



**SECTION F**

**TECHNICAL SPECIFICATIONS**

**CSA 70 D-1 LAKE ARROWHEAD  
MacKay PARK PICKLEBALL COURTS  
PROJECT**

**FOR**

**COUNTY SERVICE AREA 70 D-1 MacKay PARK  
LAKE ARROWHEAD, CALIFORNIA**

## TABLE OF CONTENTS

### DIVISION 01 – GENERAL REQUIREMENTS

SECTION 01 56 39 Temporary Tree and Plant Protection

### DIVISION 02 – EXISTING CONDITIONS

SECTION 02 41 16 Site Demolition

### DIVISION 03 – CONCRETE

SECTION 03 30 00 Cast-In-Place Concrete

### DIVISION 31 – EARTHWORK

SECTION 31 10 00 Site Clearing

SECTION 31 20 00 Earthworks

SECTION 31 23 16 Excavation and Fill for Paving

### DIVISION 32 – EXTERIOR IMPROVEMENTS

SECTION 32 01 31 Stabilized Decomposed Granite Surfacing

SECTION 32 13 13 Concrete Paving

SECTION 32 31 13 Chain Link Fences and Gates

Textured Acrylic Surfacing for Athletic Courts

Chain Link Fence Wind Screen Slats

## SECTION 01 56 39

### TEMPORARY TREE AND PLANT PROTECTION

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. This Section includes the protection and trimming of existing trees that interfere with, or are affected by, execution of the Work, whether temporary or permanent construction.

##### 1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Tree Pruning Schedule: Written schedule from arborist detailing scope and extent of pruning of trees to remain that interfere with or are affected by construction.
- C. Certification: From arborist, certifying that trees indicated to remain have been protected during construction according to recognized standards and that trees were promptly and properly treated and repaired when damaged.
- D. Maintenance Recommendations: From arborist, for care and protection of trees affected by construction during and after completing the Work.

##### 1.3 QUALITY ASSURANCE

- A. Arborist Qualifications: An arborist certified by ISA or licensed in the jurisdiction where Project is located.
- B. Tree Pruning Standard: Comply with ANSI A300 (Part 1), "Tree, Shrub, and Other Woody Plant Maintenance--Standard Practices (Pruning)."

#### PART 2 - PRODUCTS

##### 2.1 MATERIALS

- A. Temporary Fence Material: 4' High orange thermoplastic fence material: Tenax Guardian visual barrier as distributed by the Home Depot.
- B. Temporary Fence Posts: 6' High green 'T' posts as distributed by the Home Depot.

## **PART 3 - EXECUTION**

### **3.1 PREPARATION**

- A. Temporary Fencing: Install temporary fencing around tree protection zones to protect remaining trees and vegetation from construction damage. Maintain temporary fence and remove when construction is complete.
- B. Protect tree root systems from damage caused by runoff or spillage of noxious materials while mixing, placing, or storing construction materials. Protect root systems from ponding, eroding, or excessive wetting caused by dewatering operations.
- C. Do not store construction materials, debris, or excavated material inside tree protection zones. Do not permit vehicles or foot traffic within tree protection zones; prevent soil compaction over root systems.

### **3.2 EXCAVATION**

- A. Install shoring or other protective support systems to minimize sloping or benching of excavations.
- B. Do not excavate within tree protection zones, unless otherwise indicated.
- C. Where utility trenches are required within tree protection zones, tunnel under or around roots by drilling, auger boring, pipe jacking, or digging by hand.
  - 1. Root Pruning: Do not cut main lateral roots or taproots; cut only smaller roots that interfere with installation of utilities. Cut roots with sharp pruning instruments; do not break or chop.

### **3.3 REGRADING**

- A. Grade Lowering: Where new finish grade is indicated below existing grade around trees, slope grade beyond tree protection zones. Maintain existing grades within tree protection zones.
- B. Minor Fill: Where existing grade is 6 inches or less below elevation of finish grade, fill with topsoil. Place topsoil in a single uncompacted layer and hand grade to required finish elevations.
- C. Moderate Fill: Where existing grade is more than 6 inches but less than 12 inches below elevation of finish grade, place drainage fill, filter fabric, and topsoil on existing grade as follows:
  - 1. Carefully place drainage fill against tree trunk approximately 2 inches above elevation of finish grade and extend not less than 18 inches from tree trunk on all sides. For balance of area within drip-line perimeter, place drainage fill up to 6 inches below elevation of grade.
  - 2. Place filter fabric with edges overlapping 6 inches minimum.
  - 3. Place fill layer of topsoil to finish grade. Do not compact drainage fill or topsoil. Hand grade to required finish elevations.

### **3.4 TREE PRUNING**

- A. Prune trees to remain that are affected by temporary and permanent construction as directed by an arborist.
- B. Prune trees to remain to compensate for root loss caused by damaging or cutting root system. An arborist shall be on site to direct trimming of trees for maintenance or construction access as approved by the owner's representative. Provide subsequent maintenance during Contract period as recommended by arborist.
- C. Pruning Standards: Prune trees according to ANSI A300 (Part 1)
- D. Cut branches with sharp pruning instruments; do not break or chop.
- E. Remove tree branches offsite.

### **3.5 TREE REPAIR AND REPLACEMENT**

- A. Promptly repair trees damaged by construction operations within 24 hours. Treat damaged trunks, limbs, and roots according to arborist's written instructions.

### **3.6 DISPOSAL OF WASTE MATERIALS**

- A. Burning is not permitted.
- B. Disposal: Remove excess excavated material and displaced trees from Owner's property.

**END OF SECTION**

## SECTION 02 41 16

### DEMOLITION

#### PART 1 – GENERAL

##### 1.1 SUMMARY

- A. Section Includes: Furnishing labor, materials, and equipment necessary for demolition, dismantling, cutting and alterations as indicated, specified, or required for completion of the Work. Includes items such as the following:
1. Protection of existing improvements to remain.
  2. Cleaning existing improvements to remain.
  3. Disconnecting and capping utilities.
  4. Removing debris, waste materials, and equipment.
  5. Removal of items for performance of the Work.
  6. Salvageable items to be retained by the Owner.
- B. Related Requirements:
1. Division 01 - General Requirements.
  2. Division 31 - Earthwork

##### 1.2 SUBMITTALS

- A. Shop Drawings: Submit Shop Drawings indicating the extent of items and systems to be removed. Indicate items to be salvaged or items to be protected during demolition. Indicate locations of utility terminations and the extent of abandoned lines to be removed. Include details indicating methods and location of utility terminations.

##### 1.3 QUALITY ASSURANCE

- A. Perform the work of this section under direct superintendence at all times.
- B. Prior to commencement of Work, schedule a walkthrough with the OAR, to confirm Owner property items have been removed from scheduled Work areas. Identify and mark remaining property items and schedule their removal.
- C. Coordinate demolition for the correct sequence, limits, and methods. Schedule demolition Work to create least possible inconvenience to the public and facility operations.
- D. Related Standard: ANSI/ASSE A10.6.

#### **1.4 PROJECT CONDITIONS**

- A. Drawings may not indicate in detail all demolition Work to be performed. Examine existing conditions to determine the full extent of required demolition.
- B. Repair damage to existing improvements or damage due to excessive demolition.
- C. Provide all measures to avoid excessive damage from inadequate or improper means and methods, improper shoring, bracing or support.
- D. If conditions are encountered that varies from those indicated, promptly notify the Architect for clarification before proceeding.

#### **PART 2 - PRODUCTS**

##### **2.1 HANDLING OF MATERIALS**

- A. Items scheduled for reuse shall be stored on the Project site and protected from damage, theft, and other deleterious conditions.

#### **PART 3 - EXECUTION**

##### **3.1 GENERAL**

- A. Protection:
  - 1. Do not commence demolition until safety partitions, barricades, warning signs or other forms of protection are installed.
  - 2. Provide safeguards, including warning signs, lights, or barricades, for protection of workers, occupants, and the public.
- B. If safety of existing construction appears to be endangered, take immediate measures to correct such conditions; cease operations and immediately notify the Project Superintendent.

##### **3.2 DEMOLITION**

- A. Do not throw or drop materials.
- B. Remove existing construction only to extent necessary for proper installation of Work and interfacing with existing construction. Cut back finished surfaces to straight, plumb or level lines as required for a smooth transition.
- C. Where openings are cut oversize or in improper locations, replace or repair to required condition.

##### **3.3 CUTTING EXISTING CONCRETE**

- A. Cutting of existing concrete shall be performed by skilled workers familiar with the requirements and space necessary for placing concrete. Perform concrete cutting with concrete cutting wheels and hand chisels. Do not damage concrete intended to remain.

- B. Prior to cutting or coring concrete, determine locations of hidden utilities or other existing improvements and provide necessary measures to protect them from damage.

### **3.4 REMOVAL OF OTHER MATERIALS**

- A. Embedded Structures: Demolish concrete footings surrounding posts while preserving post integrity.
- B. Woodwork: Cut or remove to a joint or panel line.
- C. Fencing: Remove as required, including accessory components such as posts, associated footings, and wind screen.
- D. Remove existing improvements not specifically indicated or required but necessary to perform Work. Cut to clean lines, allowing for installation of Work.

### **3.5 PATCHING**

- A. Patch or repair materials to remain when damaged by the performance of the Work of this section. Finish material and appearance of patch and/or repair Work shall match existing.

### **3.6 CLEANING**

- A. Clean existing materials to remain with appropriate tools and equipment.
- B. Protect existing improvements during cleaning operations.
- C. Debris shall be dampened by fog water spray prior to transporting by truck.
- D. Debris pick-up area shall be kept broom-clean and shall be washed daily with clean water.
- E. Remove waste and debris, other than items to be salvaged. Turn over salvaged items to Owner, or store and protect for reuse where required. Continuously clean up and remove items as demolition Work progresses.
- F. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

**END OF SECTION**

## SECTION 03 30 00

### CAST-IN-PLACE CONCRETE

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. This Section specifies cast-in place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes.
- B. See Division 31 "Earthwork" for base course fill under slabs-on-grade.

##### 1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Design Mixtures: For each concrete mixture.
- C. Shop Drawings: For steel reinforcement.
- D. Material test reports and certificates.

##### 1.3 QUALITY ASSURANCE

- A. 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.
  - 1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."
- B. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
  - 1. ACI 301, "Specification for Structural Concrete," Sections 1 through 5 and Section 7, "Lightweight Concrete."
  - 2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."
- C. Pre-installation Conference: Conduct conference at Project site.

#### PART 2 – PRODUCTS

##### 2.1 FORM-FACING MATERIALS

- A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.

- B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.

## 2.2 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 deformed.
  - 1. Galvanized Reinforcing Bars: ASTM A 767/A 767M, Class I zinc coated after fabrication and bending.
- B. Deformed-Steel Welded Wire Reinforcement: ASTM A 497, flat sheet.
- C. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice."

## 2.3 CONCRETE MATERIALS

- A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:
  - 1. Portland Cement: ASTM C 150, Type I Supplement with the following:
    - a. Fly Ash: ASTM C 618, Class [C] [F].
    - b. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.
- B. Normal-Weight Aggregates: ASTM C 33, graded, 3/4-inch nominal maximum coarse-aggregate size.
  - 1. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- C. Water: ASTM C 94/C 94M and potable.
- D. Air-Entraining Admixture: ASTM C 260.
- E. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
  - 1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
  - 2. Retarding Admixture: ASTM C 494/C 494M, Type B.
  - 3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
  - 4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
  - 5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
  - 6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.
- F. Synthetic Fiber: fibrillated polypropylene fibers engineered and designed for use in concrete pavement, complying with ASTM C 1116, Type III, 1/2 inches long.

