

# MARTIN LUTHER KING PARK

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Prepared for:

Department of Transportation and Capital Improvements

City of San Antonio

September 2016

Project: #40-00374

AVO 29666A



300 East Sonterra Blvd., Suite 230  
San Antonio, Texas 78258

## GENERAL CONDITIONS

### General Conditions:

- a. Section 1.1.11 of the General Conditions for City of San Antonio Construction Contracts is deleted and replaced in its entirety with the following:
  - 1.1.11. "DAY" as used in the Contract Documents shall mean Calendar Day, unless otherwise specifically defined. A Calendar Day is a day of 24 hours, measured from midnight to the next midnight, unless otherwise specifically stipulated. A Working Day is measured from sunrise to sundown Monday through Saturday, except legal holidays, or the hours during which Contractor has been authorized to work by Owner.
  
- b. Section 3.10.5 of the General Conditions for City of San Antonio Construction Contracts will be modified to include in its entirety the following:
  - 3.10.5.4. Contactor shall perform work Six (6) days each week, Monday through Saturday, from sunrise to sundown, unless otherwise directed by the City.
  
- c. Section 3.10.6.3 of the General Conditions for City of San Antonio Construction Contracts is deleted and replaced in its entirety with the following:
  - 3.10.6.3. Work shall be scheduled based upon Contractor's six (6) day work week, utilizing the appropriate calendar assignments and using compatible Project Scheduling software.

## List of Governing Specifications, Special Provisions and Special Specifications

All specifications applicable to this project are identified as follows:

2008 Standard Specifications for Public Works Construction, City of San Antonio, Texas with any revisions thereto, or 2014 TxDOT Standard Specifications for Construction of and Maintenance of Highways, Streets and Bridges with any revisions thereto where specified "TxDOT". The governing specifications for the project are not limited to those listed below. All cross references made in the items listed below (or in the construction documents) to other specification items are also part of this Contract.

### **SECTION 1**

**CITY OF SAN ANTONIO STANDARD SPECIFICATIONS (June 2008) AND SPECIAL PROVISIONS (MAY 2009, FEBRUARY 2010, June 2010 and November 2013)** Note that the referenced specifications 100 through 628 below are not printed in Section 1 but are available on-line at <https://www.sanantonio.gov/TCI/CurrentVendorResources/StandardSpecificationsandDetails.aspx>

<b>ITEM NO.</b>	<b>DESCRIPTION</b>
100	MOBILIZATION
101	PREPARING RIGHT-OF-WAY
102	OBLITERATING ABANDONED STREET
103	REMOVE CONCRETE
104	STREET EXCAVATION
105	CHANNEL EXCAVATION
107	EMBANKMENT
108	LIME TREATED SUBGRADE
200	FLEXIBLE BASE
202	PRIME COAT
203	TACK COAT
205	HOT MIX ASPHALTIC CONCRETE PAVEMENT
307	CONCRETE STRUCTURES
308	DRILLED SHAFTS AND UNDER-REAMED FOUNDATIONS
500	CONCRETE CURB, GUTTER, AND CONCRETE CURB AND GUTTER
502	CONCRETE SIDEWALKS
505	CONCRETE RIPRAP
514	PAINT AND PAINTING
515	TOPSOIL
516	SODDING
520	HYDROMULCHING
526	FIELD OFFICE
530	BARRICADES, SIGNS & TRAFFIC HANDLING
531	SIGNS
535	HOT APPLIED THERMOPLASTIC PAVEMENT MARKINGS
618	CONDUIT
620	ELECTRICAL CONDUCTORS
624	GROUND BOXES
628	ELECTRICAL SERVICES
540	TEMPORARY EROSION, SEDIMENTATION AND WATER POLLUTION PREVENTION AND CONTROL
554	EROSION CONTROL MATTING
618	CONDUIT
620	ELECTRICAL CONDUCTORS
624	GROUND BOXES
628	ELECTRICAL SERVICES

<b>ITEM NO.</b>	<b>DESCRIPTION</b>
801	TREE PROTECTION
1000	WEB PORTAL

## **SECTION 2**

**SPECIAL PROVISIONS:** Special provisions will govern and take precedence over the specifications enumerated hereon wherever in conflict therewith.

