

# PROJECT MANUAL

*Heard County  
Glover Road Park  
Franklin, Georgia*

*October 13, 2022  
Gardner Spencer Smith Tench & Jarbeau, PC  
Project No. 20106*



## **PART 1 GENERAL**

### **1.01 SECTION INCLUDES**

- A. Formwork for cast-in place concrete, with shoring, bracing and anchorage.
- B. Openings for other work.
- C. Form accessories.
- D. Form stripping.

### **1.02 RELATED REQUIREMENTS**

- A. Section 03 2000 - Concrete Reinforcing
- B. Section 03 3000 - Cast-in-Place Concrete

### **1.03 REFERENCE STANDARDS**

- A. ACI 117 - Specifications for Tolerances for Concrete Construction and Materials 2010 (Reapproved 2015).
- B. ACI 318 - Building Code Requirements for Structural Concrete and Commentary 2014 (Errata 2018).
- C. ACI 347R - Guide to Formwork for Concrete 2014, with Errata (2017)

### **1.04 DESIGN REQUIREMENTS**

- A. Design, engineer and construct formwork, shoring and bracing to conform to design and code requirements; resultant concrete to conform to required shape, line and dimension.

### **1.05 SUBMITTALS**

- A. See RFP
- B. Product Data: Provide data on void form materials and installation requirements.
- C. Shop Drawings: Indicate pertinent dimensions, materials, bracing, and arrangement of joints and ties.

### **1.06 QUALITY ASSURANCE**

- A. Perform work of this section in accordance with ACI 347, ACI 301, and ACI 318.
- B. Designer Qualifications: Design formwork under direct supervision of a Professional Structural Engineer experienced in design of concrete formwork and licensed in the State of Georgia.
- C. Plywood: Conform to tables for form design and strength in APA Form V 345.

### **1.07 REGULATORY REQUIREMENTS**

- A. Conform to applicable code for design, fabrication, erection and removal of formwork.

### **1.08 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver prefabricated forms and installation instructions in manufacturer's packaging.
- B. Store prefabricated forms off ground in ventilated and protected manner to prevent deterioration from moisture.

## **PART 2 PRODUCTS**

### **2.01 FORMWORK - GENERAL**

- A. Provide concrete forms, accessories, shoring, and bracing as required to accomplish cast-in-place concrete work.

- B. Design and construct concrete that complies with design with respect to shape, lines, and dimensions.
- C. Comply with applicable state and local codes with respect to design, fabrication, erection, and removal of formwork.

## **2.02 GENERAL**

- A. Form materials may be reused during progress of the Work provided they are completely cleaned and reconditioned, recoated for each use, capable of producing formwork of required quality, and are structurally sound.
- B. Form Lumber: WCLIB Construction Grade or Better, WWPA No. 1 or Better.
- C. Plywood: PS 1-95, Group I, Exterior Grade B-B Plyform or better, minimum 5-ply and 3/4 inch thick for exposed locations and at least 5/8 inch thick for unexposed locations, grade marked, not mill oiled. Furnished plywood with medium or high density overlay is permitted.
- D. For Exposed Concrete Finish:
  - 1. Plywood: New, waterproof, synthetic resin bonded, exterior type Douglas fir or Southern pine plywood manufactured especially for concrete formwork and conforming to NIST PS 1, BB grade, class I.
  - 2. Glass-Fiber-Fabric Reinforced Plastic Forms: Matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to structural tolerances and appearance of finished concrete surfaces.
  - 3. Steel: Minimum 16 gage sheet, well matched, tight fitting, stiffened to support weight of concrete, without deflection detrimental to tolerances and appearances of finished concrete surfaces.
  - 4. Plywood: "Finland Form," or "Combi Form" distributed by North American Plywood Corporation. The material shall be furnished with hard smooth birch face veneers with phenolic resin thermally fused onto panel sides. Edges shall be factory sealed.
- E. Form Ties: Prefabricated rod, flat band, wire, internally threaded disconnecting type, not leaving metal within 1-1/2 inch of concrete surface.
- F. Form Coating: Non-staining clear coating free from oil, silicone, wax, not grain-raising, "Formshield" by A.C. Horn, Inc., "Release" by Burke Concrete Accessories, or "Cast-Off" by Sonneborn Building Products. Where form liners are furnished, provide form coatings recommended by form liner manufacturer.
- G. Form Liner: Rigid or resilient type by L.M. Scofield, Labrado Forms, Symons, or Greenstreak.

## **2.03 FORMWORK ACCESSORIES**

- A. Form Ties: Removable type, galvanized metal, fixed length, free of defects that could leave holes larger than 1 inch in concrete surface.
- B. Form Release Agent: Colorless mineral oil that will not stain concrete.
- C. Corners: Filleted, rigid plastic type; 3/4 inch size; maximum possible lengths.



- D. Dovetail Anchor Slot: Galvanized steel, 22 gage thick, foam filled, release tape sealed slots, anchors for securing to concrete formwork.
- E. Flashing Reglets: Galvanized steel, 22 gage thick, longest possible lengths, with alignment splines for joints, foam filled, release tape sealed slots, anchors for securing to concrete formwork.
- F. Nails, Spikes, Lag Bolts, Through Bolts, Anchorages: Sized as required, of sufficient strength and character to maintain formwork in place while placing concrete.
- G. Embedded Anchor Shapes, Plates, Angles and Bars: As specified in Section 05 1200.
- H. Waterstops: Rubber, minimum 1,750 psi tensile strength, minimum 50 degrees F to plus 175 degrees F working temperature range, 6 inch wide, maximum possible lengths, ribbed profile, preformed corner sections, heat welded jointing.
  - 1. Manufacturers:
    - a. Paul Murphy Plastics Co., ribbed bulb, 6 inch.
    - b. American Colloid Company, Waterstop RX, Butyl rubber bentonite compound rope, 25% composition.
    - c. Synko - Flex Products, Inc. Superstop.
    - d. Substitutions: See Division 01 - Product requirements.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify lines, levels and centers before proceeding with formwork. Ensure that dimensions agree with drawings.

#### **3.02 EARTH FORMS**

- A. Do not use earth cuts for formed vertical surfaces unless approved by Gardner Spencer Smith Tench & Jarbeau, P.C..
- B. Where allowed, hand trim sides and bottom of earth forms. Remove loose soil prior to placing concrete.

#### **3.03 ERECTION - FORMWORK**

- A. Erect formwork, shoring and bracing to achieve design requirements, in accordance with requirements of ACI 301.
- B. Provide bracing to ensure stability of formwork. Shore or strengthen formwork subject to overstressing by construction loads.
- C. Forms shall be constructed so as to shape final concrete structure conforming to shape, lines and dimensions of members required by Drawings and Specifications, and shall be sufficiently tight to prevent leakage of mortar. They shall be properly braced or tied together to maintain position and shape. Forms and their supports shall be designed so that previously placed structures will not be damaged. Forms shall be true to line within a tolerance of plus-or-minus 1/250 of the span.
- D. Plywood shall be installed with horizontal joints level, vertical joints plumb and with joints tight. Back joints by studs or solid blocking, and fill where necessary for smoothness. Reused plywood shall be thoroughly cleaned, damaged edges or surfaces repaired and both sides and edges oiled with colorless form oil. Nail plywood along edges, and to intermediate supports, with common wire nails spaced as necessary to maintain alignment and prevent warping.
- E. Provisions for Other Trades: Provide openings in concrete formwork to accommodate work of other trades and accurately place and securely support items to be built into forms.
- F. Openings for Cleaning: Provide temporary openings at points in formwork to facilitate cleaning and inspection. At base of walls and wide piers, bottom form board on one face for entire length shall be omitted until form has been cleaned and inspected.



- G. Preparation and Tightening: Thoroughly clean forms and adjacent surfaces to receive concrete.
  - 1. Form Surface Treatment:
    - a. Before placing reinforcing steel or concrete, coat the form surfaces with a material that will effectively prevent absorption of moisture, prevent bond with concrete and not stain concrete.
    - b. A field applied form release agent or factory applied non-absorptive liner material may be used.
    - c. Do not allow form release agent to stand in puddles, come into contact with reinforcing steel or hardened concrete against which fresh concrete is to be placed.
  - 2. Remove loose metal, wood chips, sawdust, dirt, trash, and other debris just prior to concrete placement.
  - 3. Re-tighten forms during and immediately after concrete placement to eliminate leaks.
- H. Arrange and assemble formwork to permit dismantling and stripping. Do not damage concrete during stripping. Permit removal of remaining principal shores.
- I. Align joints and make watertight. Keep form joints to a minimum.
- J. Obtain approval before framing openings in structural members that are not indicated on drawings.
- K. Provide fillet and chamfer strips on external corners of beams, joists, and columns.
- L. Install void forms in accordance with manufacturer's recommendations. Protect forms from moisture or crushing.
- M. Coordinate this section with other sections of work that require attachment of components to formwork.
- N. If formwork is placed after reinforcement, resulting in insufficient concrete cover over reinforcement, request instructions from Gardner Spencer Smith Tench & Jarbeau, P.C. before proceeding.

#### **3.04 APPLICATION - FORM RELEASE AGENT**

- A. Apply form release agent on formwork in accordance with manufacturer's recommendations.
- B. Apply prior to placement of reinforcing steel, anchoring devices, and embedded items.
- C. Do not apply form release agent where concrete surfaces will receive special finishes or applied coverings that are affected by agent. Soak inside surfaces of untreated forms with clean water. Keep surfaces coated prior to placement of concrete.