## 2.4 VAPOR RETARDERS

- A. Plastic Vapor Retarder: ASTM E 1745, Class A. Include manufacturer's recommended adhesive or pressure-sensitive tape.
- B. Plastic Vapor Retarder: ASTM E 1745, Class B. Include manufacturer's recommended adhesive or pressure-sensitive tape.
- C. Plastic Vapor Retarder: ASTM E 1745, Class C, or polyethylene sheet, ASTM D 4397, not less than 10 mils thick. Include manufacturer's recommended adhesive or pressure-sensitive joint tape.

## 2.5 CURING MATERIALS

- A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
- B. Water: Potable.
- C. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.
- D. Retain paragraph below if a nondissipating-type, waterborne, membrane-forming curing compound with minimal solids content is required. Retain option if applicable.

## 2.6 RELATED MATERIALS

- A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber.

## 2.7 CONCRETE MIXTURES

- A. Prepare design mixtures for each type and strength of concrete, proportioned based on laboratory trial mixture or field test data, or both, according to ACI 301.
- B. Proportion normal-weight concrete mixture as follows:
  - 1. Minimum Compressive Strength: 2500 psi at 28 days.
  - 2. Maximum Water-Cementitious Materials Ratio: 0.45
  - 3. Slump Limit: 8 inches for concrete with verified slump of 2 to 4 inches before adding high-range water-reducing admixture or plasticizing admixture, plus or minus 1 inch.
  - 4. Air Content: 5-1/2 percent, plus or minus 1.5 percent at point of delivery for 1-1/2-inch nominal maximum aggregate size.
  - 5. Air Content: 6 percent, plus or minus 1.5 percent at point of delivery 3/4-inch nominal maximum aggregate size.
  - 6. Air Content: Do not allow air content of troweled finished floors to exceed 3 percent.
  - 7. Synthetic Fiber: Uniformly disperse in concrete mixture at manufacturer's recommended rate, but not less than 1.0 lb/cu. yd.

C. Proportion structural lightweight concrete mixture as follows:

1. Minimum Compressive Strength: 3500 psi at 28 days.
  2. Maximum Water-Cementitious Materials Ratio: 0.45
  3. Slump Limit: 8 inches for concrete with verified slump of 2 to 4 inches before adding high-range water-reducing admixture or plasticizing admixture, plus or minus 1 inch.
  4. Air Content: 5-1/2 percent, plus or minus 1.5 percent at point of delivery for 1-1/2-inch nominal maximum aggregate size.
  5. Air Content: 6 percent, plus or minus 1.5 percent at point of delivery 3/4-inch nominal maximum aggregate size.
  6. Air Content: Do not allow air content of troweled finished floors to exceed 3 percent.
- Synthetic Fiber: Uniformly dispersed in concrete mixture at manufacturer's recommended rate, but not less than 1.0 lb/cu. yd.

## **2.8 FABRICATING REINFORCEMENT**

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

## **2.9 CONCRETE MIXING**

- E. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M and ASTM C 1116 and furnish batch ticket information.
1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

## **PART 3 - EXECUTION**

### **3.1 FORMWORK**

- A. Design, erect, shore, brace, and maintain formwork according to ACI 301 to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.
- B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.
- C. Chamfer: do not chamfer exterior corners and edges of permanently exposed concrete, unless otherwise indicated on drawings.

### **3.2 EMBEDDED ITEMS**

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

### **3.3 VAPOR RETARDERS**

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

### **3.4 STEEL REINFORCEMENT**

- A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.
  - 1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

### **3.5 JOINTS**

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Landscape Architect.
- C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:
  - 1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
  - 2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.
- D. 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.

### **3.6 CONCRETE PLACEMENT**

- A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.
- B. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.
  - 1. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.

- C. Cold-Weather Placement: Comply with ACI 306.1.
- D. Hot-Weather Placement: Comply with ACI 301.

### **3.7 FINISHING FORMED SURFACES**

- A. 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 that exceed specified limits on formed-surface irregularities.
  - 1. Apply to concrete surfaces not exposed to public view.
- B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
  - 1. Apply to concrete surfaces exposed to public view, to receive a rubbed finish.
- C. Rubbed Finish: Apply the following to smooth-formed finished as-cast concrete where indicated:
  - 1. Smooth-Rubbed Finish: Not later than one day after form removal, moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.
- D. 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 CONCRETE PROTECTING AND CURING**

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.
- B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- C. Cure concrete according to ACI 308.1, by one or a combination of the following methods:
  - 1. Moisture Curing: Keep surfaces continuously moist for not less than seven days.
  - 2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, 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.

### **3.9 CONCRETE SURFACE REPAIRS**

- A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

### **3.10 FIELD QUALITY CONTROL**

- A. Testing and Inspecting: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.
  - 1. Testing Services: Tests shall be performed according to ACI 301.

**END OF SECTION**

NOT FOR BID

## SECTION 31 10 00

### SITE CLEARING

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. This Section includes the following:
  - 1. Removing existing vegetation per plan.
  - 2. Pruning and cutting back vegetation.
  - 3. Clearing and grubbing.
  - 4. Temporary erosion and sedimentation control measures.
- B. Related Sections include the following:
  - 1. Section 01 56 39 - Tree and Plant Protection
  - 2. Section 31 22 00 - Grading

##### 1.2 MATERIAL OWNERSHIP

- A. Except for stripped topsoil or other materials indicated to remain on Owner's property, cleared materials shall become Contractor's property and shall be removed from Project site.

##### 1.3 PROJECT CONDITIONS

- A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.
  - 1. Do not close or obstruct streets, walks, driveways, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
  - 2. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.
- B. Utility Locator Service: Notify utility locator service for area where Project is located before site clearing.
  - 1. Do not commence site clearing operations until temporary erosion and sedimentation control measures are in place.

##### 1.4 SOIL MATERIALS

- A. Satisfactory Soil Materials: Requirements for satisfactory soil materials are specified in Division 2 Section "Earthwork."

## **PART 2 - EXECUTION**

### **2.1 PREPARATION**

- A. Protect and maintain benchmarks and survey control points from disturbance during construction.
- B. Locate and clearly identify trees and vegetation to remain with approval from Landscape Architect.
- C. Protect existing site improvements to remain from damage during construction.
  - 1. Restore damaged improvements to their original condition, as acceptable to Owner.

### **2.2 TEMPORARY EROSION AND SEDIMENTATION CONTROL**

- A. Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties, streets and walkways, according to a sediment and erosion control plan, specific to the site, that complies with EPA 832/R-92-005 or requirements of authorities having jurisdiction, whichever is more stringent.
- B. Inspect, repair, and maintain erosion and sedimentation control measures during construction.
- C. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

### **2.3 CLEARING AND GRUBBING**

- A. Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated.
  - 1. Place fill material in horizontal layers not exceeding a loose depth of 8 inches and compact each layer to a density equal to adjacent original ground.
- B. Remove from the area of work all plants indicated on plans and verified with Landscape Architect for removal, concrete debris and trash. Vegetation and roots shall be removed down to three (3) feet below grade within clearing areas and legally dispose of them off Owner's property.
- C. Cut back foliage as indicated on plans and where necessary to allow for construction of trails and other improvements.
- D. Prune existing trees where indicated to lift skirt to a height of 6' above existing grade.
- E. Boulders 12" and larger in size encountered during operations shall be retained on site for reuse.

- F. No less frequently than daily, treat exposed ground areas and removal operations for dust control with water truck or equal. Provide dust control in windy conditions as required to the County inspector's satisfaction.

**2.4 DISPOSAL**

- A. Disposal: Removed obstructions, cleared materials, and waste materials including trash and debris shall be legally disposed of off Owner's property.

**END OF SECTION**

NOT FOR BID

## SECTION 31 20 00

### EARTHWORKS

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Section Includes:
1. Preparing subgrades for slabs-on-grade, walks, and pavements.
  2. Drainage course for concrete slabs-on-grade.
  3. Subbase course for concrete walks and pavements.
  4. Subsurface drainage backfill for walls and trenches.
  5. Excavating and backfilling for footings, utilities, and pits for buried utility structures.
- B. Related Requirements:
1. Section 01 56 39 - Temporary Tree and Plant Protection
  2. Section 31 10 00 - Site Clearing

##### 1.2 DEFINITIONS

- A. Backfill: Soil material or controlled low-strength material used to fill an excavation.
1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
  2. Final Backfill: Backfill placed over initial backfill to fill a trench.
- B. Base Course: Aggregate layer placed between the subbase course and paving course.
- C. Bedding Course: Aggregate layer placed over the excavated subgrade in a trench before laying pipe.
- D. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.
- E. Drainage Course: Aggregate layer supporting the slab-on-grade that also minimizes upward capillary flow of pore water.
- F. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.
1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by the Landscape Architect. Authorized additional excavation and replacement material will be paid for according to Contract provisions for unit prices, changes in the Work.
  2. Bulk Excavation: Excavation more than 10 feet in width and more than 30 feet in length.
  3. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by the Landscape Architect.

Unauthorized excavation, as well as remedial work directed by Architect, will be without additional compensation.

- G. Fill: Soil materials used to raise existing grades.
- H. Subbase Course: Aggregate layer placed between the subgrade and base course for synthetic turf concrete pavement or a cement concrete or hot-mix asphalt walk.
- I. Subgrade: Uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, drainage course, or topsoil materials.
- J. Utilities: On-site underground pipes, conduits, ducts, and cables as well as underground services within buildings.

### **1.3 PREINSTALLATION MEETINGS**

- A. Preinstallation Conference: Conduct pre-excavation conference at Project Site.
  - 1. Review methods and procedures related to earthmoving, including, but not limited to, the following:
    - a. Personnel and equipment needed to make progress and avoid delays.
    - b. Coordination of Work with utility locator service.
    - c. Coordination of Work and equipment movement with the locations of tree- and plant-protection zones.
    - d. Extent of trenching by hand or with air spade.
    - e. Field quality control.

### **1.4 SUBMITTALS**

- A. Product Data: For each type of the following manufactured products required:
  - 1. Geotextiles.
  - 2. Controlled low-strength material, including design mixture.
  - 3. Warning tapes.
- B. Samples for Verification: For the following products, in sizes indicated below:
  - 1. Geotextile: 12 by 12 inches.
  - 2. Warning Tape: 12 inches long; of each color.

### **1.5 INFORMATIONAL SUBMITTALS**

- A. Qualification Data: For qualified testing agency.
- B. Material Test Reports: For each on-site and borrow soil material proposed for fill and backfill as follows:
  - 1. Classification according to ASTM D2487.
  - 2. Laboratory compaction curve according to ASTM D698, ASTM D1557.

- C. Seismic survey report from seismic survey agency.
- D. Pre-excavation Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including finish surfaces that might be misconstrued as damage caused by earth-moving operations. Submit before earth moving begins.

## **1.6 QUALITY ASSURANCE**

- A. Geotechnical Testing Agency Qualifications: Qualified according to ASTM E329 and ASTM D3740 for testing indicated.

## **1.7 FIELD CONDITIONS**

- A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during earth-moving operations.
  - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
  - 2. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.
- B. Utility Locator Service: Notify utility locator service, "811" for area where Project is located before beginning earth-moving operations.
- C. Do not commence earth-moving operations until plant-protection measures specified in Section 01 56 39 "Temporary Tree and Plant Protection" are in place.
- D. The following practices are prohibited within protection zones:
  - 1. Storage of construction materials, debris, or excavated material.
  - 2. Parking vehicles or equipment.
  - 3. Erection of sheds or structures.
  - 4. Excavation or other digging unless otherwise indicated.
  - 5. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.
- E. Do not direct vehicle or equipment exhaust towards protection zones.
- F. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones.

