a job and at intervals as directed. Submit calibration curves and related test results prior to using the device or equipment being calibrated.

1.6.2.5 Wear Test

Perform wear tests on aggregate surface course material in conformance with ASTM C131/C131M.

1.7 ENVIRONMENTAL REQUIREMENTS

Perform construction when the atmospheric temperature is above 35 degrees F. It is the responsibility of the Contractor to protect, by approved method or methods, all areas of surfacing that have not been accepted by the Contracting Officer. Bring surfaces damaged by freeze, rainfall, or other weather conditions to a satisfactory condition.

PART 2 PRODUCTS

2.1 AGGREGATES

Provide aggregates consisting of clean, sound, durable particles of natural gravel, crushed gravel, crushed stone, local natural mineral soil, sand, slag, soil, or other approved materials processed and blended or naturally combined. Provide aggregates free from lumps and balls of clay, organic matter, objectionable coatings, and other foreign materials.

2.1.1 Coarse Aggregates

The material retained on the No. 4 sieve is known as coarse aggregate. Use only coarse aggregates that are reasonably uniform in density and quality. Use only coarse aggregate having a percentage of wear not exceeding 50 percent after 500 revolutions as determined by ASTM C131/C131M. The amount of flat and/or elongated particles must not exceed 20 percent. A flat particle is one having a ratio of width to thickness greater than three; an elongated particle is one having a ratio of length to width greater than three. When the coarse aggregate is supplied from more than one source, aggregate from each source must meet the requirements set forth herein.

2.1.2 Fine Aggregates

The material passing the No. 4 sieve is known as fine aggregate. Fine aggregate consists of screenings, sand, soil, or other finely divided mineral matter that is processed or naturally combined with the coarse aggregate.

2.1.3 Gradation Requirements

Gradation requirements specified in TABLE I apply to the completed aggregate surface. It is the responsibility of the Contractor to obtain materials that will meet the gradation requirements after mixing, placing, compacting, and other operations. TABLE I shows permissible gradings for granular material used in aggregate surface roads and airfields. Use sieves conforming to ASTM E11.

TABLE I. GRADATION FOR AGGREGATE SURFACE COURSES

Percentage by Weight Passing Square-Mesh Sieve

Sieve Designation	No. 1	No. 2	No. 3	No. 4
1 inch	100	100	100	100
3/8 inch	50-85	60-100	--	--
No. 4	35-65	50-85	55-100	70-100
No. 10	25-50	40-70	40-100	55-100
No. 40	15-30	24-45	20-50	30-70
No. 200	8-15	8-15	8-15	8-15

2.2 LIQUID LIMIT AND PLASTICITY INDEX

The portion of the completed aggregate surface course passing the No. 40 sieve must have a maximum liquid limit of 35 and a plasticity index of 4 to 9.

2.3 TESTS, INSPECTIONS, AND VERIFICATIONS

2.3.1 Initial Tests

Perform one of each of the following tests, on the proposed material prior to commencing construction, to demonstrate that the proposed material meets all specified requirements when furnished. Complete this testing for each source if materials from more than one source are proposed.

- a. Sieve Analysis.
- b. Liquid limit and plasticity index.
- c. Moisture-density relationship.
- d. Wear.

Submit certified copies of test results for approval not less than 30 days before material is required for the work.

2.3.2 Approval of Material

Tentative approval of material will be based on initial test results.

PART 3 EXECUTION

3.1 OPERATION OF AGGREGATE SOURCES

Perform clearing, stripping, and excavating. Operate the aggregate sources to produce the quantity and quality of materials meeting these specification requirements in the specified time limit. Upon completion of the work, leave aggregate sources on Government property in a satisfactory condition so that they readily drain.

3.2 STOCKPILING MATERIAL

Prior to stockpiling the material, clear and level the storage sites. Stockpile all materials, including approved material available from excavation and grading, in the manner and at the locations designated. Stockpile aggregates in such a manner that will prevent segregation. Stockpile aggregates and binders obtained from different sources separately.