#### **3.05 INSERTS, EMBEDDED PARTS, AND OPENINGS**

- A. Set and build into the work anchorage devices, inserts, and other embedded items required for material attached to or supported by cast-in-place concrete.
- B. Use setting drawings, diagrams, instructions, and directions provided by suppliers items to be attached.
- C. Do not place embedded items in any manner that will displace or interfere with the reinforcing steel.
- D. Conduit:
  - 1. Embed all electrical conduit in slabs.
  - 2. Wire conduit inside layers of reinforcement.
  - 3. Wire conduit to reinforcement perpendicular to the conduit. Do not wire to parallel reinforcement.
  - 4. Separate parallel conduit by 2 inches, minimum.
- E. Waterstops:
  - 1. Install in greatest continuous lengths possible.

2. Do not displace concrete reinforcement.
  3. Splice waterstops in accordance with manufacturer's written recommendations.
- F. Junction Boxes:
1. Boxes of any depth may be located in slabs, beams and soffits, and headers.
  2. Do not locate in joist soffits.
  3. Provide header to accommodate junction boxes over 2 1/4 inches deep.
- G. Provide formed openings where required for items to be embedded in passing through concrete work.
- H. Locate and set in place items that will be cast directly into concrete.
- I. Coordinate with work of other sections in forming and placing openings, slots, reglets, recesses, sleeves, bolts, anchors, other inserts, and components of other work.
- J. Position recessed anchor slots for brick veneer masonry anchors to spacing and intervals specified in Division 04.
- K. Install accessories in accordance with manufacturer's instructions, so they are straight, level, and plumb. Ensure items are not disturbed during concrete placement.
- L. Install waterstops in accordance with manufacturer's instructions, so they are continuous without displacing reinforcement. Heat seal joints so they are watertight.
- M. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection. Locate openings at bottom of forms to allow flushing water to drain.
- N. Close temporary openings with tight fitting panels, flush with inside face of forms, and neatly fitted so joints will not be apparent in exposed concrete surfaces.

### 3.06 FORM CLEANING

- A. Clean forms as erection proceeds, to remove foreign matter within forms.
- B. Clean formed cavities of debris prior to placing concrete.
  1. Flush with water or use compressed air to remove remaining foreign matter. Ensure that water and debris drain to exterior through clean-out ports.
  2. During cold weather, remove ice and snow from within forms. Do not use de-icing salts. Do not use water to clean out forms, unless formwork and concrete construction proceed within heated enclosure. Use compressed air or other means to remove foreign matter.

### 3.07 FORMWORK TOLERANCES

- A. Construct formwork to maintain tolerances required by ACI 117, unless otherwise indicated.
- B. Construct and align formwork for elevator hoistway in accordance with ASME A17.1.
- C. Camber slabs and beams in accordance with ACI 301.
- D. Construct formwork to provide completed cast-in-place concrete surfaces:
  1. Variation in depth of stair treads: 3/16 inch, maximum.
  2. Variation from level in slabs: +/- 1/4 inch in any 10 foot radius.
  3. Piers, Columns, and Walls:
    - a. Variation in plan from straight lines parallel to specified linear building lines:
      - 1) 1/40 in/ft adjacent members less than 20 feet apart or any wall or bay length less than 20 feet.
      - 2) 1/2 inch adjacent members 20 feet or more apart or any wall or bay length 20 feet or more.
    - b. Variation in elevation from lines parallel to specified grade lines:
      - 1) 1/40 in/ft adjacent members less than 20 feet apart or any wall or bay length less than 20 feet.
      - 2) 1/2 inch adjacent members 20 feet or more apart or any wall or bay length 20 feet or more.



- c. Variation in cross-sectional dimension of pan formed joist: Minus 1/4 inch, plus 1 1/2 inch.

### **3.08 RE-USE OF FORMS**

- A. Re-Use forms only when properly maintained and in condition to produce the formed finish required.
- B. Do not re-use forms that cannot be tightly butted and made watertight.
- C. Repair forms between uses:
  - 1. Align and tighten to provide secure and watertight joints and avoid offsets.
  - 2. Do not plug old tie holes that will not be reused.
  - 3. Replace materials containing unused tie holes.
  - 4. Split, frayed, delaminated or otherwise damaged form facing material is not acceptable.
  - 5. Do not use patched forms for exposed concrete surfaces unless approved by Gardner Spencer Smith Tench & Jarbeau, P.C..

### **3.09 FIELD QUALITY CONTROL**

- A. An independent testing agency will perform field quality control tests, as specified in Division 01.
- B. Inspect erected formwork, shoring, and bracing to ensure that work is in accordance with formwork design, and to verify that supports, fastenings, wedges, ties, and items are secure.

### **3.10 FORM REMOVAL**

- A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads.
- B. Forms shall not be removed until concrete has sufficiently hydrated to maintain its integrity and not be damaged by form removal operations.
- C. Compressive strength of in-place concrete shall be determined by testing field-cured specimens representative of concrete location or members, as specified in Section 03 3000 - Cast-in-Place Concrete.
- D. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.
- E. Store removed forms to prevent damage to form materials or to fresh concrete. Discard damaged forms.

### **3.11 PROTECTION**

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

### **3.12 CLEAN UP**

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

**END OF SECTION**

## **PART 1 GENERAL**

### **1.01 SECTION INCLUDES**

- A. Reinforcing steel for cast-in-place concrete.
- B. Supports and accessories for steel reinforcement.

### **1.02 RELATED REQUIREMENTS**

- A. Section 03 1000 - Concrete Forming and Accessories
- B. Section 03 3000 - Cast-in-Place Concrete

### **1.03 REFERENCE STANDARDS**

- A. ACI 301 - Specifications for Structural Concrete 2016.
- B. ACI 318 - Building Code Requirements for Structural Concrete and Commentary 2014 (Errata 2018).
- C. ACI SP-66 - ACI Detailing Manual 2004.
- D. ASTM A82/A82M - Standard Specification for Steel Wire, Plain, for Concrete Reinforcement; 2007.
- E. ASTM A184/A184M - Standard Specification for Welded Deformed Steel Bar Mats for Concrete Reinforcement 2019.
- F. ASTM A185/A185M - Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete; 2007.
- G. ASTM A497/A497M - Standard Specification for Steel Welded Wire Reinforcement, Deformed, for Concrete; 2007.
- H. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement 2020.
- I. ASTM A641/A641M - Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire 2019.
- J. ASTM A704/A704M - Standard Specification for Welded Steel Plain Bar or Rod Mats for Concrete Reinforcement 2019, with Editorial Revision.
- K. AWS D1.4/D1.4M - Structural Welding Code - Reinforcing Steel 2018.
- L. CRSI (DA4) - Manual of Standard Practice 2009.
- M. CRSI (P1) - Placing Reinforcing Bars 2011.

### **1.04 SUBMITTALS**

- A. See Division 01 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Comply with requirements of ACI SP-66. Include bar schedules, shapes of bent bars, spacing of bars, and location of splices.
  - 1. Prepare shop drawings under seal of a Professional Structural Engineer experienced in design of work of this type and licensed in the State of Georgia.
- C. Manufacturer's Certificate: Certify that reinforcing steel and accessories supplied for this project meet or exceed specified requirements.
- D. Reports: Submit certified copies of mill test report of reinforcement materials analysis.
- E. Closeout Submittals: Record exact locations of reinforcing that vary from Shop Drawings.

### **1.05 QUALITY ASSURANCE**

- A. Perform work of this section in accordance with ACI 301.
- B. Provide Gardner Spencer Smith Tench & Jarbeau, P.C. with access to fabrication plant to facilitate inspection of reinforcement. Provide notification of commencement and



duration of shop fabrication in sufficient time to allow inspection.

- C. Welders' Certificates: Submit certifications for welders employed on the project, verifying AWS qualification within the previous 12 months.
- D. Source Quality Control: Refer to Division 01 Sections for general requirements and to following paragraphs for specific procedures. Testing laboratory retained by Heard County Board of Commissioners shall perform following conformance testing, select test Samples of bars, ties, and stirrups from the material at the Project site or from the place of distribution, with each Sample consisting of not less than two 18 inch long pieces, and perform the following tests according to ASTM A 615.
  - 1. Identified Bars: If Samples are obtained from bundles as delivered from the mill, identified as to heat number, accompanied by mill analyses and mill test reports, and properly tagged with the identification certificate so as to be readily identified, perform one tensile and one bend test for each 10 tons or fraction thereof of each size of bars. Submit mill reports when Samples are selected.
  - 2. Unidentified Bars: When positive identification of reinforcing bars cannot be performed and when random Samples are obtained, perform tests for each 2.5 tons or fraction thereof, one tensile and one bend test from each size of bars.

#### **1.06 DELIVERY, STORAGE AND HANDLING**

- A. Avoid exposure to dirt, moisture or conditions harmful to reinforcing.
- B. Reinforcing steel bars, wire, and wire fabric shall be stored on the Project site to permit easy access for examination and identification of each shipment. Material of each shipment shall be separated for size and shape.

### **PART 2 PRODUCTS**

#### **2.01 REINFORCEMENT**

- A. Provide reinforcing of sizes, gages and lengths indicated, bent to indicated shapes.
- B. Steel Reinforcing Bars: ASTM A 615, or ASTM A 706 deformed grade 60 billet steel unless otherwise specified or indicated.
- C. Bars or Rod Mats: ASTM A 184.
- D. Wire Fabric for Reinforcement: ASTM A 185.
- E. Reinforcement Accessories:
  - 1. Tie Wire: ASTM A 82, fully annealed, copper-bearing steel wire, 16 gage minimum.
  - 2. Chairs, Spacers, Supports, and Other Accessories: Standard manufacture conforming to ACI-315 fabricated from steel wire of required types and sizes. For reinforcement supported from grade, provide properly sized dense precast blocks of concrete.