## **PART 2 - PRODUCTS**

### **2.1 SOIL MATERIALS**

- A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.
- B. Satisfactory Soils: Soil Classification Groups GW, GP, GM, SW, SP, and SM according to ASTM D2487, Groups A-1, A-2-4, A-2-5, and A-3 according to AASHTO M 145, or a

combination of these groups; free of rock or gravel larger than 3 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.

- C. Unsatisfactory Soils: Soil Classification Groups GC, SC, CL, ML, OL, CH, MH, OH, and PT according to ASTM D2487, Groups A-2-6, A-2-7, A-4, A-5, A-6, and A-7 according to AASHTO M 145, or a combination of these groups.
  - 1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction..
- D. Subbase Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D2940/D2940M; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 20 sieve.
- E. Base Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D2940/D2940M; with at least 95 percent passing a 1-1/2-inch sieve and not more than 8 percent passing a No. 200 sieve.
- F. Engineered Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D2940/D2940M; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 200 sieve.
- G. Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D2940/D2940M; except with 100 percent passing a 1-inch sieve and not more than 8 percent passing a No. 200 sieve.
- H. Drainage Course: Narrowly graded mixture of washed crushed stone, or crushed or uncrushed gravel; ASTM D448; coarse-aggregate grading Size 57; with 100 percent passing a 1-1/2-inch sieve and zero to 5 percent passing a No. 8 sieve.
- I. Filter Material: Narrowly graded mixture of natural or crushed gravel, or crushed stone and natural sand; ASTM D448; coarse-aggregate grading Size 67; with 100 percent passing a 1-inch sieve and zero to 5 percent passing a No. 4 sieve.
- J. Sand: ASTM C33/C33M; fine aggregate.
- K. Impervious Fill: Clayey gravel and sand mixture capable of compacting to a dense state.

## 2.2 GEOTEXTILES

- A. Separation Geotextile: Woven geotextile fabric, manufactured for separation applications, made from polyolefins or polyesters; with elongation less than 50 percent; complying with AASHTO M 288 and the following, measured per test methods referenced:
  - 1. Survivability:
    - a. Class 2; AASHTO M 288
    - b. As follows:
      - 1) Grab Tensile Strength: 247 lbf; ASTM D4632.
      - 2) Sewn Seam Strength: 22lbf; ASTM D4632.
      - 3) Tear Strength: 90 lbf; ASTM D4533.

4) Puncture Strength: 90 lbf; ASTM D4833.

- c. Apparent Opening Size: No. 60 sieve, maximum; ASTM D4751.
- d. Permittivity: 0.02 per second, minimum; ASTM D4491.
- e. UV Stability: 50 percent after 500 hours' exposure; ASTM D4355.

## 2.3 CONTROLLED LOW-STRENGTH MATERIAL

- A. Controlled Low-Strength Material: Self-compacting, cellular, low-density, flowable concrete material produced from the following:
  - 1. Portland Cement: ASTM C150/C150M, Type I, Type II, or Type III.
  - 2. Fly Ash: ASTM C618, Class C or F.
  - 3. Normal-Weight Aggregate: ASTM C33/C33M, 3/4-inch, 3/8-inch nominal maximum aggregate size.
  - 4. Foaming Agent: ASTM C869/C869M.
  - 5. Water: ASTM C94/C94M.
  - 6. Air-Entraining Admixture: ASTM C260/C260M.
- B. Produce cellular, low-density, controlled low-strength material with the following physical properties:
  - 1. As-Cast Unit Weight: 30 to 36 lb/cu. ft., 36 to 42 lb/cu. ft. at point of placement, when tested according to ASTM C138/C138M.
  - 2. Compressive Strength: 80 psi, 140 psi, when tested according to ASTM C495/C495M.
- C. Produce conventional-weight, controlled low-strength material with 80-psi, 140-psi compressive strength when tested according to ASTM C495/C495M.

## 2.4 ACCESSORIES

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

## **PART 3 - EXECUTION**

### **3.1 PREPARATION**

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth-moving operations.
- B. Protect and maintain erosion and sedimentation controls during earth-moving operations.
- C. Protect subgrades and foundation soils from freezing temperatures and frost. Remove temporary protection before placing subsequent materials.

### **3.2 EXCAVATION, GENERAL**

- A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.
  - 1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.
  - 2. Remove rock to lines and grades indicated to permit installation of permanent construction without exceeding the following dimensions:
    - a. 24 inches outside of concrete forms other than at footings.
    - b. 12 inches outside of concrete forms at footings.
    - c. 6 inches outside of minimum required dimensions of concrete cast against grade.
    - d. Outside dimensions of concrete walls indicated to be cast against rock without forms or exterior waterproofing treatments.
    - e. 6 inches beneath bottom of concrete slabs-on-grade.
    - f. 6 inches beneath pipe in trenches and the greater of 24 inches wider than pipe or 42 inches wide.

### **3.3 EXCAVATION FOR WALKS AND PAVEMENTS**

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

### **3.4 SUBGRADE INSPECTION**

- A. Notify owner's representative when excavations have reached required subgrade.
- B. If owner's representative determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.

- C. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by owner's representative, without additional compensation.

### **3.5 UNAUTHORIZED EXCAVATION**

- A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill, with 28-day compressive strength of 2500 psi, may be used when approved by Architect.
  - 1. Fill unauthorized excavations under other construction, pipe, or conduit as directed by Landscape Architect.

### **3.6 STORAGE OF SOIL MATERIALS**

- A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
  - 1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

### **3.7 BACKFILL**

- A. Place and compact backfill in excavations promptly, but not before completing the following:
  - 1. Construction below finish grade including, where applicable, subdrainage, damp proofing, waterproofing, and perimeter insulation.
  - 2. Surveying locations of underground utilities for Record Documents.
  - 3. Testing and inspecting underground utilities.
  - 4. Removing concrete formwork.
  - 5. Removing trash and debris.
  - 6. Removing temporary shoring, bracing, and sheeting.
  - 7. Installing permanent or temporary horizontal bracing on horizontally supported walls.
- B. Place backfill on subgrades free of mud, frost, snow, or ice.

### **3.8 SOIL FILL**

- A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.
- B. Place and compact fill material in layers to required elevations as follows:
  - 1. Under walks and pavements, use satisfactory soil material.
  - 2. Under steps and ramps, use engineered fill.
  - 3. Under footings and foundations, use engineered fill.

- C. Place soil fill on subgrades free of mud, frost, snow, or ice.

### **3.9 SOIL MOISTURE CONTROL**

- A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.
  - 1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
  - 2. Remove and replace, or scarify and air dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

### **3.10 COMPACTION OF SOIL BACKFILLS AND FILLS**

- A. Place backfill and fill soil materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment and not more than 4 inches in loose depth for material compacted by hand-operated tampers.
- B. Place backfill and fill soil materials evenly on all sides of structures to required elevations and uniformly along the full length of each structure.
- C. Compact soil materials to not less than the following percentages of maximum dry unit weight according to ASTM D698, ASTM D1557:
  - 1. Under structures, building slabs, steps, and pavements, scarify and recompact top 12 inches of existing subgrade and each layer of backfill or fill soil material at 95 percent.
  - 2. Under walkways, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 95 percent.
  - 3. Under turf or unpaved areas, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 85 percent.

### **3.11 GRADING**

- A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
  - 1. Provide a smooth transition between adjacent existing grades and new grades.
  - 2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.
- B. Site Rough Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to elevations required to achieve indicated finish elevations, within the following subgrade tolerances:
  - 1. Unpaved Areas: Plus or minus 1 inch.
  - 2. Walks: Plus or minus 1 inch.
  - 3. Pavements: Plus or minus 1/2 inch.

### **3.12 SUBBASE AND BASE COURSES UNDER PAVEMENTS AND WALKS**

- A. Place subbase course and base course on subgrades free of mud, frost, snow, or ice.
- B. On prepared subgrade, place subbase course and base course under pavements and walks as follows:
  - 1. Install separation geotextile on prepared subgrade according to manufacturer's written instructions, overlapping sides and ends.
  - 2. Place base course material over subbase course under pavement.
  - 3. Shape subbase course and base course to required crown elevations and cross-slope grades.
  - 4. Place subbase course and base course 6 inches or less in compacted thickness in a single layer.
  - 5. Place subbase course and base course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
  - 6. Compact subbase course and base course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D698, ASTM D1557.
- C. Pavement Shoulders: Place shoulders along edges of subbase course and base course to prevent lateral movement. Construct shoulders, at least 12 inches wide, of satisfactory soil materials and compact simultaneously with each subbase and base layer to not less than 95 percent of maximum dry unit weight according to ASTM D698, ASTM D1557.

### **3.13 FIELD QUALITY CONTROL**

- A. Special Inspections: Owner will engage a qualified special inspector to perform the following special inspections:
  - 1. Determine prior to placement of fill that site has been prepared in compliance with requirements.
  - 2. Determine that fill material classification and maximum lift thickness comply with requirements.
  - 3. Determine, during placement and compaction, that in-place density of compacted fill complies with requirements.
- B. Testing Agency: Owner will engage a qualified geotechnical engineering testing agency to perform tests and inspections.
- C. Allow the testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earth moving only after test results for previously completed work comply with requirements.
- D. Footing Subgrade: At footing subgrades, at least one test of each soil stratum will be performed to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by Architect.

- E. Testing agency will test compaction of soils in place according to ASTM D1556, ASTM D2167, ASTM D2937, and ASTM D6938, as applicable. Tests will be performed at the following locations and frequencies:
  - 1. Paved Slab Areas: At subgrade and at each compacted fill and backfill layer, at least one test for every 2000 sq. ft. or less of paved area or building slab but in no case fewer than three tests.
  - 2. Foundation Wall Backfill: At each compacted backfill layer, at least one test for every 100 feet or less of wall length but no fewer than two tests.
  - 3. Trench Backfill: At each compacted initial and final backfill layer, at least one test for every 150 feet or less of trench length but no fewer than two tests.
- F. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil materials to depth required; recompact and retest until specified compaction is obtained.

### **3.14 PROTECTION**

- A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.
- B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.
  - 1. Scarify or remove and replace soil material to depth as directed by Architect; reshape and recompact.
- C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
  - 1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

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

- A. Remove surplus satisfactory soil and waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property.
- B. Transport surplus satisfactory soil to designated storage areas on Owner's property. Stockpile or spread soil as directed by Landscape Architect.
  - 1. Remove waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property.

**END OF SECTION**

## SECTION 31 23 16

### EXCAVATION AND FILL FOR PAVING

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Section Includes:
  - 1. Excavating, backfill, and compacting for paved areas.
  - 2. Installation of fill materials.
- B. Related Requirements:
  - 1. Division 01 - General Requirements.
  - 2. Section 31 10 00 - Site Clearing.
  - 3. Section 31 20 00 - Earthworks
  - 6. Section 32 13 13 - Site Concrete Work.

##### 1.2 PROJECT REQUIREMENTS

- A. Import and Export of Earth Materials:
  - 1. Fees: Pay as required by authorities having jurisdiction over the area.
  - 2. Bonds: Post as required by authorities having jurisdiction over the area.
  - 3. Haul Routes and Restrictions: Comply with requirements of authorities having jurisdiction over the area.