3.3 PREPARATION OF UNDERLYING COURSE OR SUBGRADE

Clean the underlying course or subgrade and shoulders of all foreign substances. Do not construct the surface course on underlying course or subgrade that is frozen material. Correct ruts or soft yielding spots

in the underlying course or subgrade, areas having inadequate compaction and deviations of the surface from the requirements set forth herein by loosening and removing soft or unsatisfactory material and by adding approved material, reshaping to line and grade and recompacting to density requirements specified in Section 31 00 00 EARTHWORK. Do not allow traffic or other operations to disturb the completed underlying course or subgrade and maintain in a satisfactory condition until the surface course is placed.

3.4 GRADE CONTROL

During construction, maintain the lines and grades including crown and cross slope indicated for the aggregate surface course by means of line and grade stakes placed by the Contractor in accordance with the SPECIAL CONTRACT REQUIREMENTS.

3.5 MIXING AND PLACING MATERIALS

Mix and place the materials to obtain uniformity of the material and a uniform optimum water content for compaction. Make adjustments in mixing, placing procedures, or in equipment to obtain the true grades, to minimize segregation and degradation, to obtain the desired water content, and to ensure a satisfactory surface course.

3.6 LAYER THICKNESS

Place the aggregate material on the [underlying course] [subgrade] in layers of uniform thickness. Compact the completed aggregate surface course to the thickness indicated. No individual layer may be thicker than 6 inches nor be thinner than 3 inches in compacted thickness. Compact the aggregate surface course to a total thickness that is within 1/2 inch of the thickness indicated. Where the measured thickness is more than 1/2 inch deficient, correct such areas by scarifying, adding new material of proper gradation, reblading, and recompacting as directed. Where the measured thickness is more than 1/2 inch thicker than indicated, the course will be considered as conforming to the specified thickness requirements. The average job thickness will be the average of all thickness measurements taken for the job and must be within 1/4 inch of the thickness indicated. Measure the total thickness of the aggregate surface course at intervals of one measurement for each 500 square yards of surface course. Measure total thickness using 3 inch diameter test holes penetrating the aggregate surface course.

3.7 COMPACTION

Degree of compaction is a percentage of the maximum density obtained by the test procedure presented in ASTM D1557 abbreviated herein as percent laboratory maximum density. Compact each layer of the aggregate surface course with approved compaction equipment, as required in the following paragraphs. Maintain the water content during the compaction procedure at optimum or at the percentage specified by the Contracting Officer. Compact the mixture with mechanical tampers in locations not accessible to rollers. Continue compaction until each layer through the full depth is compacted to at least 100 percent of laboratory maximum density. Remove any materials that are found to be unsatisfactory and replace them with satisfactory material or rework them to produce a satisfactory material.

3.8 PROOF ROLLING (Deleted)

3.9 EDGES OF AGGREGATE SURFACE COURSE

Place approved material along the edges of the aggregate surface course in such quantity as to compact to the thickness of the course being constructed. Simultaneously roll and compact at least 1 foot of shoulder width with the rolling and compacting of each layer of the surface course when the course is being constructed in two or more layers.

3.10 SMOOTHNESS TEST

Construct each layer so that the surface shows no deviations in excess of 3/8 inch when tested with a 10 foot straightedge applied both parallel with and at right angles to the centerline of the area to be paved. Correct deviations exceeding this amount by removing material, replacing with new material, or reworking existing material and compacting, as directed.

3.11 FIELD QUALITY CONTROL

3.11.1 In-Place Tests

Perform each of the following tests on samples taken from the placed and compacted aggregate surface course. Take samples and test at the rates indicated.

- a. Perform density tests on every lift of material placed and at a frequency of one set of tests for every 250 square yards, or portion thereof, of completed area.
- b. Perform sieve analysis on every lift of material placed and at a frequency of one sieve analysis for every 500 square yards, or portion thereof, of material placed.
- c. Perform liquid limit and plasticity index tests at the same frequency as the sieve analysis.
- d. Measure the thickness of the aggregate surface course at intervals providing at least one measurement for each 500 square yards of base course or part thereof. Measure the thickness using test holes, at least 3 inch in diameter through the aggregate surface course.