#### **2.02 FABRICATION**

- A. Comply with CRSI Manual of Standard Practice for Reinforced Concrete Construction for fabrication of reinforcing steel.
- B. Bending and Forming: Fabricate bars of the indicated sizes and bend and form to required shapes and lengths by methods not injurious to materials. Do not heat reinforcement for bending. Bend bars No. 6 size and larger in the shop only. Bars with unscheduled kinks or bends are not permitted. Provide only tested and permitted bar materials.
- C. Welding: Provide only ASTM A 706 steel where welding is indicated. Perform welding by the direct electric arc process in accordance with AWS D1.4 and specified low-hydrogen electrodes. Preheat 6 inches each side of joint. Protect joints from drafts during the cooling process; accelerated cooling is not permitted. Do not tack weld bars. Clean metal surfaces to be welded of loose scale and foreign material. Clean welds each time electrode is changed and chip burned edges before placing welds. When wire brushed, the completed welds must exhibit uniform section, smooth welded metal,

feather edges without undercuts or overlays, freedom from porosity and clinkers, and good fusion and penetration into the base metal. Cut out welds or parts of welds deemed defective, using chisel, and replace with proper welding.

### **PART 3 EXECUTION**

#### **3.01 PLACEMENT**

- A. Place, support and secure reinforcement against displacement. Do not deviate from required position.
- B. Do not displace or damage vapor barrier.
- C. Accommodate placement of formed openings.
- D. Bars shall be bent cold. Bars partially embedded in concrete shall not be field bent except as indicated on reviewed Shop Drawings. Before installation, clean reinforcing of loose scale, rust, oil, dirt and any coating that could reduce bond.
- E. Accurately position, install, and secure reinforcing to prevent displacement during the placement of concrete.
- F. Provide metal chairs to hold reinforcement the required distance above form bottoms. In beams and slab construction, provide chairs under top slab reinforcement as well as under bottom reinforcement. Space chairs so that reinforcement will not be displaced during installation. Provide metal spacers to secure proper spacing. Stirrups shall be accurately and securely wired to bars at both top and bottom. At slabs, footings, and beams in contact with earth, provide concrete blocks to support reinforcement at required distance above grade.
- G. Install and secure reinforcement to maintain required clearance between parallel bars and between bars and forms. Lapped splices shall be installed wherever possible in a manner to provide required clearance between sets of bars. Stagger lapped splices. Dowels and bars extending through construction joints shall be secured in position against displacement before concrete is installed and subsequently cleaned of concrete encrustation's while they are still soft.
- H. Do not install reinforcing in supported slabs and beams until walls and columns have been installed to underside of slabs and beams or until construction joints have been thoroughly cleaned. Reinforcing shall be inspected before placement of concrete and cleaned as required.
- I. Use deformed bars unless otherwise indicated, except for spiral reinforcement.

#### **3.02 FIELD QUALITY CONTROL**

- A. An independent testing agency, as specified in Division 01, will inspect installed reinforcement for conformance to contract documents before concrete placement.

#### **3.03 CLEAN UP**

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

#### **3.04 PROTECTION**

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

**END OF SECTION**



## **PART 1 GENERAL**

### **1.01 SECTION INCLUDES**

- A. Concrete slabs

### **1.02 RELATED REQUIREMENTS**

- A. Section 03 1000 - Concrete Forming and Accessories: Forms and accessories for formwork.
- B. Section 03 2000 - Concrete Reinforcing.

### **1.03 REFERENCE STANDARDS**

- A. ASTM A185/A185M - Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete; 2007.
- B. ASTM A497/A497M - Standard Specification for Steel Welded Wire Reinforcement, Deformed, for Concrete; 2007.
- C. ASTM C171 - Standard Specification for Sheet Materials for Curing Concrete 2016.
- D. ASTM D994/D994M - Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type) 2011 (Reapproved 2016).
- E. ASTM E 1155M - Standard Test Method for Determining F(F) Floor Flatness and F(L) Floor Levelness Numbers [Metric]; 1996 (Reapproved 2008).

### **1.04 SUBMITTALS**

- A. Shop Drawings: Submit Shop Drawings indicating locations of cast-in-place concrete Work and accessory items such as vapor barriers. Include details and locations of reinforcing, embedded items, and interfacing with other Work.
- B. Product Data: Submit manufacturers' data on manufactured products showing compliance with specified requirements and installation instructions.
- C. Material Samples: Submit Samples illustrating concrete finishes, minimum 12 inches x 12 inches in size.
- D. Manufacturer's Installation Instructions: For concrete accessories, indicate installation procedures and interface required with adjacent construction.
- E. Project Record Documents: Accurately record actual locations of embedded utilities and components that will be concealed from view upon completion of concrete work.
- F. Certificates: Submit a notarized certificate that each of following conforms to standards indicated:
  - 1. Aggregates – ASTM Standards C33.
  - 2. Admixtures - ASTM Standards C260.
  - 3. Curing materials - ASTM Standards C171.

### **1.05 RECORD DOCUMENTS**

- A. Ready-mixed concrete shall be used for all cast-in-place concrete. Ready-mixed concrete suppliers shall each qualify under the requirements of ASTM Specification C 94-06a entitled "Ready-Mixed Concrete". Ready-mixed concrete shall be mixed and transported as required by the same ASTM Specification, and delivery tickets shall be dated the time of leaving the plant and the time the truck is completely unloaded..
- B. Submit shop drawings in accordance with the requirements of the Submittals Section. Show size, type, and location of all reinforcing bars, bar supports, and forms. Drawings must bear the approval of the General contractor. Drawings will not be reviewed without this approval.
- C. Submit mix designs for review.

## **1.06 QUALITY ASSURANCE**

- A. Perform work of this section in accordance with ACI 301 and ACI 318.
- B. Follow recommendations of ACI 305R when concreting during hot weather.
- C. Follow recommendations of ACI 306R when concreting during cold weather.
- D. Continuous inspection shall be provided at the batch plant and for transit-mixed concrete to run check sieve analysis of aggregate, check moisture content of fine aggregate, check design of mix, check cement being used with test reports, check loading of mixer trucks, and certify to quantities of materials placed in each mixer truck.
- E. Inspection shall be performed by a representative of a testing laboratory selected by Heard County Board of Commissioners. Heard County Board of Commissioners will pay for inspection costs. Notify the laboratory 24 hours in advance of time concrete is to be mixed. Notify the laboratory of postponement or cancellation of mixing within at least 24 hours of scheduling time.
- F. Continuous batch plant inspection requirement may be waived. Waiver shall be in writing, including Heard County Board of Commissioners approval.
- G. Strength Test of Concrete: Refer to Division 01: Testing and Inspection.

## **1.07 WARRANTY**

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

## **1.08 DELIVERY, STORAGE AND HANDLING**

- A. Mixing and Placing Concrete: Refer to Division 01: Testing and Inspection.
- B. Ready-mix concrete shall be mixed and delivered in accordance with ASTM C 94 . Each batch of concrete delivered to the Project site shall be accompanied by a time slip bearing departure time and signature of batch plant supervisor. Concrete shall be placed within 90 minutes after start of mixing.
- C. Store cement and aggregate materials so as to prevent their deterioration or intrusion by foreign matter. Deteriorated or contaminated materials shall not be furnished.

## **1.09 JOB CONDITIONS**

- A. Cold Weather Requirements:
  - 1. Adequate equipment shall be provided for heating concrete materials and protecting concrete during freezing or near-freezing weather. Surfaces, in which concrete is to come in contact with, shall be free from frost or ice. No frozen materials or materials containing ice shall be furnished.
  - 2. When placing concrete during freezing or near-freezing weather the mix shall have a temperature of at least 50 degrees F., but not more than 90 degrees F. when cement is added. Concrete shall be maintained at a temperature of at least 50 degrees F. for at least 72 hours after placing or until it has thoroughly hydrated. When necessary, concrete materials shall be heated before mixing. Special precautions shall be provided for protection of transit-mixed concrete.
- B. Hot Weather Requirements: During hot weather, proper attention shall be provided for ingredients, production methods, handling, placing, protection and curing, to prevent excessive concrete temperatures or water evaporation which could impair required strength or durability.

## **PART 2 PRODUCTS**

### **2.01 GENERAL**

- A. Ready-Mixed Concrete: Mix and deliver in accordance with requirements of ASTM C94.
- B. Strength of Concrete: Concrete, unless otherwise indicated or specified, shall be provided with a minimum ultimate 28-day strength of 3000 psi (f'c). For high-early-strength concrete, age for reaching the f'c shall be as indicated on Drawings.



## **2.02 FORMWORK**

- A. Comply with requirements of Section 03 1000.

## **2.03 REINFORCEMENT**

- A. Comply with requirements of Section 03 2000.

## **2.04 CONCRETE MATERIALS**

- A. Cement: ASTM C 150. Furnished cement shall be as selected and reviewed for concrete proportioning.
- B. Aggregates: Aggregates shall conform to ASTM C 33 and C 227 except as modified herein. Any suitable individual grading of coarse aggregate may be furnished, provided Grading of Combined Aggregate indicated in following table is obtained. Refer to Section 01420: Testing and Inspection.