##### 1.3 QUALITY ASSURANCE

- A. Comply with Standard Specifications for Public Works Construction, current edition, except as modified herein.
- B. Sampling, testing, and certification of imported and/or exported soils shall be performed in accordance with Section 01 4524 - Environmental Import/Export Materials Testing.

##### 1.4 TESTING

- A. Owner will retain a Geotechnical Engineer as an Owner's Consultant who will provide observations, tests, inspections, and approvals identified in the Contract Documents as being responsibility of Owner.
- B. Imported Soils: The Geotechnical Engineer will obtain initial product Sample for testing in accordance Article 3.05 of this Section.

## 1.5 PROJECT CONDITIONS

- A. Information on Drawings or in soils report does not constitute a guarantee of accuracy or uniformity of soil conditions over the Project site.

## PART 2 - PRODUCTS

### 2.1 FILL AND BACKFILL MATERIALS

- A. Fill and backfill materials shall be previously excavated materials or imported fill material, free of clods and stones larger than 3-inch, foreign materials, vegetable growths, sod, expansive soils, rubbish, and debris. Material shall conform to these specified requirements and related sections.
- B. Fill material exhibiting a wide variation in consistency and moisture content shall be blended or aerated to stabilize and upgrade the material.
- C. Imported Fill Material:
1. Provide suitable materials obtained from Project site excavations for earthwork and fill materials. If excavated materials are not of suitable quality or sufficient quantity, import additional materials as necessary.
  2. Imported fill shall be a granular material with sufficient binder to form a firm and stable unyielding subgrade and shall not have more than 60 percent of fines passing 200 mesh sieve. Material shall have a coefficient of expansion of not more than 2 percent from air dry to optimum moisture content and not more than 6 percent from air dry to saturation. Imported material shall be clean and free of rubbish, debris, and toxic or hazardous contaminants. Adobe or clay soils are not permitted.
- D. Brick rubble and broken concrete originating from the Project site shall be legally disposed of off the Project site. No such materials shall be imported from outside the Project site.
- E. Permeable Backfill:
1. Provide permeable backfill material behind retaining structures consisting of gravel, crushed gravel, crushed rock, natural sands, manufactured sand, or combinations of these materials conforming to the following gradations:

Sieve Size:	Percentage Passing:
3/4 inch (19mm)	100
3/8 inch (10mm)	80 to 100
No. 100	0 to 8
No. 200	0 to 3
  2. Those portions of fill material passing a No. 4 sieve shall provide a sand equivalent of at least 60.
  3. Provided backing for weep holes shall consist of two cubic feet of aggregate in burlap sacks, securely tied. Aggregate shall conform to requirements for

No. 3 concrete aggregate as specified in subsection 200-1.4 of the Standard Specifications for Public Works Construction.

4. Permeable Backfill Alternate Materials: Instead of the materials specified for retaining structures backfill, a drainage matting system, Miradrain by Mirafi, Inc., or equal, may be provided if reviewed and approved by the ARCHITECT.

## **PART 3 - EXECUTION**

### **3.1 GENERAL**

- A. Before initiating intrusive activities, contact Underground Service Alert of Southern California (USA or Dig Alert) to obtain a Dig Alert ticket for location information on buried public and USA member utilities and pipelines at least 48-hours prior to beginning work. A copy of the Dig Alert ticket shall be forwarded to the OWNER. For on-site utilities, retain a state-licensed third-party underground utility locating service.
- B. Clear the Project site as indicated in Section 31 1000 - Site Clearing.

### **3.2 PROTECTION**

- A. Protect and guard excavations against danger to life, limb, and property as required by, but not limited to, Cal-OSHA regulations.
- B. Protect adjacent existing improvements including landscaping against damage.

### **3.3 EXISTING UTILITY LINES**

- A. Protect existing utility lines from damage or displacement.
- B. Remove conduits or pipes not in service, exposed during Work, unless a minimum cover of 2 feet is provided. Remove concrete, clay or other non-metallic pipe over 8 inches in diameter, unless otherwise indicated.

### **3.4 EXCAVATION**

- A. Unclassified Excavations: Comply with the Standard Specifications for Public Works Construction, Section 300: "Earthwork," except as modified herein.

### **3.5 FILL**

- A. Unclassified Fill and Compaction: Comply with the Standard Specifications for Public Works Construction except as modified herein.
- B. Provide fill materials as specified in Part 2 - Products. If excavated materials from the Project site are not of the required quality or sufficient quantity, import additional materials as necessary.
- C. In addition to the requirements of this Section, import and/or exported materials shall comply with the requirements of Section 01 4524 - Environmental Import/Export Materials Testing.

- D. Imported fill materials will be sampled by the Geotechnical Engineer for compliance with the requirements of Part 2 of this Section.
- E. The Geotechnical Engineer will submit samples to a DSA approved independent approved testing laboratory for testing.
- F. Initial sampling will be performed by the Geotechnical Engineer before importing material to the Project site. Identify the location of the source site in addition to the address, name of the person and/or entity responsible for the source site. The Geotechnical Engineer will obtain both the initial and additional samples from the identified site and will submit samples to the approved independent testing laboratory for testing.
- G. The Geotechnical Engineer will perform additional sampling during import operations. If the total quantity of import is determined to be greater than 1,000 cubic yards of material, one sample shall be obtained and submitted for testing for each 250 cubic yards of imported material. If the total quantity of import is determined to be less than 1,000 yards, one sample shall be obtained and submitted for testing for each 100 cubic yards of imported material.
- H. The independent approved testing laboratory will perform the required tests and report results of tests noting if the tested material passed or failed such tests and will furnish copies to the Project Inspector, Landscape Architect, Contractor, and others as required. Report shall state tests were conducted under the responsible charge of a licensed State of California professional engineer and the material was tested in accordance with applicable provisions of the Contract Documents. Upon completion of the Work of this Section, the independent testing laboratory and Geotechnical Engineer shall submit a verified report to the DSA as required by CBC.
- I. Bills of lading or equivalent documentation shall be submitted to the Project Inspector on a daily basis.
- J. Upon completion of import operations, provide the OAR a certification statement attesting that imported material has been obtained from the identified source site.

### **3.6 INSTALLATION OF MATERIALS**

- A. Fill or backfill materials shall be installed in horizontal layers of 6 inches, unless otherwise required. Each layer shall be evenly placed and moistened or aerated as necessary. Unless otherwise reviewed by the Geotechnical Engineer, each layer of fill material shall cover the length and width of the area to be filled before the next layer of material is installed. The top surface of each layer shall be installed to an approximate level with a crown or crossfall of at least 1 in 50, but no more than 1 in 20. Provide adequate drainage at all times during construction of the Work of this Section.

### **3.7 COMPACTING**

- A. Each layer of fill material shall be compacted by tamping, sheepsfoot rollers, or pneumatic-tired rollers to provide specified relative compaction. At inaccessible locations, provide specified compaction by manually held, operated and directed compaction equipment.

- B. Unless otherwise indicated, compact each layer of earth fill to a relative compaction of at least 90 percent.
- C. When fill materials, or a combination of fill materials, are encountered or provided which develop densely packed surfaces as a result of installation or compacting operations, scarify each compacted layer before installing the next succeeding layer.

### **3.8 INSPECTION AND TESTING**

- A. The Geotechnical Engineer will inspect and test excavations, sample material quality as required in Part 2, and observe installation and compaction of fill materials.
- B. The Geotechnical Engineer will sample imported fill materials from their designated source before delivery to the Project site.
- C. Installation of backfill will be observed by the Geotechnical Engineer.
- D. The Geotechnical Engineer will inspect and test excavation Work before the installation of fill and/or other materials.
- E. Compaction: Test compaction in accordance with ASTM D1557, Method C.

### **3.9 PROTECTION**

- A. Protect the Work of this Section until Substantial Completion.

### **3.10 CLEANING**

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

**END OF SECTION**

## SECTION 32 01 31

### STABILIZED DECOMPOSED GRANITE SURFACE

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Section includes the Constructing a decomposed granite surface.

##### 1.2 REFERENCES

- A. American Society of Testing and Materials (ASTM):
  - 1. C136, Method for Sieve Analysis for Fine and Coarse Aggregates.

##### 1.3 QUALITY ASSURANCE

- A. Installation shall be by a contractor and crew with at least one year of experience in placing decomposed granite with stabilizer on projects of similar nature or dollar cost.
- B. Paving: Contractor shall replace without additional cost to the Agency all areas of paving which may become defective within on 1 year after date of acceptance.
- C. Sterilization: Contractor shall maintain all areas of paving free of vegetation growing through the paving from below for 90 days after date of acceptance. Any procedure required for eradication of such vegetation growth shall be done by the Contractor at no additional cost to the Agency.

##### 1.4 SUBMITTALS

- A. Submit sieve analysis of proposed material to ensure it meets grading requirements.
- B. Products: Five lb. sample and sieve analysis for grading of decomposed granite or crushed 3/8" minus aggregate. Color to match existing trails.
- C. Sieve analysis and color of crushed aggregate screenings shall be approved in Writing by the Landscape Architect before any material is delivered to the project site.
- D. Test Results: from an independent testing laboratory for compliance of gradation of decomposed granite material or 3/8" minus crushed aggregate in accordance with ASTM C136 – Method for Sieve Analysis for Fine and Coarse Aggregates.

##### 1.5 MOCK-UPS

- A. Install 4 ft. wide x 10 ft. long mock-up of decomposed granite or 3/8 inch minus crushed aggregate paving with Stabilizer additive at location as directed by Owner's Representative.

- B. This area, once approved, shall be the standard from which the work will be judged and may be incorporated into the work.

## **1.6 EXCESS MATERIALS**

- A. Provide Owner's Representative with the following excess materials for use in future decomposed granite or crushed 3/8" minus aggregate paving repair:
  - 1. 40-50 lb bags of aggregate paving.
  - 2. 1 – 40 lb. bag of the Stabilizer additive.

## **1.7 PROJECT CONDITIONS**

- A. Use lightweight hauling equipment. Exercise care in using equipment, avoiding damage to adjacent plant and tree growth. Do not install decomposed granite or crushed 3/8" minus aggregate paving during rainy conditions or below 40 degrees and falling.

## **PART 2- PRODUCTS**

### **2.1 STABILIZER BINDER**

- A. Provide a stabilizing organic non-toxic binder, buff in color and without a marked odor. The swell volume shall have a minimum of 35 ml/g with a minimum mucilliod content of 80 percent. The light extraneous matter shall not exceed a maximum of 20 percent with the heavy extraneous matter not exceeding 5 percent. The material shall be screened with 90-100 percent passing a 200-mesh sieve.
- B. Natracil, or equal, provided by: KRC Rock Inc., Santee, California (619) 443-8153.

### **2.2 DECOMPOSED GRANITE OR 3/8-INCH MINUS CRUSHED AGGREGATE SEEDINGS**

- A. Clean, non-plastic, free from deleterious or foreign matter, natural or manufactured from the crushing and screening of naturally friable granite. Blending of course sand with rock dust is not acceptable.
- B. Crushed Stone Sieve Analysis Percentage of Weight Passing:  
Square Mesh Sieve AASHTO T011-05-UL and T027-11-UL

Conform to the grading requirements shown below:

SVE DESIGNATION	PERCENT PASSING
3/8"	100
No. 4	95-100
No. 8 (2.36 mm)	75-80
No. 16 (1.18 mm)	55-65
No. 30 (0.600 mm)	40-50
No. 50 (0.300 mm)	25-35
No. 100 (0.150 mm)	15-20
No. 200 (0.075 mm)	10-15

C. Acceptable local supplier: KRC Rock Inc. Santee, CA (619) 443-8153 or Southwest Boulder & Stone, Fallbrook, California (760) 451-3333, or approved equal.