3.11.2 Approval of Material

Final approval of the materials will be based on tests for gradation, liquid limit, and plasticity index performed on samples taken from the completed and full compacted aggregate surface course.

3.12 MAINTENANCE

Maintain the aggregate surface course in a condition that will meet all specification requirements until accepted.

END OF SECTION

DIVISION 32 - EXTERIOR IMPROVEMENTS

SECTION 32 15 40 DECOMPOSED GRANITE PAVING

PART 1 GENERAL

1.1 DESCRIPTION

A. Section Includes: Supply and installation of stabilized crushed aggregate paving as indicated in the Contract documents, including:

1. Base Course
2. Crushed Aggregate Paving
3. Organic Binder for Crushed Aggregate

1.2 RELATED WORK

- A. BMPs and Erosion Control: Section 00 31 24.01 ANF CE Checklist & BMPs
- B. General Requirements: Section 01 11 01 USFS GENERAL REQUIREMENTS
- C. Environmental Protection: Section 01 57 19, TEMPORARY ENVIRONMENTAL CONTROLS.

1.3 REFERENCES

- A. ASTM C136 – Sieve Analysis of Fine and Coarse Aggregates.
- B. ASTM D2419 – Sand Equivalent Value of Soils and Fine Aggregates.

1.4 SUBMITTALS

- A. Submit in accordance with Section 01 33 00 [01330] - Submittal Procedures:
1. Manufacturer's product data sheet.
 2. 1 quart sample of base course.
 3. Base Course gradation indicating that the product meets specifications.
 4. 1 quart sample of stabilized crushed aggregate paving.
 5. Stabilized crushed aggregate gradation indicating that the product meets specifications.

1.5 MOCK-UP

- A. Install 10 square feet minimum of stabilized crushed aggregate paving including base course, at location approved by Project Manager.
- B. Allow Project Manager to view mock-up before proceeding with rest of stabilized crushed aggregate paving.

- C. Approved mock-up may remain as part of completed Work.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Protect stabilized crushed aggregate mix from contamination. Store under cover.

1.7 SEQUENCING

- A. Do not install work specified in this Section prior to acceptance of earth moving.
- B. Coordinate work specified in this Section with work specified in other Sections to minimize cutting of and operation of heavy equipment over installed stabilized crushed aggregate paving.
- C. Do not install stabilized crushed aggregate surfacing when subbase is wet at saturated field capacity.

PART 2: PRODUCTS

2.1 MATERIALS

- A. Base Course Materials:

- 1. Comply with MTO OPSS 1010 – “Material Specification for Aggregates – Granular A, B, M and Select Subgrade Material” specification for Granular A material.

- B. Crushed Aggregate Materials:

- 1. Crushed Aggregate Material shall consist of sound, angular, durable particles.
- 2. Gradation, in accordance with ASTM C136:

Sieve	Sieve Size (mm)	Percent Passing
1/2"	12.7	100%
3/8"	9.51	90 - 100%
4	4.76	50 - 100%
30	0.595	25 - 55%
100	0.149	10 - 25 %
200	0.074	5 -18%

- 3. Aggregate color shall be selected from a pre-approved material pallet from Gail Materials 951-667-6106, www.gailmaterials.net.

- C. Organic Binder:

- 1. Binder: Natracil by Gail Materials and complying with following requirements:
 - a. Swell Volume: 35 ml/gm minimum in accordance with USP procedures.
 - b. 90% minimum shall pass a No. 40 mesh screen.

- 2. Substitutions: Not permitted.

- D. Pre-blended Decomposed Granite with Natracil™ binder

- 1. Mix Decomposed Granite with Natracil™ binder using a pug mill that includes a weigh-belt feeder.

2. Mix rate of Decomposed Granite with Natracil™ binder depends on the selected material as well as the application and shall be determined by Gail Materials.
- E. Accessories:
1. Water: Free from contaminants that would discolour or be deleterious to stabilized aggregate paving.

PART 3: EXECUTION

3.1 EXAMINATION

- A. Examine grading and subsoil conditions. Do not proceed until conditions are acceptable.
- B. A qualified engineer should determine subgrade preparation and base course installation requirements.