## **2.05 GRADING OF COMBINED AGGREGATE**

- A. Sieve Number or 1-1/2" 1 3/4"
- B. Size in Inches Maximum Maximum Maximum
- C. Passing a 2"-----
- D. Passing a 1-1/2" 95-100-----
- E. Passing a 1" 70-90 90-100-----
- F. Passing a 3/4" 50-80 70-95 90-100
- G. Passing a 3/8" 40-60 45-70 55-75
- H. Passing a No. 435-55 35-55 40-60
- I. Passing a No. 825-40 27-45 30-46
- J. Passing a No. 1616-34 20-38 23-40
- K. Passing a No. 3012-25 12-27 13-28
- L. Passing a No. 502-125-155-15
- M. Passing a No. 1000-30-50-5
- N. Water: Water shall be potable and free from deleterious matter.
- O. Admixtures: ASTM C 494.
- P. Expansion Joint Fillers: Preformed strips, non-extruding and resilient bituminous type, of thickness indicated, conforming to ASTM D 1751.

## **2.06 CONCRETE MIX DESIGN**

- A. All Concrete
  - 1. 28-Day Strength: 3000 psi
  - 2. Type: Normal Weight
  - 3. Slump Range: 4" + 1"
  - 4. Weight: 135 pcf - 150 pcf
  - 5. Air Entrained: 5% + 1% (For Exterior Concrete Only)
- B. Accessories: Accessories used in exposed concrete shall be galvanized. Footing and slab-on-ground reinforcements shall be supported on solid blocks of concrete, concrete brick, or similar concrete masonry.

## **PART 3 EXECUTION**

### **3.01 GENERAL**

- A. Time of Placing: Do not place concrete until reinforcement, conduits, outlet boxes, anchors, hangers, sleeves, bolts, and other embedded materials are securely fastened in place. Contact the Heard County Board of Commissioners's OR at least 24 hours before placing concrete; do not place concrete until inspected by the Heard County Board of Commissioners's OR.

- B. Pouring Record: A record shall be kept on the Project site of time and date of placing concrete in each portion of structure. Such record shall be maintained on the Project site until Substantial Completion and shall be available for examination by Gardner Spencer Smith Tench & Jarbeau, P.C. and Heard County Board of Commissioners's OR.

### **3.02 EXAMINATION**

- A. Verify lines, levels, and dimensions before proceeding with work of this section.

### **3.03 PREPARATION**

- A. Reglets and Rebates:
  - 1. If concrete slabs on grade adjoin a wall or other perpendicular concrete surface, form a reglet in wall to receive and carry horizontal concrete Work. Reglet shall be full thickness of the slab and shall be 3/4 inch wide, unless otherwise indicated. Requirement does not apply to exterior walks, unless specifically indicated
- B. Screeds: Install screeds accurately and maintain at required grade or slab elevations after steel reinforcement has been installed , but before starting to place concrete. Install screeds adjacent to walls and in parallel rows not to exceed 8 feet on centers.
- C. Formwork: Comply with requirements of ACI 301. Design and fabricate forms to support all applied loads until concrete is cured, and for easy removal without damage to concrete.
  - 1. Earth forms may be used for footing forms providing the earth is clean cut, and bottoms level and sound.
  - 2. Construct to conform to the shape, lines, grades and dimensions indicated on the drawings.
  - 3. Verify that forms are clean and free of rust before applying release agent.

### **3.04 PLACING CONCRETE**

- A. Place concrete in accordance with ACI 304R.
- B. Conveying and Placing:
  - 1. Concrete shall be conveyed from mixer to location of final placement by methods, which will prevent separation or loss of materials.
  - 2. Concrete shall be placed as nearly as practicable to its final position to avoid segregation due to re-handling or flowing. No concrete that has partially hydrated or has been contaminated by foreign materials shall be placed, nor shall re-tempered concrete or concrete which has been remixed after initial set be placed.



5. Concrete shall be placed as a continuous operation until placing of panel or section is completed.
  6. Concrete shall be thoroughly consolidated during placement, and shall be worked around reinforcement and embedded fixtures with mechanical vibrators.
    - a. Vibrators of the internal type shall be used to mechanically vibrate concrete while being placed. Particular attention shall be given the vibrating concrete to insure a dense, homogeneous mass free of air bubbles and honeycombs; however, care shall be taken not to separate materials by excessive vibrating. Vibrators shall not be used as a transporting facility.
  7. Where conditions make consolidation difficult, or where reinforcement is congested, batches of mortar containing same proportions of cement, sand, and water as provided in the concrete, shall first be deposited in the forms to a depth of at least one inch.
- C. Compaction and Screeding:
1. Tamp freshly placed concrete with a heavy tamper until at least 3/8 inch of mortar is brought to surface. Concrete shall then be tamped with a light tamper and screeded with a heavy straightedge until depressions and irregularities are eliminated, and surface is true to finish grades or elevations. Remove excess water and debris.
  2. Where slabs are to receive separate cement finish or mortar setting bed, continued tamping to raise mortar to surface is not performed. Laitance shall be removed by brushing with a stiff brush or by light sandblasting to expose clean top surface of coarse aggregate.
- CI. Curing:
1. Concrete shall be maintained above 50 degrees F., and in a moist condition for 7 days after placing, except that high early strength concrete shall be maintained in a moist condition for 3 days.
- CII. Cement Base: Cement base shall be of the height, thickness, and shape detailed. Base shall be reinforced with one inch mesh, 18 gage, zinc-coated wire fabric. Base finish mixture shall be one part Portland cement, 2 parts of fine aggregate and one part pea gravel. Colored cement base shall include a chemically inert mineral oxide pigment in the mix.

### 3.05 FIELD QUALITY CONTROL

- A. Molded Cylinder Tests:
1. Testing Agency will prepare cylinders. Each cylinder shall be dated, given a number, point in structure from which sample was obtained, mix design number, mix design strength and result of accompanying slump test noted.
  2. Separate tests of molded concrete cylinders obtained at same place and time shall be made at age of 3 days, 7 days, and 28 days. A strength test shall be the average of the compressive strength of 2 cylinders, obtained from the same sample of concrete and tested at 28 days or at test age designated for determination of  $f'_c$ .
  3. Test cylinders shall be prepared at the Project site and stored in testing laboratory in accordance with ASTM C 31, and tested in accordance with ASTM C 39.
- B. Core Test: Cores of hardened concrete shall be cut from portions of hydrated structures for testing, in accordance with ASTM C 42.
1. Provide 4 inch diameter cores at representative places throughout the slabs.

2. Where cores have been removed, fill voids with drypack, and patch the finish to match the adjacent existing surfaces.
- C. Concrete Consistency: Measure consistency according to ASTM C 143. Test twice each day or partial day's run of the mixer.
- D. Adjustment of Mix: If the strength of any grade of concrete for any portion of Work, as indicated by molded test cylinders, fall below minimum 28 days compressive strength specified or indicated, adjust mix design for remaining portion of construction so that resulting concrete meets minimum strength requirements.

### **3.06 DEFECTIVE CONCRETE**

- A. Should strength of any grade of concrete, for any portion of Work indicated by tests of molded cylinders and core tests, fall below minimum 28 days strength specified or indicated, concrete will be deemed defective Work and shall be replaced or adequately strengthened.
- B. Concrete Work that is not formed as indicated, not true to intended alignment, not plumb or level where so intended, not true to intended grades and levels, contains sawdust shavings, wood or embedded debris, or does not fully conform to Contract provisions, shall be deemed to be defective Work and shall be removed and replaced.

### **3.07 CLEAN UP**

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

### **3.08 PROTECTION**

- A. Do not permit traffic over unprotected concrete floor surface until fully cured.
- B. Protect the Work of this section until Substantial Completion.

**END OF SECTION**



## **PART 1 GENERAL**

### **1.01 SECTION INCLUDES**

- A. Application of acrylic color coating system over prepared asphaltic concrete pavement for tennis courts and recreational surfaces.
- B. Athletic game lines.

### **1.02 SYSTEM DESCRIPTION**

- A. Single component, skid-resistant coating, which provides a tough impervious surface with high resistance to water, greases, and ultraviolet light.

### **1.03 REFERENCES**

- A. ASTM C 136 - Method of Sieve Analysis of Fine and Coarse Aggregates.
- B. ASTM D 870 - Resistance to Water.
- C. ASTM D 2939 - Section 8 Test Method to Determine Residue by Evaporation.
- D. ASTM D 4214 - Resistance to Chalking.
- E. ASTM D 4587 - Resistance to Color Fading.
- F. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2005.
- G. ASTM E 96 - Standard Test Methods for Water Vapor Transmission of Materials; 2000.
- H. EPA - Toxicity Characteristics Leaching Procedure referenced in SW-846, 3rd Ed; 40 CFR, Part 261.
- I. United States Tennis Association (USTA) - Publication Tennis Courts 1992 - 1993 - Page 24 Layout of Tennis Court.

### **1.04 SUBMITTALS**

- A. See Division 01 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on specified products, describing physical and performance characteristics; sizes, patterns and colors available ; and dimensioned plans indicating layout of athletic recreational sports coatings.
- C. Samples: Submit two samples, 6 x 6 inch in size illustrating color representing manufacturers full range of available color finishes to athletic recreation sports coatings.
- D. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.
- E. Maintenance Data: Include damage prevention procedures, maintenance procedures, recommended maintenance materials, repairing surface, and suggested schedule for cleaning.