### 2.3 WEED CONTROL FABRIC

- A. Acceptable Manufacturers: Note – needle punched material is unacceptable.
1. Typar #3401 thermally spunbonded polypropylene, non-woven, thin geotextile weed control fabric, 4.0 oz/lineal yard weight.
  2. Mirafi TenCate N Series, non-woven polypropylene geotextile.
  3. CSI Geotextile Fabric, polypropylene, non-woven, weed control fabric.

## PART 3 - EXECUTION

### 3.1 SUBGRADE PREPARATION

- A. Subgrade that is to receive decomposed granite shall be prepared immediately prior to placing of surfacing. After area to be paved is brought approximately to required grades, scarify to a minimum depth of 6 inches.
- B. After scarifying, loosened material shall be worked to a finely divided condition and the moisture content brought to optimum by the addition of water, by the addition and blending of dry, suitable material or drying of existing material. The subgrade shall then be compacted to at least 90% standard Proctor density per ASTM D698-12. Re-grade high and low areas to a uniform grade.
- C. No placement of decomposed granite surfacing material shall be allowed until approval of subgrade by the Geotechnical Engineer.

### 3.2 INSTALLATION

- A. Blending stabilizer: Blend a minimum 12 lbs. of Stabilizer per ton of decomposed granite or crushed 3/8" minus aggregate screenings. It is critical that Stabilizer be thoroughly and uniformly mixed throughout decomposed or crushed 3/8" minus aggregate screenings.

- B. Placement of Decomposed Granite Screenings or 3/8" Crushed Minus Aggregate Screenings: Upon thorough moisture penetration, compact aggregate screenings to 95% relative compaction by compaction equipment such as: double drum roller (2-4 ton) or single drum roller (1000 lbs.) vibratory plate tamp. Do not begin compaction for 6 hours after placement and up to 48 hours.
- C. Contractor shall take precaution in compacting decomposed granite or crushed 3/8" minus aggregate screenings when adjacent to planting and irrigation systems.
- D. Repairs and Protection: Remove and replace decomposed granite or crushed 3/8" minus aggregate paving that is damaged, defective or does not meet requirements of this section.
- E. The final surface elevations shall not deviate more than 3/8 in. under a 10 ft long straightedge. Rework to tolerance as required.
- F. The surface elevation of decomposed granite shall be flush with the adjacent paving, drainage inlets, concrete collars or headers.

### **3.3 BLENDING STABILIZER**

- A. Blend 12 to 16 lbs (call manufacturer for exact amount of Stabilizer) per 1-ton of decomposed granite or crushed 3/8" or 1/4" minus aggregate screenings. It is critical that Stabilizer be thoroughly and uniformly mixed throughout decomposed granite or crushed 1/4" or 3/8" minus aggregate screenings. Bucket blending is not acceptable. Blending with a rake and or shovel is not acceptable.

### **3.4 FORMS**

- A. Wood headers where shown shall be installed prior to placement of crushed stone material. The header shall be realigned as needed in the event it is deformed during placement and compaction.

### **3.5 WEED CONTROL FABRIC**

- A. Fabric shall be installed between the compacted subgrade and crushed aggregate screenings to prevent weeds from growing up through the crushed stone trail; pre-emergent chemicals are to be used prior to installing fabric. Place fabric across the entire surface to receive aggregate; overlap ends of rolls a minimum of 6 inches.

### **3.6 SOIL STABILIZER**

- A. Thoroughly pre-blend Stabilizer with the 1/4" minus crushed aggregate screenings, at the rate of 12 to 16 lbs. (call manufacturer for exact amount of Stabilizer) of Stabilizer per ton of aggregate screenings prior to placing of Stabilized mix. It is essential that Stabilizer be mixed thoroughly and uniformly through the crushed aggregate screenings to achieve a successful result. The Stabilizer locks the fines together, trapping the larger crushed aggregate screenings; Stabilizer does not act directly on larger aggregate screenings. Blending is best accomplished with a truck-mounted mixer; a portable mechanical mixer may be used. Blend for a minimum of 15 minutes prior to placing on subgrade.

- B. Drop spreading of Stabilizer over raked crushed aggregate screenings and mixing Stabilizer by rototilling is not acceptable.
- C. Soil stabilizer shall not be applied during, just prior to, or immediately following rainfall.

### **3.7 PLACING CRUSH AGGREGATE SCREENINGS**

- A. After pre-blending, place the Stabilized Crushed Aggregate Screenings (CAS) on prepared subgrade, and rake smooth using a steel tine rake to desired grade and cross section. Place to avoid segregation, in two layers of 2 inches maximum thickness. Do not apply CAS deeper than 2 inches in one lift. Example: For a 4 inch thickness, apply CAS in two 2 inch lifts.

### **3.8 WATERING**

- A. Water material to achieve full depth moisture penetration of the mix. Watering is accomplished using a garden hose with spray nozzle set to a coarse spray; pressure should not disturb leveled trail surface. A one-hour application at a rate of 20 GPM per 1,000 sq. ft. of mixed surface seems to achieve the desired full depth moisture penetration. Water activates Stabilizer; consequently, it is essential that the full depth of Stabilized material is saturated. Test for depth of water penetration by random inspection of cores. After inspection, fill core holes with material removed, smooth and hand tamp to match adjoining surface grade. (Let the watered mix stand 6-24 hours until surface water is no longer present; the mix should then be moist but not wet).

### **3.9 COMPACTION**

- A. While the mix is still thoroughly moist, roll with a heavy lawn roller minimum 225 pounds and maximum 30 inch width, to achieve finish grade and initial compaction. Hand tamp edges around, signposts, tree stakes, etc. Use a heavy 1-ton minimum small rider, after having initially used the lawn roller, to obtain the desired final dense, smooth, uniform texture.
- B. Do not use wackers or vibratory rollers; the mix will not harden for weeks after vibration.

### **3.10 FINISHING**

- A. After the finished compacted surface has been achieved, check surface to assure slope is to required grade and cross section.

### **3.11 INSPECTION**

- A. Finished surface of shall be smooth, uniform, and solid, with no evidence of chipping or cracking. Dried, compacted material shall be firm all the way through with no spongy areas. Loose material shall not be present on the surface initially. After the first year of use, a minor amount of loose material is expected on the surface.

- B. Loose gravel on the surface, or unconsolidated crushed aggregate screenings below the surface, is evidence of improper bonding due to poor mixing or insufficient watering. Test the loose material for adequate Stabilizer by wetting, then tamping, and allowing it to dry. If the material is still unconsolidated, Stabilizer did not get mixed adequately throughout the crushed aggregate screenings. If the material is now solid, initial watering was insufficient. Cracking or sponginess is evidence of excess Stabilizer in the mix.
- C. Unconsolidated areas shall be dug out and be replaced with new crushed aggregate screenings with a high proportion of fines meeting the grading requirements of Section 2.2 above, pre-blended with Stabilizer per the procedures listed under Section 3.7A above. Patched areas then shall be wetted thoroughly and rolled smooth. Patching shall be completed prior to any trail smoothing required.
- D. Any significant irregularities shall be smoothed out prior to final acceptance of work. Smoothing shall be accomplished by rewetting/saturating rough areas thoroughly, and then rolling the trail again with a heavy roller 100-1500 lbs. powered walk-behind or small rider. Wackers are not acceptable.
- E. Final thickness of completed area shall not vary more than 1/2-inch from dimension indicated. Measurements may be taken by means of test holes taken at random in finished trail surface. Correct any variations in the thickness beyond the allowable 1/2-inch by repeating the procedures listed under Sections 3.7-3.11 above.
- G. Edges of weed control fabric shall not be exposed to view.

### **3.12 WARRANTY**

- A. Provide a 5-year warranty against failure, cracking, separation, spalling, and weed penetration.

**END OF SECTION**

**SECTION 32 13 13**  
**CONCRETE PAVING**

**PART 1 - GENERAL**

**1.1 SECTION INCLUDES**

- A. Furnish all labor and materials, appliances, tools, equipment, facilities, transportation, and services necessary for installing all concrete work as indicated in drawings including, but not limited to:
  - 1. Furnish and set reinforcing steel, bolts, and anchors.
  - 2. Install all items required by other trades, which are to be cast into concrete.
  - 3. Concrete paving, banding, curbs, and slabs for benches, controllers, and decks, etc. where applicable.
- B. Related Sections:
  - 1. Section 03 30 00 – Cast-in-Place Concrete.

**1.2 REFERENCES**

- A. ACI 301 - Specifications for Structural Concrete for Buildings.
- B. ADAAG - Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities.
- C. ASTM A82 - Specification for Steel Wire, Plain, for Concrete Reinforcement.
- D. ASTM A185 - Welded Steel Wire Fabric for Concrete Reinforcement.
- E. ASTM A184 - Specification for Fabricated Deformed Steel Bars for Concrete.
- F. ASTM D1751 - Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction.
- G. ASTM A615 - Deformed and Plain Billet-Steel for Concrete Reinforcement.
- H. ASTM C33 - Concrete Aggregates.
- I. ASTM C94 - Ready Mixed Concrete.
- J. ASTM C150 - Portland Cement.
- K. ASTM C260 - Air-Entraining Admixtures for Concrete.
- L. ASTM C289 - Potential Reactivity of Aggregates.
- M. ASTM C309 - Liquid Membrane-Forming Compounds for Curing Concrete.

- N. ASTM C494 - Chemical Admixtures for Concrete.
- O. ASTM C618- Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture for Concrete.
- P. ASTM C979 - Pigments for Integrally Colored Concrete.
- Q. ASTM C1116 - Specification for Fiber-Reinforced Concrete and Shotcrete.
- R. CBC - California Building Code, (CCR) California Code of Regulations, Title 24, Part 2, California State Accessibility Standards.
- S. DSA/AC - Division of State Architect/Access Compliance.
- T. National Ready Mix Concrete Association - Plant Certification Program.
- U. Southern California Chapter, American Public Works Association – Standard Specifications for Public Works Construction.
- V. Storm-water Best Management Practice Handbook ( BMP Handbook ), Construction Edition, as published by the California Storm Water Quality Association.

### **1.3 QUALITY ASSURANCE**

- A. Perform work in accordance with ACI 301.
- B. Obtain materials from same source throughout.

### **1.4 QUALIFICATIONS**

- A. Manufacturer: Manufacturer of ready-mix concrete products complying with ASTM C94 requirements for production facilities and equipment. Certified according to National Ready Mix Concrete Association's Plant Certification Program.
- B. Installer: Company who has completed a minimum of 5-years recent pavement work similar in material, design, and extent to that indicated for this project.

### **1.5 REGULATORY REQUIREMENTS**

- A. Conform to (CBC) California Building Code, (CCR) Title 24, Part 2, and ADAAG for access requirements for individuals with disabilities.

### **1.6 ENVIROMENTAL REQUIREMENTS**

- A. Provide concrete curing, finishing, and waste management techniques as defined in Section 4 of the Storm Water Best Management Practice Handbook, (BMP Handbook) Construction Edition.