<b>ITEM NO.</b>	<b>DESCRIPTION</b>
502	CONCRETE SIDEWALKS
505	CONCRETE RIPRAP
520	HYDROMULCHING
526	FIELD OFFICE
700	COST LOADED PROJECT SCHEDULES
800	PROJECT SIGN
804	NEW TREE & SHRUB PLANTING AND MAINTENANCE

## **SECTION 3**

### **SPECIAL SPECIFICATIONS**

<b>ITEM NO.</b>	<b>DESCRIPTION</b>
1	DIVERSION AND CARE OF WATER
2	SWING GATES
02225	DEMOLITION
02316	FILL AND BACKFILL
02751	PORLAND CEMENT CONCRETE PAVING
02871	SITE AND STREET FURNISHINGS
02230	SITE CLEARING
04720	CAST STONE
04810	UNIT MASONRY ASSEMBLIES
04852	STONE MASONRY VENEER
05500	MISCELLANEOUS METALS – STEEL & ALUMINUM
10420	ARCHITECTURAL LETTERS, PLAQUES, IMAGE ETCHING ON ALUMINUM PANELS
129302	REMOVABLE BOLLARDS
129303	FIXED BOLLARDS

## **SECTION 4**

**TxDOT STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MAINTENANCE OF HIGHWAYS, STREETS AND BRIDGES (June 2014)** Note that the referenced specifications 168 through 620 below are not printed in Section 3 but are available on-line at <ftp://ftp.dot.state.tx.us/pub/txdot-info/des/spec-book-1114.pdf>

<b>ITEM NO.</b>	<b>DESCRIPTION</b>
168	VEGETATIVE WATERING
354	PLANING AND TEXTURING PAVEMENT
400	EXCAVATION AND BACKFILL FOR STRUCTURES
420	CONCRETE SUPERSTRUCTURES
422	CONCRETE SUPERSTRUCTURES
432	RIPRAP
440	REINFORCEMENT FOR CONCRETE
442	METAL FOR STRUCTURES

<b>ITEM NO.</b>	<b>DESCRIPTION</b>
450	RAILING
454	BRIDGE EXPANSION JOINTS
459	GABIONS AND GABION MATTRESSES
476	JACKING, BORING, OR TUNNELING PIPE OR BOX
508	CONSTRUCTION DETOURS
528	COLORED TEXTURED CONCRETE AND LANDSCAPE PAVERS
529	CONCRETE CURB, GUTTER, AND COMBINED CURB AND GUTTER
543	CABLE BARRIER SYSTEMS
610	ROADWAY ILLUMINATION ASSEMBLIES

# **SECTION 1**

**CITY OF SAN ANTONIO  
STANDARD  
SPECIFICATIONS FOR  
CONSTRUCTION**

**(June 2008)**

**SPECIAL PROVISIONS**

**(May 2009, February 2010, June 2010 and November 2013)**

**ITEM 307 CONCRETE STRUCTURES** is revised as follows:

**Section L. Defective Work:** add the following paragraph:

A maximum of 2% of the overall concrete quantity covered under this item shall receive patching or repair. Damaged concrete in excess of 2% of the overall quantity shall be removed and replaced at the contractor's expense. Elements to be replaced shall be saw cut and removed to the nearest construction joint and replaced with new materials free of defects. Elements to be repaired shall first be approved by the Engineer/Owner.

# **SECTION 2**

# **SPECIAL PROVISIONS**

**SPECIAL PROVISION  
001---001**

**Notice to Proceed and Commencement of Contract Times**

For this project, Article I “General Provisions” of the General Conditions for City of San Antonio Heavy Highway Construction Contracts, is hereby amended with respect to the clauses cited below, and no other clauses or requirements of this Article are waived or changed hereby.

**Article 1.2.3 Notice to proceed and Commencement of Contract Times.** This article will be amended to include the following sentence:

The City may delay issuance of the Notice to Proceed by up to 90 days after the contract is awarded. This possible delay start shall not be the basis for any claim by the contractor for additional time or compensation.

THE FOLLOWING ITEMS ARE SPECIAL PROVISIONS TO  
THE CITY OF SAN ANTONIO  
STANDARD SPECIFICATIONS FOR CONSTRUCTION  
DATED JUNE 2008

<del>1. Item 401 Reinforced Concrete Pipe</del>	<del>Page 2</del>
<del>2. Item 402 High Density Corrugated Polyethylene Pipe</del>	<del>Page 2</del>
<del>3. Item 403 Storm Sewer Junction Boxes and Inlets</del>	<del>Page 3</del>
<del>4. Item 404 Corrugated Metal Pipe</del>	<del>Page 3</del>
<del>5. Item 405 Fiber Reinforced Concrete Pipe</del>	<del>Page 4</del>
6. Item 502 Concrete Sidewalks	Page 4
<del>7. Item 503 Asphaltic Concrete, Portland Cement Concrete and Gravel Driveways</del>	<del>Page 5</del>
8. Item 505 Concrete Riprap	Page 5
9. Item 520 Hydromulching	Page 5
<del>10. Item 523 Adjusting of Vehicular &amp; Pedestrian Gates</del>	<del>Page 6</del>
<del>11. Bid Item Summary Revisions</del>	<del>Page 8</del>

General

Throughout the City of San Antonio Standard Specifications for Construction (June 2008) replace the following:

- “Item 407 Frames, Grates, Rings and Covers” with “Item 409 Cast Iron Castings”
- “Item 304 Expansion Joint Material” with “Item 307.2.E, Expansion Joint Material”
- “Item 305, Membrane Curing” with “Item 307.2.H, Membrane Curing”

## Item 405 Fiber Reinforced Concrete Pipe

Delete in its entirety:

### **Section 405.6 Payment**

Add:

### **Section 405.6 Payment:**

The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for "Fiber Reinforced Concrete Pipe" of the backfill type, size and D-load class specified. This price is full compensation for excavation and backfilling for Type I, Type II and Type III; constructing, furnishing, transporting, placing and joining pipes; shaping the bed; cutting pipes on skew or slope; connecting to new or existing structures; breaking back, removing and disposing of portions of the existing structure; replacing portions of the existing structure; cutting pipe ends skew or slope; and equipment, labor, tools and incidentals required to complete the work.

## Item 502 Concrete Sidewalks

Delete first paragraph from 502.4.F.Joints:

Add :

### **Section 502.4.F Joints:**

Unless otherwise specified on the plans or as agreed to by the Engineer, tooled joints with rounded edges will be placed at intervals equal to the sidewalk width and will be opened with one-half inch (1/2") radius by one and one-half inch (1 1/2") depth and closed by one-half inch (1/2") radius by one-inch (1") depth.

### **Section 502.6 Payment:**

Delete from first paragraph: "removal and disposal of existing concrete;"

Item 503 Asphaltic Concrete, Portland Cement Concrete and  
Gravel Driveways

Delete in its entirety:

**Section 503.6 Payment**

Add :

**Section 503.6 Payment:**

The work performed as prescribed by this item will be paid for at the contract unit price bid per square yard for “Portland Cement Concrete Driveway”, Portland Cement Concrete Driveway – Commercial”, “Asphaltic Concrete Driveway”, or “Gravel Driveway”, which price shall be full compensation for preparing the subgrade, for furnishing and placing all materials, manipulations, labor, tools, equipment and incidentals necessary to complete the work.

Item 505 Concrete Riprap

Delete in its entirety:

**Section 505.4.A Concrete Reinforcement**

Add :

**Section 505.4.A Concrete Reinforcement:**

Unless otherwise shown on the plans, reinforce concrete riprap with 6 x 6 – W6 x W6 welded wire fabric or with No. 4 reinforcing bars spaced at a maximum of 18 in. in each direction unless otherwise shown. A combination of welded wire fabric and reinforcing bars may be provided when both are permitted. Provide a minimum 6-in. lap at all splices. At the edge of the riprap, provide a minimum horizontal cover of 1 in. and a maximum cover of 3 in. Place the first parallel bar no more than 6 in. from the edge of concrete. Use approved supports to hold the reinforcement approximately equidistant from the top and bottom surface of the slab. Adjust reinforcement during concrete placement to maintain correct position. Reinforcement protruding from existing riprap shall be thoroughly cleaned.

Item 520 Hydromulching

**Section 520.4 Construction (D) Slurry:**

Delete: “Annual Ryegrass (Oct. through March 15) 20 lbs per 1,000 sqft”.

Add: “Annual Ryegrass (Oct. through March 15) 5-10 lbs per 1,000 sqft”.

THE FOLLOWING ITEMS ARE SPECIAL PROVISIONS TO  
THE CITY OF SAN ANTONIO  
STANDARD SPECIFICATIONS FOR CONSTRUCTION  
DATED JUNE 2008

1. Item 526 Field Office.....2 Pages

General

1. None

Standard Specifications

1. Delete Item 526 – Field Office (*dated June 2008*) in its entirety and replace with Item 526 – Field Office (*dated June 2010*) shown on the attached document.

## ITEM

### 526 FIELD OFFICE

**526.1. DESCRIPTION:** *This item shall govern the erection or furnishing of a building to be used by the inspection force as a Field Office where the total contract amount (including Joint Bid Utilities) is one million dollars or greater.*

**526.2. EQUIPMENT:**

- A. General.** Furnish facilities after the receipt of the notice to proceed and before beginning physical work on the project. Provide field offices of the type specified near the worksite at a location acceptable to the Engineer. The Contractor may make use of permanent buildings or rental space meeting the requirements for field offices instead of portable buildings if approved. Maintain and clean the field office bi-weekly until the City accepts the project. Furnish other equipment as required.
- B. Damage.** Immediately repair or replace the facility if it is damaged in any manner. Payment for repair will be made at no cost to the City.
- C. Right-Of-Way.** When facilities are allowed in the right of way, remove buildings and other facilities and restore the right of way before project acceptance.
- D. Parking and Fencing.** Provide 6" compacted gravel parking area for the sole use of at least 2 City-owned vehicles. Situate the area near the field office at a location acceptable to the Engineer. Maintain the parking area until the project is completed and restore the area to a condition acceptable to the Engineer upon project completion. Enclose the field office and the parking area with a 6-ft. chain-link fence, a top-mounted 3-strand barbed wire, and a 12-ft. gate.
- E. Field Office.**

Provide field offices with roofs, floors, doors, and screened windows. The building shall be a minimum of 10 feet by 16 feet by 8 feet high with not less than three glass windows and one door. Ensure the floor has an impervious floor covering.