### **1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum five years documented experience.
- B. Applicator Qualifications: Company specializing in performing the work of this section with minimum five years experience.

### **1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Store materials in a dry, secure area.
- B. Storage: Keep material from freezing, store on pallets in a cool place; never in the hot sun.
- C. Record batch numbers from delivered material and enter into Warranty registration form.

### **1.07 PROJECT CONDITIONS**

- A. Existing conditions: Examine areas where materials are to be installed, particularly the sub-base, drainage, compaction and levelness.
- B. Ensure area to be surfaced is to be clear of any construction traffic, pedestrian traffic and any obstructions during application of product.

### **1.08 ENVIRONMENTAL REQUIREMENTS**

- A. Use of large volumes of surfacing material can lead to spills. Precautions should be taken, i.e. drop cloths, in order that areas not desirous of spillage do not sustain same.
- B. Apply coating in dry weather when pavement and atmospheric temperatures are fifty (50) degrees F. or above and are anticipated to remain above fifty (50) degrees F., and good drying conditions are present and expected for the next eight (8) hours.
- C. Do not apply if freezing temperatures are expected for at least forty-eight (48) hours.

### **1.09 WARRANTY**

- A. See Division 01 - Closeout Submittals, for additional warranty requirements.
- B. Special Warranty for surfacing material: Manufacturer's standard form in which manufacturer agrees to repair or replace the surfacing material against chalking, checking, fading, discoloration, or other adverse effects from ultraviolet rays of the sun, from weather moisture, or from weather temperatures, within specified warranty period.
  - 1. Warranty Period: 5 years from date of Substantial Completion.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Basis of design: Stegas, Inc; Product Acrytech: [www.tennispaint.com](http://www.tennispaint.com).
- B. Substitutions: See Section 01 6000 - Product Requirements.

### **2.02 MATERIALS**

- A. Color Coating: Two Color Acrylic.
  - 1. Colors to be selected by Gardner Spencer Smith Tench & Jarbeau, P.C. from the manufacturer's full range of available colors.
- B. Line Paint:
  - 1. A water-based acrylic striping paint.
- C. Aggregate:
  - 1. Washed, dry silica sand free of dust, trash, clay, organic materials or other contaminants.
  - 2. Gradation: To have an American Foundry Society grain fineness number that is no less than seventy (70) and no greater than one hundred (100) when tested in accordance with ASTM C 136 for color coat.
- D. Court Patch Binder:
  - 1. A water-based acrylic, polymer/portland cement/sand patching material.
- E. Acrylic Crack Sealant:
  - 1. Minimum dry solids by volume sixty nine (69) percent.
- F. Mixing Water
  - 1. Potable and free from harmful soluble salts.
  - 2. Temperature of the water: minimum fifty (50) degrees F./ten (10) degrees C.

### **2.03 MIXES**

- A. Color Coating Slurry Mixes: Per one hundred (100) gallons of color concentrate, add forty (40) to fifty (50) gallons of water, then add and mix from four (4) to eight (8) pounds per gallon of silica sand as per manufacturer's written specification.



## **2.04 EQUIPMENT**

- A. All equipment, tools, and machinery used for handling materials and executing work shall be in good working condition and capable of applying required coating weights evenly to provide a smooth uniform coated surface.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that sub-floor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive flooring.
- B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive flooring.
- C. Verify that sub-floor surfaces are dust-free and free of substances which would impair bonding of materials to sub-floor surfaces.
- D. Verify that required floor-mounted utilities and accessories are in correct location.
- E. Inspect existing pavement surfaces for condition and defect that will adversely affect quality of work, and which cannot be put into an acceptable condition through normal preparatory work as specified. Do not place coating if defects exist, notify Gardner Spencer Smith Tench & Jarbeau, P.C..
- F. Starting installation constitutes contractor's acceptance of surface as suitable for installation.

### **3.02 PREPARATION**

- A. Prepare concrete and/or asphaltic concrete surfaces to receive coatings as recommended by the coating manufacturer. Fill hairline and minor cracks, depressions, and broken or chipped areas as recommended by the manufacturer.
  - 1. Repair grade depressions: Prior to the application of coating materials, entire surface should be checked for minor depressions or irregularities. This is to be done by flooding the courts and after one-half (1/2) hour marking any depressions where water covers a nickel one eighth (1/8) inch. Fill such irregularities with court patch binder according to manufacturer's specifications.
  - 2. Clean all cracks thoroughly and fill.
    - a. Cracks less than one-quarter (1/4) inch in width shall be filled with acrylic crack sealant.
    - b. Cracks greater than one-quarter (1/4) inch in width shall be filled with court patch binder.
- B. Remove loose surface coatings with a high pressure water wash.
  - 1. Thoroughly clean surfaces to be coated to remove all foreign debris (dirt, silt, gravel, leaves, etc.) using mechanically powered forced air sweepers, mechanical street sweepers, steel bristle brooms and/or high pressure water.
  - 2. Thoroughly scrape mud areas and scrub wash with clean water.
- C. Surfaces to receive coating shall be clean, sound, smooth, and free from dust, dirt or oily residue.
- D. Protection: Protect adjacent curbs, walks, fences, and other items from receiving color coat or resurfacer.
- E. New pavements which have been accepted by Heard County Board of Commissioners's OR and Gardner Spencer Smith Tench & Jarbeau, P.C., shall be allowed to cure, and pass the "no water break" test before application. Cast one or two gallons of clean water from a suitable clean container (such as a 5 gallon pail) out on the surface. The water should sheet out and wet the surface uniformly without ribboning, crawling, or showing oil rings. (Comparable to water on very clean glass vs. dirty or greasy glass.) If the clean water does not wet the surface uniformly, the asphalt is not ready for coating and should age longer.

### **3.03 INSTALLATION**

- A. Apply in accordance with manufacturer's instructions.
- B. When making mixes add water first then while agitating add silica sand slowly. Keep mixture homogeneous prior to beginning application and during entire time mixture is being applied.
- C. Primer: On concrete substrates install one coat of concrete primer.
- D. Acrylic Filler: Install one coat of Acrylic Resurfacer.
- E. Color Base and Finish Coat: Install 3 coats of base and finish coats according to manufacturer's recommendation for type of play.
- F. Court Markings:
  - 1. When color coating is sufficiently cured, install court markings in accordance with the requirements of the color finish material manufacturer.
  - 2. Install line paint as recommended by finish coat manufacturer.
- G. Finished surface shall be free of streaks, pinholes, or uneven distribution of sand and shall have a uniform appearance..
- H. Apply game lines over base coat in accordance with diagram on shop drawings.
- I. Playing lines: Base lines shall be four (4) inches wide and playing lines not more than two (2) inches wide, accurately located and marked in accordance with rules of the United States Tennis Association, and painted with a paint recommended or approved by the manufacturer of the color finish material; however, use of traffic, oil, alkyd, or solvent-vehicle type paint is prohibited.

### **3.04 PROTECTION**

- A. Allow adequate time between applications for prior coat to dry thoroughly before applying next coat. Acrylic resurfacer can normally be re-coated after four (4) hours of good drying with sun. Color coats can normally be re-coated after two - four (2 - 4) hours of good drying with sun. Upon completion of final coat keep all foot traffic off sealed surface. Allow the final coat to cure at least twenty-four (24) hours, under good drying conditions, before allowing foot traffic on surface. Less favorable conditions will require longer drying times.
- B. Prohibit traffic on surfacing for one week after installation.
- C. Barricade area to protect surfacing until cured.
- D. Protect the Work of this section until Substantial Completion.

**END OF SECTION**



**SECTION 09 9000  
PAINTING AND COATING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Surface preparation.
- B. Field application of paints and other coatings.
- C. Scope: Finish all exterior surfaces noted on the drawings.
- D. Paint exposed surfaces, except where these Specifications indicate that the surface or material is not to be painted or is to remain natural. If an item or a surface is not specifically mentioned, paint the item or surface the same as similar adjacent materials or surfaces. If a color of finish is not indicated, Gardner Spencer Smith Tench and Jarbeau, PC will select from standard colors and finishes available.
- E. Do Not Paint or Finish the Following Items:
  - 1. Items fully factory-finished unless specifically so indicated; materials and products having factory-applied primers are not considered factory finished.
  - 2. Items indicated to receive other finishes.
  - 3. Items indicated to remain unfinished.
  - 4. Non-metallic roofing and flashing.
  - 5. Stainless steel, anodized aluminum, bronze, terne, and lead items.
  - 6. Marble, granite, slate, and other natural stones.
  - 7. Floors, unless specifically so indicated..
  - 8. Glass.

**1.02 DEFINITIONS**

- A. Conform to ASTM D16 for interpretation of terms used in this section.
- B. Exposed Surfaces: Includes areas visible when permanent or built-in components are in place. Extend coatings in these areas, as required, to maintain system integrity and provide desired protection.
- C. Standard coating terms defined in ASTM D 16 apply to this Section.
  - 1. Flat refers to a lusterless or matte finish with a gloss range below 15 when measured at an 85-degree meter.
  - 2. Eggshell refers to low-sheen finish with a gloss range between 20 and 35 when measured at a 60-degree meter.
  - 3. Semigloss refers to medium-sheen finish with a gloss range between 35 and 70 when measured at a 60-degree meter.
  - 4. Full gloss refers to high-sheen finish with a gloss range more than 70 when measured at a 60-degree meter.