### **1.7 SUBMITTALS**

- A. Submit one copy of Statement of Mix Design prepared by batch plant servicing project for each load delivered to the project for review prior to commencement of work. Statement of Mix Design shall include the following information:

1. Name, address, and telephone number of batch plant preparing statement of mix design.
  2. Date of mix design.
  3. Project location.
  4. Contractor requesting load delivery.
  5. Mix design number.
  6. Integral color used, if any.
  7. Gradations for sand and aggregate.
  8. Material weights, specific gravity, and absolute volumes.
  9. Basis of testing, i.e. UBC 2605 D4 and Title 24 2604 D4.
  10. Water/cement ratio.
  11. PSI rating.
  12. Signature of testing laboratory manager.
  13. Signed stamp from registered Project structural engineer or architect..
- B. Include data on curing compounds and sealers.
- C. Shop Drawings:
1. Submit drawings for reinforcing steel and accessories in accordance with ACI standards.
  2. Paving Jointing and Pour sequence – submit drawings indicating the following:
    - a. Proposed layout of construction, dowel basket, and sawcut joints. Clearly delineate the three different joint types
- D. Submit manufacturer's instructions under provisions of Section 01330.

### **1.8 MOCKUP**

- A. Provide a 3' x 3' x 3-1/2" mockup of each pavement type as indicated in the paving and surfacing schedule.
- B. Construct a mockup area under conditions similar to those that will exist during actual placement, with sealers applied.
- C. Locate where it will not need to be removed during construction so it can be verified as the standard throughout the scope of work in coordination with the Owner's representative.
- D. Mockup may not remain as part of the completed work.

## 1.9 WARRANTY

- A. In addition to the manufacturer's guarantees or warranties, all work shall be warranted for one-year after the date of the Final Acceptance against defects in materials and workmanship by Contractor.
- B. Provide a five-year written warranty for detectable wearing pavement. Warranty shall indicate compliance with standards required by CBC, California Building Code, (CCR) California Code of Regulations, Title 24, Part 2, Section 1133B.8.5. Warranty coverage shall include durability criteria which indicates that the shape, color fastness, sound-on-cane acoustic quality, resilience, and attachment will not degrade significantly for at least five years after original installation. As used in this Article, "not degrade significantly" means that the product maintains at least 90 percent of its approved design characteristics, as determined by the Division of The State Architect.

## PART 2 - PRODUCTS

### 2.1 CONCRETE MATERIALS

- A. Cement: ASTM C150 Normal-Type I Portland type, gray color, from single source throughout project.
- B. Fine and Coarse Aggregates: ASTM C33, non-reactive when tested in accordance with ASTM C289 and Appendix X-1 of ASTM C33.
- C. Water: Clean and not detrimental to concrete.
- D. Fly Ash C616 – Type F

### 2.2 CONSTRUCTION JOINT DOWELS

- A. Construct Speed Dowel Construction Joints (CJ) at modules no larger than 20'-0" x 20'-0". Wire dowel baskets (DB) may be used in lieu of CJs to facilitate larger pour areas.
- E. Dowel schedule to match rebar schedule with a minimum spacing of 18" O.C.
- F. 5/8" size glass fiber reinforced polymer dowel bar. Contact Aslan FRP at (402) 643-2991 or Owens Corning at (800) GET-PINK
- G. Encase 50 percent of each dowel (one side) in a Speed Dowel™ plastic sleeve to allow parallel lateral movement of each dowel. Double check fiberglass dowel to Speed dowel tolerance to ensure snug fit. Contact Greenstreak at (800) 325-9504 or [www.greenstreak.com/speeddowelhome.htm](http://www.greenstreak.com/speeddowelhome.htm) or contact local suppliers such as White Cap.

### 2.3 FORM MATERIALS

- A. Lumber – Douglas Fir species
  - 1. Select from lumber that is free of cupping, large or loose knots and other imperfections which may produce objectionable defects in the exposed finish concrete surfaces.
  - 2. Light framing or studs for board or plywood forms: 2" x 4" and larger depending on

pavement type, pedestrian, vehicular or EVA. Construction grade.

3. Board surface: Surfaced four sides (S4S).
- B. Plywood: Douglas Fir species or SPF (spuce-pine-fir):
- C. 1. Plywood for general formwork shall have a close, uniform grain and the edges shall be sealed with barrier paint, polyurethane varnish, or other impermeable material.
1. Plywood for all formed surfaces exposed to view shall be PS1, High Density Concrete Form Overlay, Class 1 exterior, APA stamped, 5/8" minimum thickness.
  2. Seam tape: Pressure sensitive tape. 3M or approved equivalent, polyurethane or mylar faced, or adhesive-backed paper tape, 1" wide. For use in covering joints in formwork exposed to view.
- D. Preformed Steel Forms: Minimum 16 gauge matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished surfaces.
- E. Conform to ACI 301.

## 2.4 REINFORCEMENT

- A. Reinforcing Steel: ASTM A615, grade 60, deformed billet steel bars, uncoated finish.
- B. Welded Steel Wire Fabric: Plain type, ASTM A185; in coiled rolls or flat sheets; uncoated finish.
- C. Fabricated Bar Mats: ASTM A184; welded or clip-assembled steel bar mats of ASTM A615, Grade 60 steel bars.
- D. Tie Wire: ASTM A82, annealed steel, minimum 16 gage size.
2. Dowels: Provide 3/4" diameter x 18" long slip dowels by Sika.
  3. ASTM A615; grade 40, plain steel, uncoated finish.
- E. Supports: Chairs, spacers, dowel bar supports and other devices for spacing, supporting and fastening reinforcing bars, welded wire fabric, and dowels in place.

## 2.5 JOINT SEALERS

- A. Preformed Joint: ASTM D1751, 1/2 inch thick.
- B. Joint Sealers: As specified in Section 07 92 00.

## 2.6 ADMIXTURES

- A. Air Entrainment: ASTM C260.
- B. Surface Retarder: ASTM C494, Type B or D.
- C. Fly Ash: ASTM C618, Class F.

- D. Water Reducing Admixture: ASTM C494, Type A.

## **2.7 CONCRETE MIX**

- A. Mix concrete in accordance with ASTM C94, Alternative No. 3.
- B. Provide concrete of the following characteristics:
  - 1. Driveways, aprons, and approaches: Compressive strength of 3,500 psi at 28 days.
  - 2. Sidewalks, curbs, gutters and utility slabs: Compressive Strength of 2,500 psi at 28 days.
  - 3. Slump: 4 to 6 inches.
  - 4. Maximum aggregate size: 3/4 inch.
  - 5. Cement Content: Minimum 5.5 sacks/cu. yd.
  - 6. Fly Ash: Maximum 25 percent by weight.
  - 7. Air Entrainment: 2 to 4 percent.

## **2.8 CURING COMPOUND**

- A. Acceptable Products
  - 1. Admixtures Inc.; Colorful Clear Curing Compound – (626) 357-3263
  - 2. W.R. Meadows; CURE-TREAT RTU – (800)342-5976
  - 3. W.R. Meadows; MED-CURE – (800)342-5976
  - 4. Sinak Corporation; Lithium Cure 1000 – (619) 231-1771

## **2.9 SEALER**

- A. Acceptable Penetrating Sealers:
  - 1. Prosoco, Inc.; Concrete Protector SB – Tel. (800) 255-4255
  - 2. Prosoco, Inc.; Concrete Protector WB – Tel. (800) 255-4255
  - 3. Sinak Corporation; HLQ-125 – Tel. (619) 231-1771

## **PART 3 - EXECUTION**

### **3.1 INSPECTION**

- A. Verify compacted subgrade is ready to support paving and imposed loads.
- B. Verify gradients and elevations of base are correct.

- C. Beginning of installation means acceptance of existing conditions.
- D. Ensure all irrigation and electrical conduits are placed prior to pour with respective contractors and are properly compacted.

### **3.2 BASE**

- A. Subgrade compaction to meet requirements of projects soils report.
- B. Prepare and compact base materials in accordance with provisions of Section 31 23 26.

### **3.3 PREPARATION**

- A. Moisten base to minimize absorption of water from fresh concrete.
- B. Coat surfaces of adjacent manholes, catch basins, inlets, and other fixed objects with oil to form isolation joint and prevent bond with paving.
- C. Notify Architect minimum 24 hours prior to commencement of concrete operations.

### **3.4 FORMING**

- A. Ensure that work conforms to recommended practice for concrete form work ACA 347.
- B. Place and secure forms to correct location, dimension, and profile.
- C. Perform layout with an electronic digital transit for line layout accuracy.
- D. Assemble formwork to permit easy stripping and dismantling without damaging concrete.
- E. Place joint fillers vertical in position, in straight lines. Secure to formwork during concrete placement.

### **3.5 REINFORCEMENT**

- A. Place reinforcement at mid-height of slabs-on-grade.
- B. Lap adjoining pieces of welded wire fabric one full mesh and lace splice with wire. Offset laps of adjoining sheets.
- C. Place fabricated bar mats in lengths as long as practical. Overlap adjacent mat 2 inches.
- D. Interrupt reinforcement at expansion joints.
- E. Place secondary fiber reinforcement in concrete mix in quantities as specified for concrete pavements.
- F. Place reinforcement to achieve slab and curb alignment as detailed.
- G. Provide doweled joints at interruption of concrete with one end of dowel set in capped sleeve to allow longitudinal movement.

### 3.6 PLACING CONCRETE

- A. Place concrete in accordance with ACI 301.
- B. Hot and Cold Weather Placement: ACI 301.
- C. Ensure reinforcement, inserts, embedded parts, and formed joints are not disturbed during concrete placement.
- D. Place concrete continuously between predetermined construction joints and control joints.
- E. Do not push or drag concrete into place or use vibrators to move concrete into place.
- F. Place concrete to pattern indicated on plans.

### 3.7 JOINTS

- A. Refer to ACI 302 "Guide for Concrete Floor and Slab Construction" for work under this section.
- B. Review locations of joints when indicated and make recommendations for any additional joints or suggestions for new locations. Lack of joints or misplacement of joints will not constitute justification of pavement cracking.
- C. Place expansion joints at not to exceed 20-foot intervals to correct elevation and profile as per drawings. Align curb, gutter, and sidewalk joints.
- D. Place joint filler between paving components and building or other appurtenances. Recess top of filler for sealant placement by Section 02764.
- E. Provide control joints at not to exceed 5-foot intervals.
- F. Hand tool control joints 3/16 inch wide at an optimum time during finishing. Cut 1/3 into depth of slab.
- G. Provide keyed joints as indicated.
- H. Finish each edge of joint with radiused jointer tool
- I. Form isolation joints where paving abuts curbs, catch basins, manholes, inlets, structures, and other fixed objects.

### 3.8 FINISHING

- A. Uniformly spread, screed, and consolidate concrete. Do not spread concrete by vibration.
- B. Smooth Form Finish:
  - 1. Coordinate as necessary to secure form construction using smooth, hard, uniform surfaces, with number of seams kept to a practical minimum and in a uniform, orderly pattern.
  - 2. Patch tie holes and defects.

3. Trowel to smooth even finish.
  4. Use for curbs, gutters, and mow strips.
- C. Medium Broom Finish:
1. Float surface and trowel to smooth even finish.
  2. While the surface is still plastic draw a soft fiber bristle broom uniformly over surface in perpendicular direction to traffic.

### **3.9 CURING**

- A. Cure concrete surfaces in accordance with ACI 301.
- B. Immediately after placement, protect concrete under provisions of Section 01600 from premature drying, excessive hot or cold temperatures, and mechanical injury.
- C. Do not permit traffic over pavement for 7 days after finishing for foot traffic and (28 days without vehicular traffic unless an accelerator is used.
- D. Apply curing compound on finished slab surfaces in accordance with manufacturer's instructions.

### **3.10 SEALING**

- A. Acid clean the entire surface after initial cure (3 day minimum) and seal surface of concrete per manufacturer's requirements.