Ensure that the field office is weatherproof, piped for potable water, and electrically wired by certified personnel. Furnish and install adequate outlets, lighting, air conditioning, heating, and ventilation.

Provide a partitioned rest room furnished with rest room supplies, a lavatory and a flush toilet connected to a sewer or septic tank. A portable toilet may be used when approved by the Engineer.

Provide secured and controlled access to the field office through the use of security measures such as bars, alarms, or security fencing. Furnish steps to the building if deemed necessary by the Engineer.

Provide workbenches and tables at least 3 ft. wide and 6 ft. long, chairs, and filing cabinets in the quantity acceptable to the Engineer. Provide solar screens, blinds, or shades if deemed necessary by the Engineer.

Provide a telephone and service unless otherwise directed.

Provide all of the following in accordance with the requirements therein:

- computers (laptop or desktop) meeting the minimum requirements of Item 1000, “Web Portal” or as designated on the plans,
- printer scanner, and
- Internet service. The Internet service must be a provided on a line separate from required phone service and include a Wi-Fi wireless LAN with minimum speeds of 3mbps.
- Digital camera with memory card 2GB or greater and appropriate software.

**526.3. MEASUREMENT:** No measurement will be made under this item.

**526.4. PAYMENT:** No payment will be made under this item. The Field Office and items listed above are not a pay item and shall remain the property of the contractor after completion of this project.

**526.5. BID ITEM:**

N/A

THE FOLLOWING ITEMS ARE SPECIAL PROVISIONS TO  
THE CITY OF SAN ANTONIO  
STANDARD SPECIFICATIONS FOR CONSTRUCTION  
DATED JUNE 2008

1. Item 700 Project Schedules.....7 Pages

General

1. None

Standard Specifications

1. Delete Item 700 - Cost Loaded Schedules (*dated June 2008*) in its entirety and replace with Item 700 – Project Schedules (*dated February 2010*) shown on the attached document.

**ITEM 700**  
✦  
**PROJECT SCHEDULES**

*This item shall govern the creation, maintenance, and delivery of Critical Path Method (CPM) project schedules.*

**CRITICAL PATH METHOD PROJECT SCHEDULE**

The Contractor shall create and maintain a Critical Path Method (CPM) Project Schedule showing the manner of execution of work that the contractor intends to follow in order to complete the contract within the allotted time. The project schedule shall employ computerized CPM for the planning, scheduling and reporting of the work as described in this specification. The CPM project schedule shall be prepared using the Precedence Diagram Method (PDM). The Contractor shall create and maintain the schedule using Primavera Project Manager 5.x or above or Primavera Contractor 4.1 or above. For construction contracts under \$300K and project durations 90 days or less, the project schedule can be created and maintained in Microsoft Project software. The observance of the requirements herein is an essential part of the work to be done under the contract. No direct compensation will be allowed for fulfilling these requirements, as such work is considered subsidiary to the various bid items of the contract.

**PERSONNEL**

The Contractor shall provide an individual, referred to hereafter as the Scheduler, to create and maintain the Project Schedule. The Scheduler shall be proficient in Critical Path Method (CPM) analysis as demonstrated through certification from Project Management Institute (PMI), Association for the Advancement of Cost Engineering (AACE) or possess sufficient experience to be

able to perform required tasks on the specified software and be able to prepare and interpret reports from the software. The Scheduler shall be made available for discussion or meetings when requested by the City.

**PROJECT SCHEDULE**

**1. GENERAL:**

At least twenty (20) calendar days prior to the pre-construction conference, the Contractor shall submit a Project Schedule, which shall show the sequence and interdependence of activities required for complete performance of the work. All schedule submittals shall be in the electronic form to include PDF plots of the schedule, a PDF plot defining the Critical Path and two week look-ahead, and include the native Primavera file format. The Contractor shall submit the schedule to the Web-portal and Project Manager via electronic mail, CD-Rom, floppy disc, or any other electronic media acceptable to the City. The City will review the Project Schedule within twenty (20) calendar days for compliance with the specifications and notify the Contractor at the pre-construction conference of its acceptability. No work shall begin until the City has accepted the Project Schedule.

**2. SEQUENCE:**

The Project Schedule shall show the sequence and interdependence of activities required for complete performance of the work. The Contractor shall be responsible for assuring all work sequences are logical and show a coordinated plan of the work. The purpose of

the City requiring the Project Schedule shall be to:

- a. Ensure adequate planning during the execution and progress of the work in accordance with the allowable number of calendar days and all milestones.
- b. Assure coordination of the efforts of the Contractor, City, Utilities and others that may be involved in the project and that activities are included in the schedule highlighting coordination points with others,
- c. Assist the Contractor and City in monitoring the progress of the work and evaluating proposed changes to the contract, and
- d. Assist the City in administering the contract time requirements.