3.2 PREPARATION OF SUBGRADE

- A. Excavate to depth required so that finish grade can be established as noted on plans.
- B. Remove excavated soil from site.
- C. Compact subgrade to 95% Modified Proctor Density. Excavate soft and unstable areas of subgrade that cannot be compacted to standard noted, fill and compact with approved granular material.

3.3 BASE COURSE

- A. Place base course material over subgrade to depths and dimensions shown on drawings in maximum (6") lifts compacted to 95% Modified Proctor Density.

3.4 INSTALLATION

- A. Prior to installation, thoroughly presoak surface on which stabilized decomposed granite surfacing is to be placed. Natracil™ Stabilized Decomposed Granite is typically installed four (pedestrian) to six (vehicular) inches thick.
- B. Install in 2" maximum lift thickness and soak with sufficient water to activate Natracil™ through entire depth of lift. Install the additional lifts and soak with sufficient water to activate Natracil™ as required.
- C. Grade and smooth to required elevation. Compact: After +/- 4 hours, compact final lift with a three-five ton double or single static drum roller.
- D. Minimum Compacted Thickness: Install to depth shown on Drawings. Minimum Compacted Thickness:
 - (1) Pedestrian Paths: 4 inches.
 - (2) Vehicular Drives: 6 inches.
- E. Surface shall follow overall contours of landscape. Flat areas shall be crowned for drainage. Slope one percent minimum to drain away from structures. Completed surface shall be of consistent quality and free of deleterious materials such as organic materials, nails, stones, and loose material. Surface shall not have depressions or humps greater than ¼ inch in ten feet.

3.5 ADJUST AND CLEAN

- A. All paved areas or adjacent surface shall be brushed clean and excess materials shall be removed from the work site and disposed of in an approved dump location.

3.6 PROTECTION

- A. Do not allow traffic on stabilized crushed aggregate paving after placement or until compacted stabilized crushed aggregate paving has fully cured. This time may vary depending on weather conditions.
- B. Protect stabilized crushed aggregate paving surface from damage until Project completion.
- C. Repair damaged areas to match specified requirements.

3.7 MAINTENANCE & REPAIRS

- A. Loose aggregate will appear on the surface over time which is a natural occurrence. If excessive aggregate over ¼ inches occurs, redistribute the stabilized decomposed granite over the entire surface, water thoroughly and re-compact with a minimum one ton drum roller. This process can be repeated as needed.
- B. To repair, excavate damaged area leaving a minimum one inch depth of existing stabilized decomposed granite, water and scarify. Scarifying existing stabilized decomposed granite will prevent a cold joint layer between the existing stabilized decomposed granite and the newly imported pre-blended stabilized decomposed granite. Add water to the pre-blended stabilized decomposed granite to activate. Apply moistened pre-blended stabilized decomposed granite to excavated area at or above finished grade. Compact with a walk behind drum roller. Do not allow traffic on stabilized decomposed granite surfacing for one-two days after placement or until compacted stabilized decomposed granite has fully cured.

END OF SECTION

DIVISION 32 - EXTERIOR IMPROVEMENTS

SECTION 32 17 23 PAVEMENT MARKINGS

PART 1 GENERAL

1.1 REFERENCES

- A. State of California, Department of Transportation (Caltrans), Standard Specifications, 1992 edition: 1. Section 84 Traffic Stripes and Pavement Markings
- B. California Air Resources Board (CARB): Latest regulations governing permissible content of Volatile Organic Compounds (VOC) in paints

1.2 SUBMITTALS

Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

- A. Shop Drawings: Submit drawings and diagrams, indicating stripe width of roadway divider stripes and parking stalls, configuration and dimensions of directional arrows, style and size of letters for "compact car" designation, configuration and dimensions of international handicapped symbol, and any other traffic control markings on pavement, such as "in" and "out" or "enter" and "exit" designations as indicated.
- B. Certificate of Compliance: Submit evidence or affidavit that certifies that paint to be used complies with latest CARB/VOC regulations.