### **3.11 FIELD QUALITY CONTROL**

- A. Field inspection and testing will be performed under provisions of Section 01458.
- B. Owner's Inspector will take cylinders and perform slump tests in accordance with ACI301 and will arrange for pick-up of cylinders by Testing Laboratory.
- C. Three concrete test cylinders will be taken for every 50 or less cu. yds. of each class of concrete placed each day.
- D. One slump test will be taken for each set of test cylinders taken.
- E. Maintain records of placed concrete items. Record date, location of pour, quantity, air temperature, and test samples taken.

### **3.12 TOLERANCES**

- A. Provide tolerances per below:
  1. Maximum Variation of Surface Flatness: 1/4-inch in 10 feet.
  2. Maximum Variation from True Position: 1/4-inch.
  3. Variation of Pavement Thickness: Plus 3/8-inch, minus 1/4-inch.

4. Maximum Variation of Pavement Joints: 1/8-inch vertical alignment.

**END OF SECTION**

**NOT FOR BID**

## SECTION 32 31 13

### CHAIN LINK FENCES AND GATES

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

##### 1.2 SUMMARY

- A. Section Includes:
  - 1. Chain-link fences.
  - 2. Swing gates.
- B. Related Requirements:
  - 1. Section 033000 "Cast-in-Place Concrete" for cast-in-place concrete post footings.

##### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for the following:
    - a. Fence and gate posts, rails, and fittings.
    - b. Chain-link fabric, reinforcements, and attachments.
    - c. Gates and hardware.
- B. Shop Drawings: For each type of fence and gate assembly.
  - 1. Include plans, elevations, sections, details, and attachments to other work.
- C. Samples for Initial Selection: For each type of factory-applied finish.
- D. Samples for Verification: For each type of component with factory-applied finish, prepared on Samples of size indicated below:
  - 1. Polymer-Coated Components: In 6-inch lengths for components and on full-sized units for accessories.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For each type of chain-link fence, and gate.

#### 1.5 QUALITY ASSURANCE

- A. Emergency Access Requirements: According to requirements of authorities having jurisdiction for gates with automatic gate operators serving as a required means of access.

#### 1.6 FIELD CONDITIONS

- A. Field Measurements: Verify layout information for chain-link fences and gates shown on Drawings in relation to property survey and existing structures. Verify dimensions by field measurements.

#### 1.7 WARRANTY

- A. Special Warranty: Installer agrees to repair or replace components of chain-link fences and gates that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Failure to comply with performance requirements.
    - b. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
  - 2. Warranty Period: Five years from date of Substantial Completion.

### PART 2 - PRODUCTS

#### 2.1 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Chain-link fence and gate frameworks shall withstand the design wind loads and stresses for fence height(s) and under exposure conditions indicated according to **ASCE/SEI 7**
  - 1. Design Wind Load: As indicated on Drawings
    - a. Minimum Post Size: Determine according to ASTM F1043 for post spacing not to exceed 8 feet for Material, Schedule 40 steel pipe.

## 2.2 CHAIN-LINK FENCE FABRIC

- A. General: Provide fabric in one-piece heights measured between top and bottom of outer edge of selvage knuckle according to "CLFMI Product Manual" and requirements indicated below:
1. Fabric Height: As indicated on Drawings.
  2. Steel Wire for Fabric: Wire diameter of 0.192 inch.
    - a. Mesh Size: 2 inches.
    - b. Zinc-Coated Fabric: ASTM A392, Type II, Class 2, 2.0 oz./sq. ft with zinc coating applied before weaving.
    - c. Polymer-Coated Fabric: ASTM F668, Class 2b over zinc coated steel wire.
      - 1) Color: As selected by Architect from manufacturer's full range, according to ASTM F934.
    - d. Coat selvage ends of metallic-coated fabric before the weaving process with manufacturer's standard clear protective coating.
  3. Selvage: Knuckled at both selvages.

## 2.3 FENCE FRAMEWORK

- A. Posts and Rails: ASTM F1043 for framework, including rails, braces, and line; terminal; and corner posts. Provide members with minimum dimensions and wall thickness according to ASTM F1043 for Schedule 40 pipe based on the following:
1. Fence Height: As indicated on Drawings.
    - a. Line Post: 1.9 inches in diameter minimum.
    - b. End, Corner, and Pull Posts: 2.375 inches in diameter minimum.
  2. Horizontal Framework Members: top and bottom rails according to ASTM F1043.
    - a. Top and Bottom Rail: 1.66 inches in diameter.
  3. Brace Rails: ASTM F1043.
  4. Metallic Coating for Steel Framework:
    - a. Type A: Not less than minimum 2.0-oz./sq. ft. average zinc coating according to ASTM A123/A123M.
  5. Polymer coating over metallic coating.
    - a. Color: As selected by Architect from manufacturer's full range, according to ASTM F934.

## 2.4 TENSION WIRE

- A. Metallic-Coated Steel Wire: 0.177-inch- diameter, marcelled tension wire according to ASTM A817 or ASTM A824, with the following metallic coating:
  - 1. Type II: Zinc coated (galvanized) by electrolytic process, with the following minimum coating weight:
    - a. Matching chain-link fabric coating weight.
- B. Polymer-Coated Steel Wire: 0.177-inch diameter, tension wire according to ASTM F1664, Class 2b over zinc coated steel wire.
  - 1. Color: Match chain-link fabric, according to ASTM F934.

## 2.5 SWING GATES

- A. General: ASTM F900 for gate posts and single or double swing gate types.
  - 1. Gate Leaf Width: As indicated on the drawings.
  - 2. Framework Member Sizes and Strength: Based on gate fabric height of 72 inches or less.
- B. Pipe and Tubing:
  - 1. Zinc-Coated Steel: ASTM F1043 and ASTM F1083; protective coating and finish to match fence framework.
  - 2. Gate Posts: Round tubular steel.
  - 3. Gate Frames and Bracing: Round tubular steel.
- C. Frame Corner Construction: Welded with mitered corners.
- D. Hardware:
  - 1. Hinges: 180-degree outward swing.
  - 2. Latch: Permitting operation from both sides of gate.
  - 3. Lock: Manufacturer's standard.

## 2.6 FITTINGS

- A. Provide fittings according to ASTM F626.
- B. Post Caps: Provide for each post.
- C. Rail and Brace Ends: For each gate, corner, pull, and end post.
- D. Rail Fittings: Provide the following:
  - 1. Top Rail Sleeves: Pressed-steel or round-steel tubing not less than 6 inches long.
  - 2. Rail Clamps: Line and corner boulevard clamps for connecting intermediate and bottom rails to posts.

- E. Tension and Brace Bands: Pressed steel.
- F. Tension Bars: Steel length not less than 2 inches shorter than full height of chain-link fabric. Provide one bar for each gate and end post, and two for each corner and pull post, unless fabric is integrally woven into post.
- G. Truss Rod Assemblies: Steel, hot-dip galvanized after threading rod and turnbuckle.
- H. Tie Wires, Clips, and Fasteners: According to ASTM F626.
  - 1. Standard Round Wire Ties: For attaching chain-link fabric to posts, rails, and frames, according to the following:
    - a. Hot-Dip Galvanized Steel: galvanized coating thickness matching coating thickness of chain-link fence fabric.

## 2.7 GROUT AND ANCHORING CEMENT

- A. Anchoring Cement: Factory-packaged, non-shrink, non-staining, hydraulic-controlled expansion cement formulation for mixing with water at Project site to create pourable anchoring, patching, and grouting compound. Provide formulation that is resistant to erosion from water exposure without needing protection by a sealer or waterproof coating, and that is recommended in writing by manufacturer for exterior applications.
- B. Concrete Footings: Concrete for post footings shall be as required per section 03 30 00 Cast-in-place Concrete. Minimum Compressive Strength: 2500 psi at 28 days.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for site clearing, earthwork, pavement work, and other conditions affecting performance of the Work.
  - 1. Do not begin installation before final grading is completed unless otherwise permitted by Architect.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Stake locations of fence lines, gates, and terminal posts. Do not exceed intervals of 500 feet or line of sight between stakes. Indicate locations of utilities, lawn sprinkler system, underground structures, benchmarks, and property monuments.

### 3.3 CHAIN-LINK FENCE INSTALLATION

- A. Install chain-link fencing according to ASTM F567 and more stringent requirements specified.
  - 1. Install fencing on established boundary lines inside property line.
- B. Post Excavation: Drill or hand-excavate holes for posts to diameters and spacings indicated, in firm, undisturbed soil.
- C. Post Setting: Set posts in concrete at indicated spacing into firm, undisturbed soil.
  - 1. Verify that posts are set plumb, aligned, and at correct height and spacing, and hold in position during setting with concrete or mechanical devices.
  - 2. Concrete Fill: Place concrete around posts to dimensions indicated and vibrate or tamp for consolidation. Protect aboveground portion of posts from concrete splatter.
    - a. Exposed Concrete: Extend 2 inches above grade; shape and smooth to shed water.
    - b. Concealed Concrete: Place the top of concrete 2 inches below grade to allow covering with surface material.
    - c. Posts Set into Sleeves in Concrete: Use steel pipe sleeves preset and anchored into concrete for installing posts. After posts are inserted into sleeves, fill annular space between post and sleeve with anchoring cement, mixed and placed according to anchoring material manufacturer's written instructions. Finish anchorage joint to slope away from post to drain water.
- D. Terminal Posts: Install terminal end, corner, and gate posts according to ASTM F567 and terminal pull posts at changes in horizontal or vertical alignment of 15 degrees or more. For runs exceeding 500 feet space pull posts an equal distance between corner or end posts.
- E. Line Posts: Space line posts uniformly at 96 inches o.c.
- F. Post Bracing and Intermediate Rails: Install according to ASTM F567, maintaining plumb position and alignment of fence posts. Diagonally brace terminal posts to adjacent line posts with truss rods and turnbuckles. Install braces at end and gate posts and at both sides of corner and pull posts.
- G. Top Rail: Install according to ASTM F567, maintaining plumb position and alignment of fence posts. Run rail continuously through line post caps, bending to radius for curved runs and terminating into rail end attached to posts or post caps fabricated to receive rail at terminal posts. Provide expansion couplings as recommended in writing by fencing manufacturer.
- H. Intermediate and Bottom Rails: Secure to posts with fittings.
- I. Chain-Link Fabric: Apply fabric to outside of enclosing framework. Leave 1-inch bottom clearance between finish grade or surface and bottom selvage unless otherwise

indicated. Pull fabric taut and tie to posts, rails, and tension wires. Anchor to framework so fabric remains under tension after pulling force is released.

- J. Stretcher Bars: Thread through fabric and secure to end, corner, pull, and gate posts, with tension bands spaced not more than 15 inches o.c.
- K. Tie Wires: Use wire of proper length to firmly secure fabric to line posts and rails. Attach wire at one end to chain-link fabric, wrap wire around post a minimum of 180 degrees, and attach other end to chain-link fabric according to ASTM F626. Bend ends of wire to minimize hazard to individuals and clothing.
  - 1. Maximum Spacing: Tie fabric to line posts at 12 inches o.c. and to braces at 24 inches o.c.
- L. Fasteners: Install nuts for tension bands and carriage bolts on the side of fence opposite the fabric side. Peen ends of bolts or score threads to prevent removal of nuts.

### **3.4 GATE INSTALLATION**

- A. Install gates according to manufacturer's written instructions, level, plumb, and secure for full opening without interference. Attach fabric as for fencing. Attach hardware using tamper-resistant or concealed means. Install ground-set items in concrete for anchorage. Adjust hardware for smooth operation.