**1.03 REFERENCE STANDARDS**

- A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency current edition.
- B. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications 2014.
- C. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Base Materials 2007.
- D. NACE (IMP) - Industrial Maintenance Painting; NACE International; Edition date unknown.
- E. SSPC (PM1) - Good Painting Practice: SSPC Painting Manual, Vol. 1; Society for Protective Coatings; Fourth Edition.

#### **1.04 SUBMITTALS**

- A. See Division 01 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on all finishing products, including VOC content.
  - 1. Provide cross-referenced data indicating equivalency of any proposed paint systems other than basis of design paint systems. Provide data indicating substrate material, vehicle type, per cent solids by weight, per cent solids by volume, dry film thickness, viscosity, specular gloss, and VOC/VOS content for each type material.
- C. Samples: Submit two paper chip samples, 12 x 12 inch in size illustrating range of colors and textures available for each surface finishing product scheduled.
- D. Samples for Verification: For each color and material to be applied, with texture to simulate actual conditions, on representative Samples of the actual substrate.
  - 1. Provide stepped Samples, defining each separate coat, including block fillers and primers. Use representative colors when preparing Samples for review. Resubmit until required sheen, color and texture are achieved.
  - 2. Provide a list of materials and applications for each coat of each Sample. Label each Sample for location and application.
  - 3. Submit Samples on the following substrates for Gardner Spencer Smith Tench and Jarbeau, PC's review of color and texture only:
    - a. Concrete: 4-inch square Samples for each color and finish.
    - b. Concrete Unit Masonry: 4-inch square Samples of masonry, with mortar joint in the center, for each finish and color.
    - c. Painted Wood: 8-inch square Samples for each color and material on hardboard.
    - d. Metal: 4-inch square Samples of flat metal and 8-inch long Samples of solid metal for each color and finish.
- E. Manufacturer's Instructions: Indicate special surface preparation procedures.
- F. Maintenance Data: Submit data on cleaning, touch-up, and repair of painted and coated surfaces.

#### **1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum three years documented experience.
- B. Applicator Qualifications: Company specializing in performing the type of work specified with minimum five years experience.
- C. Source Limitations: Obtain block fillers and primers for each coating system from the same manufacturer as the finish coats.

#### **1.06 REGULATORY REQUIREMENTS**

- A. Conform to applicable code for flame and smoke rating requirements for products and finishes.
- B. Existing paint surfaces may contain lead. Prior to execution of the work, test existing paint materials to be removed and abate all contaminated materials. Conform to applicable codes and regulations for the legal removal and disposal of existing lead based paints. Protect all persons, structures, and building systems from exposure to contaminants.

#### **1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.



### 1.08 FIELD CONDITIONS

- A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.
- B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.
- C. Do not apply exterior coatings during rain or snow, or when relative humidity is outside the humidity ranges required by the paint product manufacturer.
- D. Minimum Application Temperatures for Latex Paints: 45 degrees F for interiors; 50 degrees F for exterior; unless required otherwise by manufacturer's instructions.
- E. Minimum Application Temperature for Varnish Finishes: 65 degrees F for interior or exterior, unless required otherwise by manufacturer's instructions.
- F. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

### 1.09 COORDINATION

- A. Coordination of Work: Review other Sections in which primers are provided to ensure compatibility of the total system for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.
  - 1. Notify Gardner Spencer Smith Tench and Jarbeau, PC about anticipated problems when using the materials specified over substrates primed by others.

### 1.10 EXTRA MATERIALS

- A. See Division 01 - Product Requirements, for additional provisions.
- B. Supply 5 gallons of each color; store where directed.
- C. Label each container with color in addition to the manufacturer's label.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

- A. Provide all paint and coating products used in any individual system from the same manufacturer; no exceptions.
- B. Paints:
  - 1. Basis of Design-PPG Architectural Coatings (PPG): [www.ppgpro.com](http://www.ppgpro.com).
  - 2. Benjamin Moore & Co (BM): [www.benjaminmoore.com](http://www.benjaminmoore.com).
  - 3. Sherwin-Williams Company (SW): [www.sherwin-williams.com](http://www.sherwin-williams.com).
- C. Substitutions: See Division 01 - Product Requirements.

### 2.02 PAINTS AND COATINGS - GENERAL

- A. Paints and Coatings: Ready mixed, unless intended to be a field-catalyzed coating.
  - 1. Provide paints and coatings of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
  - 2. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
  - 3. Supply each coating material in quantity required to complete entire project's work from a single production run.
  - 4. Do not reduce, thin, or dilute coatings or add materials to coatings unless such procedure is specifically described in manufacturer's product instructions.
- B. Material Quality: Provide manufacturer's best-quality paint material of the various coating types specified that are factory formulated and recommended by manufacturer for application indicated. Paint-material containers not displaying manufacturer's product identification will not be acceptable.

- C. Colors: Match Gardner Spencer Smith Tench and Jarbeau, PC's samples.
  - 1. Proprietary Names: Use of manufacturer's proprietary product color names and product numbers to designate colors is not intended to imply that products named are required to be used to the exclusion of other listed manufacturers.
  - 2. Acceptance of colors, as an aesthetic effect, is judged solely by Gardner Spencer Smith Tench and Jarbeau, PC.
- D. Primers: As follows unless other primer is required or recommended by manufacturer of top coats; where the manufacturer offers options on primers for a particular substrate, use primer categorized as "best" by the manufacturer.
- E. Volatile Organic Compound (VOC) Content:
  - 1. Provide coatings that comply with the most stringent requirements specified in the following:
    - a. 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.
  - 2. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.

## 2.03 PAINT SYSTEMS - EXTERIOR

- A. Concrete Masonry Units (Semi-gloss):
  - 1. Primer (Previously Painted) - as recommended by manufacturer:
    - a. PPG: Perma-Crete Alkali Resistant Primer, 1005 Acrylic Latex, 1.4-2.6 mils DFT
    - b. Or equal by Benjamin Moore.
    - c. Or equal by Sherwin Williams.
  - 2. Finish - 2 coats applied as recommended by manufacturer:
    - a. PPG: Pitt-Tech Plus, 90-1110 Acrylic Latex, 1.4-2.6 mils DFT
    - b. Or equal by Benjamin Moore
    - c. Or equal by Sherwin Williams
- B. Wood:
  - 1. Finish (self priming)- 2 coats applied at total DFT as recommended by manufacturer:
    - a. PPG: Flood FLD820, Solid Color 100% Acrylic Stain
    - b. Or equal by Benjamin Moore
    - c. Or equal by Sherwin Williams
- C. Metal Siding (prefinished) PVDF coated material:
  - 1. Primer - 1 coat applied as recommended by manufacturer:
    - a. PPG: Corafon ADS PVDF Bonding Primer, Polyamide Epoxy ADS 510 Series
    - b. Or equal by Benjamin Moore
    - c. Or equal by Sherwin Williams.
  - 2. Intermediate and topcoat - applied as recommended by manufacturer:
    - a. PPG: Pitt-Tech Plus, 90-1110 Series, One Component Int/Ext Satin DMT Industrial Enamel, 2.0-4.0 DFT
    - b. Or equal by Benjamin Moore
    - c. Or equal by Sherwin Williams
- D. Metal Siding (Aluminum, Bare or Galvanized):
  - 1. Primer - applied as recommended by manufacturer:
    - a. PPG: Pitt-Tech Plus, 90-912 Series, One Component Int/Ext DTM Industrial Primer, 2.0-4.0 DFT
    - b. Or equal by Benjamin Moore
    - c. Or equal by Sherwin Williams
  - 2. Finish - applied as recommended by manufacturer:
    - a. PPG: Pitt-Tech Plus, 90-1110 (Satin) or 90-1210 (Semi-Gloss) Series, One Component Int/Ext Satin Industrial Enamel, 2.0-4.0 DFT



- b. Or equal by Benjamin Moore
- c. Or equal by Sherwin Williams

## **2.04 ACCESSORY MATERIALS**

- A. Accessory Materials: Provide all primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials required to achieve the finishes specified whether specifically indicated or not; commercial quality.
- B. Patching Material: Latex filler.
- C. Fastener Head Cover Material: Latex filler.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
- B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.
  - 1. Proceed with paint application only after unsatisfactory conditions have been corrected and surfaces receiving paint are thoroughly dry.
  - 2. Start of painting will be construed as Applicator's acceptance of surfaces and conditions within a particular area.
- C. Test shop-applied primer for compatibility with subsequent cover materials.
- D. Coordination of Work: Review other Sections in which primers are provided to ensure compatibility of the tobit system for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.
  - 1. Notify Gardner Spencer Smith Tench and Jarbeau, PC about anticipated problems when using the materials specified over substrates primed by others.
- E. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
  - 1. Masonry, Concrete, and Concrete Unit Masonry: 12 percent.
  - 2. Exterior Wood: 15 percent, measured in accordance with ASTM D4442.

### **3.02 PREPARATION**

- A. Clean surfaces thoroughly and correct defects prior to coating application.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. General: For all existing surfaces to be repainted, prepare mockup area for prior approval. Area shall be minimum 8' x 8' and retained for duration of the work as example of acceptable workmanship. Methods for preparation of the existing surfaces shall be as recommended by the paint manufacturer and Architect to produce acceptable results and by any means necessary including, but not limited to, chemical and mechanical treatments.
- D. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.
- E. Surfaces: Correct defects and clean surfaces which affect work of this section. Remove or repair existing coatings that exhibit surface defects.
- F. Seal surfaces that might cause bleed through or staining of topcoat.
- G. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
- H. Concrete and Unit Masonry Surfaces to be Painted: Remove dirt, loose mortar, scale, salt or alkali powder, and other foreign matter. Remove oil and grease with a solution of tri-sodium phosphate; rinse well and allow to dry. Remove stains caused by weathering of corroding metals with a solution of sodium metasilicate after thoroughly wetting with water. Allow to dry.