### 3. ACTIVITIES:

Each activity on the Project Schedule shall include:

- a. An activity number utilizing an alphanumeric designation system that is agreeable to the City;
- b. Concise description of the work represented by the activity; and
- c. Activity durations in whole work days with a maximum of twenty (20) work days. Durations greater than twenty (20) work days may be used for non-construction activities (mobilization, submittal preparation, curing, etc.), and other activities mutually agreeable between the City and Contractor.

The Contractor shall provide to the City a legend for all abbreviations. The activities shall be coded so that organized plots of the

Project Schedule may be produced. Typical activity coding includes traffic control phase, location and work type. Show an estimated production rate per working day for each work activity. Activity durations shall be based on production rates shown.

### 4. WORK DURATION AND RESOURCES:

The schedule layout shall be grouped by Project and then by Work Breakdown Structure (WBS) for organizational purposes. The original and remaining duration shall be displayed. The grouping band will, by default, report work days planned. One additional level of effort activity shall be added to the schedule as a "time calculator" with a seven-day calendar without holidays. The calculation of their days will show up in the duration columns in Primavera.

If specified by general note, the Contractor shall plan and incorporate major resources into the Project Schedule. Major resources are defined as crews and equipment that constrain the Contractor from pursuing available work. The resources shall accurately represent the Contractor's planned equipment and manpower to achieve the productivity rates specified above.

Work shall be scheduled based upon the Contractor's standard work week utilizing the appropriate calendar assignments in Primavera software. If the Contractor's initial baseline plan is to perform the Work on a six or seven-day work week, then the appropriate calendar in Primavera must be used and the Engineer must be notified in writing through the Submittal process. This does not affect the total calendar days allotted by the contract.

Assign working calendars for the days you plan to work. Designate all City holidays (12) as non-working days (holidays). For dates beyond the current calendar year assume that

the City holidays are the same as the current calendar year.

Seasonal weather conditions shall be considered and included in the Project Schedule for all work influenced by temperature and/or precipitation. Seasonal weather conditions shall be determined by an assessment of average historical climatic conditions. Average historical weather data is available through the National Oceanic and Atmospheric Administration (NOAA). These effects will be simulated through the use of work calendars for each major work type (i.e., earthwork, concrete paving, structures, asphalt, drainage, etc.). Project and work calendars should be updated each month to show days actually able to work on the various work activities.

Total float is defined as the amount of time between the early start date and the late start date, or the early finish date and the late finish date, for each and every activity in the schedule. Float time in the Project Schedule is a shared commodity between the City and the Contractor.

Only City responsible delays in activities that affect milestone dates or the contract completion date, as determined by CPM analysis, will be considered for a time extension.

#### 5. OTHER REQUIREMENTS:

Code and organize all work by Work Breakdown Structure (WBS). An example WBS will be provided by the City.

Percent complete type shall be Duration Percent Complete.

Duration type shall be Fixed Units

Submittals shall be included in the schedule with a logical tie to what each drives.

Proposed Change Orders shall be added the schedule identifying it as a Proposed Change Order. This task must be linked to the schedule with logical ties and approved by the City. Upon approval of Change Order, task will be renamed identifying work performed and Change Order number and resources will be added to the task.

Constraints are limited to project start, project finish, material delivery, and use on Submittals. If a schedule requires additional constraints, then an explanation shall accompany the schedule Submittal.

The schedule shall include activity milestones for material delivery.

Default progress is disallowed.

If work is performed out of sequence, then an explanation must be included in the project narrative.

#### **JOINT REVIEW, REVISION AND ACCEPTANCE**

Within twenty (20) calendar days of receipt of the Contractor's proposed Project Schedule, the City shall evaluate the schedule for compliance with this specification, and notify the Contractor of its findings. If the City requests a revision or justification, the Contractor shall provide a satisfactory revision or adequate justification to the satisfaction of the City within seven (7) calendar days. If the Contractor submits a Project Schedule for acceptance, which is based on a sequence of work not shown in the plans, then the Contractor shall notify the City in writing, separate from the schedule submittal.

The City's review and acceptance of the Contractor's Project Schedule is for conformance to the requirements of the

contract documents only. Review and acceptance by the City of the Contractor's Project Schedule does not relieve the Contractor of any of its responsibility for the Project Schedule or of the Contractor's ability to meet interim milestone dates (if specified) and the contract completion date, nor does such review and acceptance expressly or by implication warrant, acknowledge or admit the reasonableness of the logic, durations, manpower or equipment loading of the Contractor's Project Schedule. In the event the Contractor fails to define any element of work, activity or logic and the City review does not detect this omission or error, such omission or error, when discovered by the Contractor or City shall be corrected by the Contractor at the next monthly schedule update and shall not affect the project completion date.