### **3.5 ADJUSTING**

- A. Gates: Adjust gates to operate smoothly, easily, and quietly, free of binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range. Confirm that latches and locks engage accurately and securely without forcing or binding.

END OF SECTION 323113

# TEXTURED ACRYLIC SURFACING FOR ATHLETIC COURTS

## PART 1 GENERAL

### 1.1 GENERAL DESCRIPTION

- A. Textured acrylic surfacing for multipurpose courts or similar decorative play areas.

### 1.2 RELATED SECTIONS

#### A. Related Work

- 1. Section 32 13 13 – Concrete Paving

#### B. References

- 1. American Concrete Institute (ACI)
- 2. American Sport Builders Association (ASBA)

### 1.3 QUALITY ASSURANCE

- A. Surfacing shall conform to the guidelines of the ASBA for planarity.
- B. Concrete shall have a vapor barrier in accordance with ASTM E-1745.
- C. Concrete mixes should be placed with a water/cement ratio of .45.
- D. Concrete surface should have a medium-broom finish.
- E. Curing compounds should not be used unless the curing compound manufacturer specifically states the surface may be coated with water based acrylic coatings.
- F. All surface coatings products shall be supplied by a single manufacturer.
- G. The contractor shall record the batch number of each product used on the site and maintain it through the warranty period.
- H. The contractor shall provide the inspector, upon request, an estimate of the volume of each product to be used on the site.
- I. The installer shall be an authorized applicator of the specified system.
- J. The manufacturer's representative shall be available to help resolve material questions.

### 1.4 SUBMITTALS

- A. Manufacturer specifications for components, color chart and installation instructions.
- B. Authorized Applicator certificate from the surface system manufacturer.
- C. Reference list from the installer of at least 5 projects of similar scope done in each of the past 3 years.

- D. Current Material Safety Data Sheets (SDS).
- E. Product substitution: If other than the product specified, the contractor shall submit at least 7 days prior to the bid date a complete type written list of proposed substitutions with sufficient data, drawings, samples and literature to demonstrate to the owners satisfaction that the proposed substitution is of equal quality and utility to that originally specified. Information must include a QUV test of at least 2000 hours illustrating the UV stability of the system. Under no circumstances will systems from multiple manufacturers be considered.

## **1.5 MATERIAL HANDLING AND STORAGE**

- A. Store materials in accordance with manufacturer specifications and SDS.
- B. Deliver product to the site in original unopened containers with proper labels attached.
- C. All surfacing materials shall be non-flammable.

## **1.6 GUARANTEE**

- A. Provide a guarantee against defects in the materials and workmanship for a period of three years from the date of substantial completion.

## **1.7 INSTALLER QUALIFICATIONS**

- A. Installer shall be regularly engaged in construction and surfacing of acrylic tennis courts, play courts or similar surfaces.
- B. Installer shall be an Authorized Applicator of the specified surface system.
- C. Installer shall be a builder member of the ASBA.

## **1.8 MANUFACTURER QUALIFICATIONS**

- A. System manufacturer shall be a US owned company.
- B. System manufacturer shall be a member of the ASBA.

## **PART 2 PRODUCTS**

### **2.1 MANUFACTURERS**

- A. California Sports Surfaces, a division of ICP Group, Andover, MA. 01810/  
[www.californiasportssurfaces.com](http://www.californiasportssurfaces.com)
- B. Substitutions: Submit requests at least 7 days prior to the bid date with a complete type written list of proposed substitutions with sufficient data, drawings, samples and literature to demonstrate to the owners satisfaction that the proposed substitution is of equal quality and utility to the specified product. Information must include a QUV test of at least 2000 hours illustrating the UV stability of the system. Under no circumstance may the final color surface contain silica sand added at the job site.

### **2.2 MATERIALS**

- A. Patching Mix (California Court Patch Binder) - for use in patching cracks, holes, depressions and other surface imperfections.
- B. Crack Filler (California Crack Filler) - for use in filling fine cracks.
- C. Concrete Preparer is a specially formulated acid heat for use in neutralizing the concrete in preparation for the DecoTurf System.
- D. Adhesion Primer – (California TiCoat) is a two-component water-based epoxy primer for uncoated concrete surfaces.
- E. Acrylic Color Playing Surface (DecoColor Ultra Performance/DecoBase I) – for use as the finish color and texture. DecoColor Ultra Performance and DecoBase I are blended at the job site to achieve the correct surface texture.
- F. Line Paint (California Line Paint) – for use as the line marking on the court/play surface.
- G. Water – for use in dilution/mixing shall be clean and potable.

## 2.3 MATERIAL SPECIFICATIONS

- A. Court Patch Binder (Product # 0300) – 100% acrylic resin blended with Portland Cement and silica sand.
- B. California Crack Filler (Product #: Green 5040, Red 060, Neutral 5080)– acrylic resin heavily filled with sand.
- C. Concrete Preparer (Product # 4520) – Phosphoric Acid based surface treatment
- D. California Ti-Coat (Product #: Component 'A' 3903, Component 'B' 3904) – 2 component epoxy primer
- E. DecoColor Ultra Performance – acrylic resin with selected light fast pigments. Colors to be selected by owner
- F. Acrylotex sand-filled Neutral (Product # 6595) –acrylic resin containing no vinyl copolymerization constituent. Contains not more than 63% rounded silica sand.
- G. California Line Paint (Product #: Hi-Hide White 6020, Textured White 6220) – acrylic resin containing no alkyds or vinyl constituents. Texturing shall be rounded silica sand.

All surfacing materials shall be non-flammable and have a VOC content of less than 100g/L, measured by EPA method 24.

Local sands are not acceptable in the color playing surface. Sands must be incorporated at the manufacturing location to ensure quality and stability.

## PART 3 EXECUTION

### 3.1 WEATHER LIMITATIONS

- A. Do not install when rainfall is imminent or extremely high humidity prevents drying.
- B. Do not apply unless surface and air temperature are 50°F and rising.

- C. Do not apply if surface temperature is in excess of 140°F.

### 3.2 PREPARATION FOR ACRYLIC COLOR PLAYING SYSTEM

- A. Clean surfaces of loose dirt, oil, grease, leaves, and other debris in strict accordance with manufacturer's directions. Pressure washing will be necessary to adequately clean areas to be coated. Any areas previously showing algae growth shall be treated with OxiCourt or approved product to kill the organisms and then be properly rinsed.
- B. Holes and cracks: Cracks and holes shall be cleaned and a suitable soil sterilant, as approved by the owner, shall be applied to kill all vegetation 14 days prior to use of **Court Patch Binder** according to manufacturer's specifications.
- C. Depression: Depressions holding enough water to cover a five cent piece shall be filled with Court Patch Binder Patching Mix: 3 gallons of Court Patch Binder, 100 lbs. 60-80 silica sand, 1 gallon Dry Portland Cement (Type I). **This step shall be accomplished prior to the squeegee application of Acrylic Resurfacer.** The contractor shall flood all the courts and then allow draining. Define and mark all areas holding enough water to cover a nickel. After defined areas are dry, prime with tack coat mixture of 2 parts water/1 part Court Patch Binder. Allow tack coat to dry completely. Spread Court Patch Binder mix true to grade using a straight edge for strike off. Steel trowel or wood float the patch so that the texture matches the surrounding area. Never add water to mix. Light misting on surface and edges to feather in is allowed as needed to maintain work ability. Allow to dry thoroughly and cure.

NO WORK FROM THIS STAGE ON SHALL COMMENCE UNTIL AN INSPECTOR HAS ACCEPTED THE SURFACE.

- D. Acid Treatment: Concrete Preparer shall be applied to all uncoated concrete surfaces at the rate of .01 to .012 gallon per square yard. Dilute 1 gallon of Concrete Preparer with 4 gallons of potable water. Apply liberally to the surface and spread with a soft hair push broom. After the surface has dried remove any dust or latent material.
- E. Primer: California Ti Coat shall be applied to all uncoated concrete surface prior to application of filler materials. Apply at an application rate of .025-.03 gallon per square yard.
  - 1. Mix component A with Component B at a ratio of 1:1. Let stand for 20-30 minutes prior to use.
  - 2. Apply with a short nap phenolic core roller.
  - 3. Allow the Ti Coat to dry for approximately 1-3 hours until the surface is slightly tacky to the touch. In no case shall the surface be left overnight before receiving an application of Acrylic Resurfacer.

### 3.3 APPLICATION OF ACRYLIC WEAR SURFACE

- A. All areas to be color coated shall be clean, free from sand, clay, grease, dust, salt or other foreign matters. The Contractor shall obtain the Engineer's approval, prior to applying any surface treatment.

- B. Blend Acrylotex neutral and DecoColor Ultra with a mechanical mixer to achieve a uniform mixture. The mix shall be:

DecoBase I	30 gallons
DecoColor Ultra	20 gallons
Water	10 gallons

- C. Application shall be made by 50 durometer rubber faced squeegees. The mixture should be poured on to the court surface and spread to a uniform thickness in a regular pattern.
- D. A total of 2 applications of textured DecoColor Ultra shall be made to achieve a total application rate of not less than .10 gal/sy. No application should be made until the previous application is thoroughly dry.
- E. A single finish coat of DecoColor Ultra shall then be mixed and applied in the same manner as the texture coats at a rate of .04 gal/sy. The mix shall be:

DecoColor MP55	55 gallons
Water	38 gallons

### 3.4 LINE PAINTING

- A. Line shall be 2” wide unless otherwise noted on the drawings. Lines shall be carefully laid out in accordance with ASBA and USTA guidelines. The area to be marked shall be taped to insure a crisp line. The California Line Paint shall have a texture similar to the surrounding play surface. Application shall be made by brush or roller at the rate of 150-200 sf./gal. (3/4 gal. per tennis court).

### 3.6 PROTECTION

- A. Erect temporary barriers to protect coatings during drying and curing.
- B. Lock gates to prevent use until acceptance by the owner’s representative.

### 3.7 CLEAN UP

- A. Remove all containers, surplus materials and debris. Dispose of materials in accordance with local, state and Federal regulations.
- B. Leave site in a clean and orderly condition.

# CHAINLINK FENCE WIND SCREEN SLATS

## PART 1 GENERAL

### 1.1 GENERAL DESCRIPTION

- A. HDPE slats for chain link fencing at athletic courts.

### 1.2 RELATED SECTIONS

- A. Related Work
  - 1. Section 32 31 13 – Chain Link Fencing

### 1.3 SUBMITTALS

- A. Manufacturer specifications for components, color chart and installation instructions.

## PART 2 PRODUCTS

### 2.1 MANUFACTURERS

- A. PDF Commercial Fence Products, a division of Pexco LLC, Atlanta, GA / <https://www.pexco.com/fence>

### 2.2 MATERIALS

- A. Windscreen – Top Lock 2” Tubular HDPE with top locking holes and locking channel.

### 2.3 MATERIAL SPECIFICATIONS

- A. HDPE Slats & Channel – 1-3/32” wide x 8’ tall. 0.945 density and 3,500 PSI tensile strength. Minimum temperature of -70° to retain flexibility. Maximum temperature of 180° with no distortion.

## PART 3 EXECUTION

### 3.1 INSTALLATION

- A. Insert slats vertically in chain link fence from top to bottom, ensuring locking holes are aligned along the top. Thread locking channel horizontally through the notched holes in the top of the slats.

### 3.2 CLEAN UP

- A. Remove all containers, surplus materials and debris. Dispose of materials in accordance with local, state and Federal regulations.
- B. Leave site in a clean and orderly condition.