1.3 RELATED WORK

- A. Misc. Cast in Place Concrete: Section 03 30 53 MISC CAST IN PLACE CONCRETE
- B. Cold Mix Asphalt Paving: Section 32 12 19.19 COLD MIX ASPHALT PAVING
- C. Exposed Aggregate Concrete: Sections 32 13 13.13 EXPOSED AGGREGATE CONCRETE

1.3 PROJECT/SITE CONDITIONS

1.3.1 Environmental Requirements

1.3.1.1 Weather Limitations for Application

Apply pavement markings to clean, dry surfaces, and unless otherwise approved, only when the air and pavement surface temperature is at least 3 degrees C 5 degrees F above the dew point and the air and pavement temperatures are within the limits recommended by the pavement marking manufacturer. Allow pavement surfaces to dry after water has been used for cleaning or rainfall has occurred prior to striping or marking. Test the pavement surface for moisture before beginning work each day and after cleaning. Do not commence marking until the pavement is sufficiently dry and the pavement condition has been approved by the Contracting Officer. Employ the "plastic wrap method" to test the pavement for moisture as specified in paragraph TESTING FOR MOISTURE.

1.3.2 Traffic Controls

Place warning signs near the beginning of the worksite and well ahead of the worksite for alerting approaching traffic from both directions. Place small markers along newly painted lines or freshly placed raised markers to control traffic and prevent damage to newly painted surfaces or displacement of raised pavement markers. Mark painting equipment with large warning signs indicating slow-moving painting equipment in operation. When traffic must be rerouted or controlled to accomplish the work, provide necessary warning signs, flag persons, and related equipment for the safe passage of vehicles.

PART 2 PRODUCTS

2.1 MATERIALS

Traffic Line Paint: Provide paint conforming with the requirements of Section 84-3 of the Caltrans Standard Specifications, white in color for traffic striping, parking stalls, and other control markings on pavement, yellow in color for traffic control markings where indicated, blue in color for accessible parking stalls, red in color for curbs where no parking is indicated, white in color for curbs where passenger

discharge and pickup are indicated, and white-yellow-green striping on curbs where taxicab parking is indicated.

1. Provide glass beads only for traffic stripes and control markings on road or street pavements.

PART 3 EXECUTION

3.1 EXAMINATION

3.1.1 Testing for Moisture

Test the pavement surface for moisture before beginning pavement marking after each period of rainfall, fog, high humidity, or cleaning, or when the ambient temperature has fallen below the dew point. Do not commence marking until the pavement is sufficiently dry and the pavement condition has been approved by the Contracting Officer or authorized representative. Employ the "plastic wrap method" to test the pavement for moisture as follows: Cover the pavement with a 12 inch by 12 inch section of clear plastic wrap and seal the edges with tape. After 15 minutes, examine the plastic wrap for any visible moisture accumulation inside the plastic. Do not begin marking operations until the test can be performed with no visible moisture accumulation inside the plastic wrap. Re-test surfaces when work has been stopped due to rain.

3.2 APPLICATION

- A. Provide traffic striping and control markings on pavement and parking stalls in accordance with the layout, configurations, and dimensions indicated on the Contract Drawings and approved Shop Drawings.
 - B. Paint application equipment shall conform with the applicable requirements of the Caltrans Standard Specifications.
 - C. Traffic control markings and parking stalls shall be applied with the use of substantial cutout patterns and templates, or with striping equipment that applies straight, uniform width, sharp lines. Coverage of paint shall be thorough and complete in accordance with the paint manufacturer's instructions and recommendations.
 - D. Where "enter" and "exit" control markings are side-by-side on pavements, indicating two-way traffic, such "enter" and "exit" designations shall be different colors, such as white and yellow, with a centerline separating the two directions of traffic.
 - E. Traffic control markings and parking stalls shall be sharp and accurate, straight where required, without fuzziness at edges of lines.
 - F. Accessible parking stalls shall include the International Symbol for Accessibility.
 - G. At completion, the Contractor shall check the work thoroughly and shall touchup traffic control markings and parking stalls that are not distinct or thorough in coverage, or are not uniform in color.
- .

END OF SECTION