- I. Exterior Metal Siding (prefinished) PVDF coated material: The service life of the coating is directly related to the surface preparation. The surface to be coated must be properly prepared, dry, clean, and free of all contamination. Solvent clean per SSPC-SP 1. Abrade substrate to remove gloss and obtain minimum surface profile of 1.0 mil. Solvent wipe to remove dust. See manufacturer's instructions.
- J. Wood: Surface must be dry and clean. Remove all dust, dirt, mildew, oil, loose wood fibers and other contaminants. Remove loose, peeling stain or paint by sanding, scraping or wire brushing. To ensure proper adhesion, weathered, dirty or mildewed surfaces should be cleaned with manufacturer's recommended wood cleaner prior to applying stain. After rinsing, allow wood to dry.  
  
Primer: The specified product is self-priming over most substrates. Some woods, such as cedar and redwood, contain high amounts of tannin, a colored wood extract. The first coat of stain may show some discoloration, but the tannins will be trapped in the first coat of stain. A second coat will result in a uniform appearance.
- K. Metal Doors to be Painted: Prime metal door top and bottom edge surfaces.
- L. Previously Painted Surfaces not described above:
  - 1. Paint only clean, dry surfaces.
  - 2. Remove all surface contaminants to include mold, mildew, dirt, dust, oil, grease, mill scale, wax, chalk or oxidation, efflorescence, rust, mortar, and any other foreign matter existing on the surface.
  - 3. Scrape or use appropriate means to remove all loose, peeling, flaking, or marginally adhering paint from the surface. Feather sand edges as necessary.
  - 4. Repair or replace caulking where needed.
  - 5. After cleaning, glossy surfaces shall be dulled by sanding. Remove all sanding dust from the surface after sanding has taken place. Prepare bare areas as new surfaces, and spot prime or fill those bare areas with the appropriate primer or filler.
  - 6. Patch or repair any cracks or voids with the appropriate patching compound and sand smooth as necessary.
  - 7. Spot prime any patched areas with the appropriate primer prior to finishing.
  - 8. If after cleaning chalky surfaces chalk residue is still present, prime the entire surface with the proper bonding primer to insure good adhesion of the topcoat to the substrate.

### 3.03 APPLICATION

- A. General: Apply paint according to manufacturer's written instructions. Use applicators and techniques best suited for substrate and type of material being applied.
  - 1. Paint colors, surface treatments, and finishes are indicated in the paint schedules.
  - 2. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film.
  - 3. Provide finish coats that are compatible with primers used.
  - 4. Finish exterior doors on tops, bottoms, and side edges the same as exterior faces.
- B. Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise as described above and prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.
  - 1. The number of coats and film thickness required are the same regardless of application method. Do not apply succeeding coats until previous coat has cured as recommended by manufacturer. If sanding is required to produce a smooth, even surface according to manufacturer's written instructions, sand between applications.
  - 2. If undercoats, stains, or other conditions show through final coat of paint, apply additional coats until paint film is of uniform finish, color, and appearance. Give special attention to ensure that edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.
  - 3. Allow sufficient time between successive coats to permit proper drying. Do not recoat surfaces until paint has dried to where it feels firm, and does not deform or feel sticky.



under moderate thumb pressure, and until application of another coat of paint does not cause undercoat to lift or lose adhesion.

- C. Application Procedures: Apply paints and coatings by brush, roller, spray, or other applicators according to manufacturer's written instructions.
  - 1. Brushes: Use brushes best suited for type of material applied. Use brush of appropriate size for surface or item being painted.
  - 2. Rollers: Use rollers of carpet, velvet-back, or high-pile sheep's wool as recommended by manufacturer for material and texture required.
  - 3. Spray Equipment: Use airless spray equipment with orifice size as recommended by manufacturer for material and texture required.
- D. Minimum Coating Thickness: Apply paint materials no thinner than manufacturer's recommended spreading rate to achieve dry film thickness indicated. Provide total dry film thickness of the entire system as recommended by manufacturer.
- E. Apply products in accordance with manufacturer's instructions.
- F. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- G. Apply each coat to uniform appearance.
- H. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- I. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

#### **3.04 CLEANING**

- A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.
- B. After completing painting, clean glass and paint-spattered surfaces. Remove spattered paint by washing and scraping without scratching or damaging adjacent finished surfaces.

#### **3.05 PROTECTION**

- A. Protect finished coatings until completion of project.
- B. Touch-up damaged coatings after Substantial Completion.
- C. Provide "Wet Paint" signs to protect newly painted finishes. After completing painting operations, remove temporary protective wrappings provided by others to protect their work.

#### **3.06 SCHEDULE - SURFACES TO BE FINISHED**

- A. Do Not Paint or Finish the Following Items:
  - 1. Items fully factory-finished unless specifically noted.
  - 2. Fire rating labels, equipment serial number and capacity labels.
  - 3. Stainless steel items.
- B. Paint the surfaces described on the Drawings and as described above.
- C. Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not complying with requirements.

#### **3.07 MAINTENANCE MATERIALS**

- A. Furnish a minimum of 5 gallons of each paint color, type and finish used on the Project to the Heard County Representative. Store materials at location designated by that Representative.
- B. Properly Identify each container with manufacturer, color name, product number, color formula and general location in the Project.

#### **3.08 SCHEDULE - PAINT SYSTEMS**

- A. Concrete, Concrete Block, Brick Masonry: Finish all surfaces exposed to view.

- 1. Exterior: Semi-gloss.
- B. Wood: Finish all surfaces exposed to view.
- C. Steel Doors and Frames: Finish all surfaces exposed to view.
  - 1. Exterior: Semi-gloss.
- D. Steel Fabrications: Finish all surfaces exposed to view.
  - 1. Exterior: Gloss; finish all surfaces, including concealed surfaces, before installation.
- E. Galvanized Steel: Finish all surfaces exposed to view.
  - 1. Exterior: Semi-gloss.
- F. Shop-Primed Metal Items: Finish all surfaces exposed to view.
  - 1. Exterior: Semi-Gloss.

**END OF SECTION**



## **PART 1 GENERAL**

### **1.01 WORK INCLUDED**

- A. The work consists of furnishing all materials, labor and services to install a vinyl chain link fence and gates with all required accessories.

### **1.02 RELATED SECTIONS**

- A. Section 03 3000 - Cast-in-Place Concrete: Concrete anchorage for posts.

### **1.03 DESCRIPTION OF WORK**

- A. Extent of chain link fence and gates is indicated on drawings or herein specified.
- B. Type "A" Fencing:
  - 1. Location: As shown on Drawings.
  - 2. Characteristics: 10 feet exposed height, unless indicated otherwise on the drawings.
  - 3. Gates: 4 foot wide, single leaf, padlocked.
- C. Temporary Construction Fencing: Minimum criteria listed; Contractor to increase criteria to suit other needs for security and safety.
  - 1. Location: Provide around all construction work areas, storage areas, and construction staging/parking areas.
  - 2. Characteristics: Minimum 6 foot exposed height, minimum 12-1/2 gauge hog wire (no barbed wire) with drive-in post.
  - 3. Gates: As necessary, padlocked.

### **1.04 SUBMITTALS**

- A. See Division 01 - Administrative Requirements, for submittal procedures.
- B. Submit plans and details indicating extent of fences, locations of gates, and details of attachment and footings. Indicate means and methods for surface preparation and finishing.

### **1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.
- B. Installer Qualifications: Company specializing in performing the work of this section with minimum three years of experience.
- C. All materials and installation shall be further in accordance with Chain Link Fabrication Manufacturer's Association ("CLFMA") criteria.
- D. Provide chain link fences and gates as complete units controlled by a single source including necessary erection accessories, fittings and fastenings.

### **1.06 PROJECT CONDITIONS**

- A. Coordinate vinyl chain link fencing installation with size, location and installation of service utilities.
- B. Sequence installation to ensure utility connections are achieved in an orderly and expeditious manner.

### **1.07 WARRANTY**

- A. See Division 01 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective Work within a five year period after Date of Substantial Completion.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:

- B. Allied Tube and Conduit Corp: [www.alliedtube.com](http://www.alliedtube.com).
- C. American Fence Corp: [www.americanfence.com](http://www.americanfence.com).
- D. Master-Halco, Inc.: [www.fenceonline.com](http://www.fenceonline.com).
- E. Merchants Metals: [www.merchantsmetals.com](http://www.merchantsmetals.com).
- F. West Georgia Fence Co.: [www.westgeorgiafence.com](http://www.westgeorgiafence.com).

## 2.02 MATERIALS

- A. Concrete: Class 500-C-2500 concrete , bevel top of footing to conform to finished grade at post and trowel smooth. All concrete shall develop a strength of 3,000 psi at 28 days.
- B. Vinyl Coated Chain Link Fabric shall conform to Federal Specification RRF-191 for mesh fabric with top and bottom edges knuckled. Fabric shall be as specified in width, nine (9) gauge core wire, six (6) gauge finish. The fence height shown or specified means the nominal width of the fabric. A top rail shall be installed at the top of the fence. A six (6) gauge coil spring wire shall be installed at the bottom of the fence. Color shall be black.
  - 1. Fabric for fencing of tennis court may be full height, single width, 6 gauge vinyl finish x 1-3/4 inches mesh.
- C. Posts, Top Rails, Brace Rails and Gate Frames: Shall be Standard O.D. steel pipe or the following nominal diameters and heights, or H, I, or U rolled sections approved by Gardner Spencer Smith Tench & Jarbeau, P.C., or approximately equal weights and structural strength.
  - 1. Steel pipe - Type I: ASTM F 1083, standard weight schedule 40; minimum yield strength of 30,000 psi (205 MPa); sizes as indicated. Hot-dipped galvanized with minimum average 1.8 oz/ft<sup>2</sup> (550 g/m<sup>2</sup>) of coated surface area.