Acceptance by the City of a Baseline or project update schedule that exceeds contractual time does not alleviate the Contractor from meeting the contractual completion date.

Payment may be delayed until acceptable baseline or updated schedule is received and accepted by the City.

#### **UPDATES**

The Project Schedule shall be updated on a monthly basis. The Project Schedule update shall be submitted one week prior to the pay application submittal. The Contractor shall meet with the City each month at a scheduled update meeting to review actual progress made through the Data Date of the schedule update as determined by the Project Manager. The review of progress will include dates activities actually started and/or completed, the percentage of work completed, the remaining duration of each activity started and/or completed, and the amount of work to complete with an analysis of the relationship

between the remaining duration of the activity and the quantity of material to install over that given period of time with a citation of past productivity. The monthly schedule update shall include a progress narrative explaining progress, identifying progress made out of sequence, defining the Critical Path, identification of any potential delays, etc. The Project Schedule Narrative template will be required for the narrative.

The project schedule update layout shall be grouped by Project, then WBS. The layout shall include the following columns:

- a. Activity ID
- b. Activity Description
- c. Original Durations
- d. Remaining Durations
- e. Start and Finish Dates
- f. Baseline Start and Finish Dates
- g. Total Float
- h. Performance Percent Complete
- i. Display logic and target bars in the Gantt bar chart view

#### **PROJECT SCHEDULE REVISIONS**

If the Contractor desires to make major changes in the Project Schedule, the Contractor shall notify the City in writing and submit the proposed schedule revision. The written notification shall include the reason for the proposed revision, what the revision is comprised of, and how the revision was incorporated into the schedule. Major changes are hereby defined as those that may affect compliance with the contract requirements or those that change the critical path. All other changes may be accomplished through the monthly updating process without written notification.

#### **TIME IMPACT ANALYSIS**

The Contractor shall notify the City when an impact may justify an extension of contract time or adjustment of milestone dates. This notice shall be made in writing as soon as

possible, but no later than the end of the next estimate period after the commencement of an impact or the notice for a change is given to the Contractor. Not providing notice to the City within twenty (20) calendar days after receipt will indicate the Contractor's approval of the time charges as shown on that time statement. Future consideration of that statement will not be permitted and the Contractor forfeits his right to subsequently request a time extension or time suspension unless the circumstances are such that the Contractor could not reasonably have knowledge of the impact by the end of the next estimate period.

When changes are initiated or impacts are experienced, the Contractor shall submit to the City a written time impact analysis describing the influence of each change or impact. A "time impact analysis" is an evaluation of the effects of changes in the construction sequence, contract, plans, or site conditions on the Contractor's plan for constructing the project, as represented by the schedule. The purpose of the time impact analysis is to determine if the overall project has been delayed, and if necessary, to provide the Contractor and the City a basis for making adjustments to the contract.

A time impact analysis shall consist of one or all of the steps listed below:

1. Establish the status of the project before the impact using the most recent project schedule update prior to the impact occurrence.
2. Predict the effect of the impact on the most recent project schedule update prior to the impact occurrence. This requires estimating the duration of the impact and inserting the impact into the schedule update. Any other changes made to the schedule including modifications to the

calendars or constraints shall be noted.

3. Track the effects of the impact on the schedule during its occurrence. Note any changes in sequencing, and mitigation efforts.
4. Compare the status of the work prior to the impact (Step 1) to the prediction of the effect of the impact (Step 2), and to the status of the work during and after the effects of the impact are over (Step 3). Note that if an impact causes a lack of access to a portion of the project, the effects of the impact may extend to include a reasonable period for remobilization.

The time impact analysis shall be electronically submitted to the City. If the Project Schedule is revised after the submittal of a time impact analysis but prior to its approval, the Contractor shall promptly indicate in writing to the City the need for any modification to its time impact analysis. One (1) copy of each time impact analysis shall be submitted within fourteen (14) calendar days after the completion of an impact. The City may require Step 1 and Step 2 of the time impact analysis be submitted at the commencement of the impact, if needed to make a decision regarding the suspension of contract time. Approval or rejection of each time impact analysis by the City shall be made within fourteen (14) calendar days after receipt unless subsequent meetings and negotiations are necessary.

#### **MEASUREMENT and PAYMENT**

Project Schedule will not be measured or paid for directly, but shall be included in the unit price bid for the items of construction in which the operations occur.