### D. Schedule of Posts and Footings:

Item	Height	Nominal Pipe Size (inches)	Outside Diameter (inches)	Weight (pounds per foot)	Footing Diameter (inches)	*Footing Depth (inches)
Top Rail, Brace Rails and Transom Rails	Up to 10'-0"	1-5/8	1.660	2.27	N/A	N/A
	10'-1" to 16'-0"	1-5/8	1.900	2.72	N/A	N/A
Line Posts	Up to 6'-0"	2	2.37	2.27	16	36
	6'-1" to 8'-0"	2	2.37	3.65	18	36
	8'-1" to 10'-0"	2-1/2	2.875	5.79	18	48
	10'-1" to 16'-0"	3	3.5	7.58	24	56
Terminal, Corner	Up to 8'-0"	2-1/2	2.875	5.79	18	36
Angle & Pull	8'-0" to 10'-0"	2-1/2	2.875	5.79	18	48
Post	10'-1" to 16'-0"	3	3.5	7.58	24	56



Gate Frames	Up to 8'-0"	1-1/2	1.900	2.72	NA	NA
Pedestrian	Up to 8'-0"	2-1/2	2.875	5.79	24	36
Gate Post (single)						
Pedestrian	Up to 8'-0"	4	4.00	9.10	24	36
Gate Post (double)						

- E. \*Embed post into footing 6 inches less than the depth of the footing. Deviations from schedule will require soil test and Gardner Spencer Smith Tench & Jarbeau, P.C. review.
- F. Tension Wire for Installation at Bottom of Fabric: 6 gauge steel vinyl finish wire, continuous and connected to all end and corner posts.
  - 1. Turnbuckles for installation with Tension Wires: Eye and eye type, drop forged steel, right and left hand threads, at least 3/8 inch screw diameter with at least 4-1/2 inches of take-up.
  - 2. Tie Wire: shall be nine (9) gauge core wire with a six (6) gauge vinyl finish.
- G. Finish of Metal Parts: Provide approved vinyl post tops, sleeves and other fittings for complete installation. All such framework material shall be vinyl coated to thickness of standard industry practice. Minimum vinyl coating thickness shall be .022".

### PART 3 EXECUTION

#### 3.01 INSTALLATION

- A. Install fences to heights indicated on Drawings.
- B. Space fence posts at equal intervals between terminal, angle, corner, and gate posts, and not more than 10 feet apart measured from center to center of posts. In curved fence sections having a radius of 50 feet or less, space posts not more than 5 feet - 6 inches apart. Install posts so that top of eye of post caps are level with top of fabric.
- C. Install angle or corner posts at each change in direction of 15 degrees or more, at change of 5 percent or more in grade of fencing, and at the beginning and end of curved fence sections.
- D. Install terminal posts at ends of runs of fencing. Install gateposts on both sides of driveway and pedestrian gates. For double-leaf gates, net opening between gate posts shall be gate size as indicated on Drawings, plus 3-1/2 inches; for single leaf gates, net opening shall be gate size plus 2-1/2 inches.
- E. Where a fence is to be installed on a curb, construct footings with top of footing level with the lower finish grade. Align posts, set plumb and true before placing footings. Remove splattered concrete from exposed pipe surfaces while concrete is still soft. In bituminous surfaced areas, install seal coat on top of concrete footings.
- F. Install fences with top rail. Top rail shall pass through eye tops and be secured at ends with rail-end fittings and bands.
- G. Install fences over 10 feet in height, in addition to top rail, with a horizontal mid-rail set at mid-height of fence.
- H. In fences higher than 10 feet, install brace rails at angles, corners, and terminals at 1/4 and 3/4 of fence height. Provide one horizontal brace rail in panels adjacent to terminal, angle, corner, and gateposts, install at mid-height of fence and rigidly secured to posts with rail end fittings and bands. Provide horizontal brace rails, as specified, in panels of curved sections having a radius of 50 feet or less. Brace rails are not required in fencing 4 feet or less in height.
- I. Provide a transom rail and fabric at top of pedestrian gate openings. Install transom rail 7 feet above high point of grade at gate opening. Ends of transom rails shall be pinned or riveted to rail end fittings with 1/4 inch mild steel rivets. Pin or rivet must go through rail and peen. Welding on rail ends is not permitted.



- J. Install bottom tension wire a minimum of 3 inches from grade for fencing, and provide a turnbuckle for each 150 feet of wire or fractional part thereof. Turnbuckles are not required in runs of 25 feet or less. Install ends of tension wires to posts in a manner to prevent slipping or loss of tension. Turn end of wire around post twisted at least 3 times around wire. At turnbuckles, wire through eye and twist end at least 3 times around wire. Cut tail of bottom wire flush.
- K. Install fence fabric on outward facing side of posts, except for tennis courts. Install fence fabric with top edge projecting above top rail of fence.
- L. Install bottom of fence fabric to clear finish grades, except on bituminous surface install 3/4 inch above such surface. Locally shape and trench ground surfaces where necessary to provide uniform top and bottom alignment of fence.
- M. Tightly stretch fabric and at terminal, pull corner, angle, and gateposts, secure with tension bars extending full height of fence. Secure tension bars to posts with bolted tension bands spaced not more than 14 inches apart.
- N. Bands and Ties: Install bands and ties in accordance with following schedule:
  - 1. 15 bands on 16 feet fence 16 ties on 16 feet fence
  - 2. 11 bands on 12 feet fence 12 ties on 12 feet fence
  - 3. 7 bands on 8 feet fence 7 ties on 8 feet fence
  - 4. 6 bands on 6 feet fence 6 ties on 6 feet fence
  - 5. 4 bands on 4 feet fence 4 ties on 4 feet fence
- O. Fasten fabric to top rails, mid-rails, brace rails, with wire ties spaced not more than 18 inches apart. Bend back ends of tie wires so as not to be a hazard. At bottom tension wire, install hog rings spaced not more than 18 inches apart. Where 2 fabrics are furnished, lap the fabrics one mesh at mid-rail and tie both fabrics with vinyl finish aluminum ties to midrails.
- P. Fabrication of Gates:
  - 1. Frames: Fabricate gate frames from steel pipe of size specified, with joints at corners miter cut and continuously welded to sides.
  - 2. Fabric: Install fence fabric to side members with tension bars and tension bands as specified, spaced not more than 14 inches apart. Tension bars shall extend full height of gate. Install fence fabric to top and bottom members and to brace rail with wire ties as specified for top rails, spaced not more than 12 inches apart.
  - 3. Hinges: Install and adjust hinges; burr or center punch threads of gate hinge bolts to prevent removal of nuts. Install 3 hinges on each post for swing gates more than 16 feet wide.
- Q. Provide sleeves for fencing on top of retaining walls.
- R. Post in masonry, concrete or solid rock shall be set in holes and grouted or leaded solidly in place. Such holes shall be of a diameter of at least two (2) inches larger than the greatest sectional dimension of the post, and shall be at least twenty-four (24) inches for terminal posts.
- S. Top rail shall be continuous and rigidly connected to all posts.
- T. Bottom tension wire shall be continuous through line post and connected to all end and corner posts.
- U. Truss bracing shall be provided in panel adjoining all end and corner posts.

### **3.02 FENCING ADJUSTMENTS**

- A. Where the finish grade is raised 6 inches or less, cut and re-knuckle the existing fence fabric. Adjust tension wire and tie to fabric. Bottom of fence fabric shall be installed 3/4" above finish grade.
- B. Where the finish pavement is lowered 6 inches or less, demolish the fence footing flush with the finish grade and adjust the fabric and its attachments. Bottom of fence fabric shall be installed 3/4" above finish grade.



- C. Post footings and fabrics that require readjustment after installation shall be entirely replaced.

### **3.03 INSTALLATION OF GATES**

- A. Provide gates of the sizes indicated on Drawings. Allow clearance on gates of 1-1/2 inches at bottom and one inch at top. Construct gates installed in sloping areas to conform to the grade. Provide an opening in each gate for access to locking device or padlock. Knuckle ends of fabric cut for opening to eliminate hazards.

### **3.04 RE-FENCING**

- A. Fabric Removal: Do not remove more than what can be replaced during one day unless a barricade, providing equal security, will be installed in its place.
- B. Post and Rails: Bent posts, rails and accessories shall be replaced. Cut bent portion of posts and weld new sections of equal diameter and thickness. Install splice to inside of all welded section prior to welding.

### **3.05 COMPLETION**

- A. Completed fencing shall form continuous units between points indicated with required parts, accessories, and fittings provided and installed. Clean exposed metal surfaces of cement, grout and other foreign substances.
- B. Fill in holes left by removal of existing fence footings, except in areas where grading Work is indicated or specified, to existing grade with clean earth thoroughly compacted to at least same density as adjoining soil.

### **3.06 PROTECTION**

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

### **3.07 CLEANUP**

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

**END OF SECTION**