**PROJECT SCHEDULE NARRATIVE**

---

PROJECT NAME:	
CONTRACTOR NAME:	
PERIOD ENDING:	
SUBMITTAL DATE:	
PREPARED BY:	

Evaluation Summary	
NTP:	
Data Date:	
Contractual Completion Date:	
Current Scheduled Completion Date:	
Previous Period Scheduled Completion Date:	
Contract Calendar Days:	

Yes	No	
		Contractor has included both a hard copy (pdf) and the native Primavera file format?
		Project calendars have been updated to reflect actual charged working days for the progress period, according to the contract time statement?
		Schedule update reflects approved change orders for the progress period?
		Have any major changes been made to the schedule? <i>(A major change is defined as those that may affect compliance with the contract requirements or those that change the critical path. If yes, written notification is required to include the reason for the proposed revision, what the revision is comprised of, and how the revision was incorporated into the schedule.)</i> If yes, provide details in Section 3 & 5 below.
		Are any delays included in this schedule submittal for which the Contractor intends to submit a Time Impact Analysis (TIA) for a claim delay? If yes, provide details in Section 6 below.

<p><b>1. Identify general progress for the update period.</b></p>    
<p><b>2. Identify work performed out of sequence and provide an explanation for the reason.</b></p>    

<b>3. Describe any changes made to the project's logic and the reason for the change(s).</b>
<b>4. Identify any new constraints used and provide an explanation for their use.</b>
<b>5. Define the critical path of the project, including any changes from the previous update.</b>
<b>6. Identify any delays that have occurred for the progress period, the reason for the delay, and current status.</b>
<b>7. Identify any potential delays and possible mitigation efforts.</b>
<b>8. Other comments.</b>

ITEM 800

PROJECT SIGNS

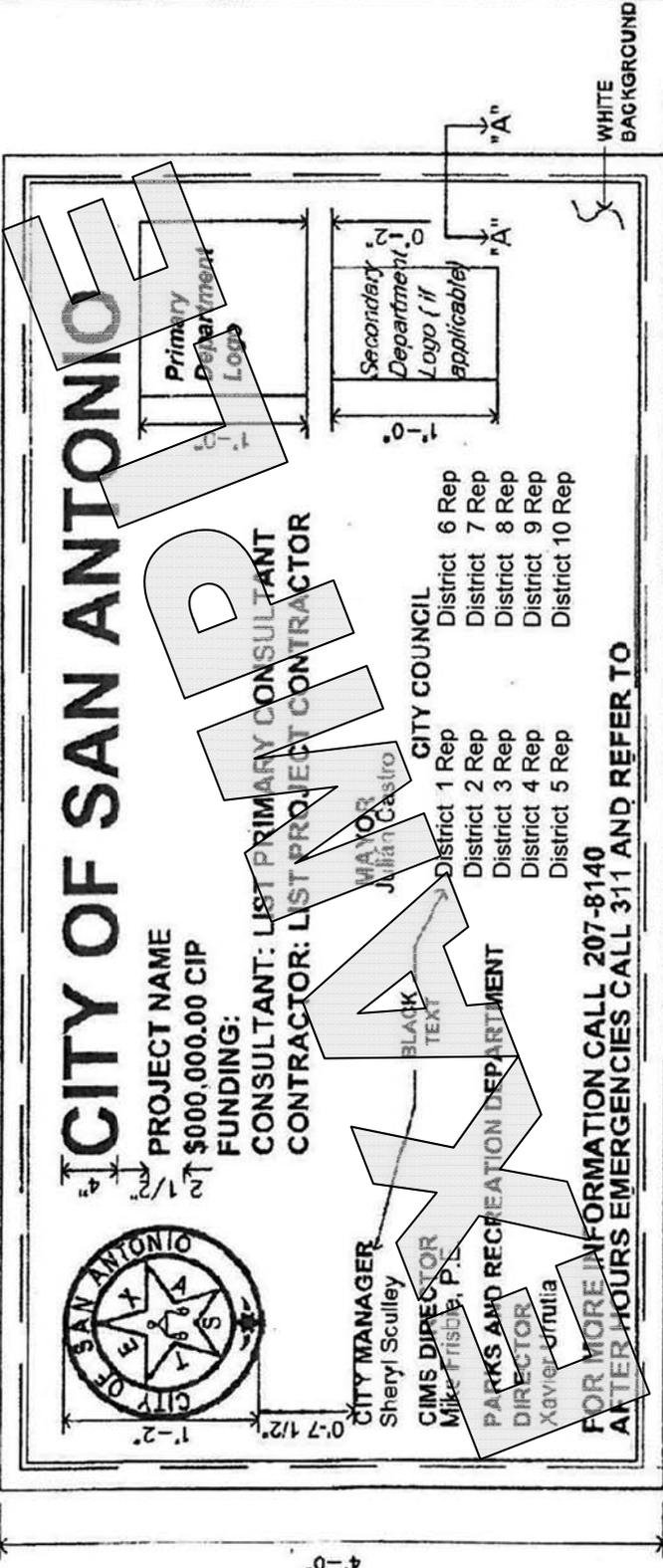
800.1 DESCRIPTION: This item shall consist of providing, installing, maintaining and (at the completion of the project) removing two (2) 4' X 8' project signs. The signs shall conform to the configuration and details indicated in a special sheet in the project specifications titled PROJECT SIGN DETAILS. These signs shall be installed at locations to be determined by the inspector.

800.2 MATERIAL: The signs shall be made of 3/4" plywood, grade A-C or better and each shall be mounted on two (2) 4" X 4" X 12' - 0" posts.

800.3 INSTALLATION: The installation will require embedding all posts a minimum of 3' - 0" below the ground.

800.4 PAYMENT: No direct payment will be made to the contractor for the work and materials required in providing, installing, maintaining and removing the signs. Such work and materials shall be considered subsidiary to the several items of work for which unit prices are provided in the proposal.

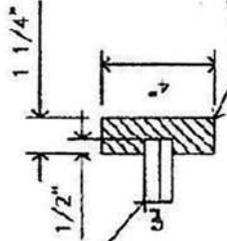
8'-0"



WHITE BACKGROUND

Provide adequate supports for sign as site conditions may require and keep sign proper distance above prevailing grade to permit viewing.

GRADE



Exterior type high density overlaid plywood or other approved material suitable for signs.

Left border shall be determined using the longest line centered on the sign providing equal borders.

PROJECT SIGN DETAILS  
CITY OF SAN ANTONIO

SIGNS TO BE PLACED IN A PROMINENT LOCATION ALONG A MAJOR THOROUGHFARE WITHIN THE CITY AND SHALL BE KEPT FREE OF GRAFFITI, IN PROPER CONDITION, AND MAINTAINED THROUGHOUT THE PROJECT.

# **SECTION 3**

# **SPECIAL SPECIFICATIONS**

**ITEM SP.1**

**SPECIAL SPECIFICATION 1 – DIVERSION AND CARE OF WATER**

**PART 1 – GENERAL**

**1.01 SCOPE**

This specification relates to work conducted at or below the top of bank (TOB) of Salado Creek that requires water to be diverted and removed from the work area. Also included in this specification are those Erosion/Sedimentation/Water Pollution Prevention control devices that are necessary to prevent water from entering the work area and also causing degradation of conditions downstream of the work area. These measures are in addition to those described in the SWPPP design sheets and captured under Item 540.

The Contractor shall furnish all labor, equipment, materials, and services to:

- A. Control and divert water from the work areas at or below the TOB of Salado Creek without increasing the risk of flooding to properties adjacent to and upstream of the project area.
- B. Dewater work areas at or below the TOB of Salado Creek due to any source of water, including, but not limited to: groundwater seepage, runoff, precipitation, and performance of diversion and control measures.
- C. Control erosion and sedimentation resulting from construction and dewatering activities.

**1.02 RELATED SECTIONS**

- A. ITEM 101.1 – Preparing Right-of-Way, as it pertains to removing the existing low water crossing.
- B. ITEM 103.4 – Remove Miscellaneous Concrete, as it pertains to removing the existing low water crossing.
- C. ITEM 105.1 – Channel Excavation
- D. ITEM 308.1 – Drilled Shafts, as it pertains to those within the ordinary high water mark.

**1.03 REFERENCES**

- A. Comply with all governmental, regional, and local standards and permits, including the US Army Corps of Engineers Section 401 Certification and Sections 404 and 402 Permits (in accordance with the Clean Water Act of 1972) with respect to requirements for care of water discharges to natural streams.

- B. Support COSA-provided biologists in aquatic resource (e.g., fish, freshwater mussels) relocation as needed during the dewatering process by coordinating the timing of the dewatering event with them, ensuring that the aquatic resources are properly supported within the work area until the biologists are able to remove them, and in the case of breaches, alerting the biologists of the event and the timing of the next dewatering event. The Contractor will not be responsible for hiring the biologists for the work described in this section.

#### **1.04 SUBMITTALS**

- A. The Contractor shall submit for acceptance, a plan showing the proposed method for diverting the perennial flow of water and storm water runoff from the work area, including dewatering for the items listed in Section 1.02. The plan may be placed in operation upon approval from the City of San Antonio (COSA) Transportation and Capital Improvements (TCI) Department Environmental Management Division (EMD), but nothing in this paragraph shall relieve the Contractor from full responsibility for the adequacy of the method used. Once all measures have been put in place on site, the functionality and success of the plan will be determined and final approval given to begin operation. However, should the measures fail at any time during operation; implementation of a remedial action plan will be required at no additional charge to the Owner. Upon approval of the plan, the Contractor will upload the final version to the Primelink system under the project submittal file.
- B. At a minimum, the Contractor's care of water plan should contain:
  - 1. A list of best management practice (BMP) devices proposed for use and how each will be used.
  - 2. Provide a detailed step-by-step procedure for all activities that will occur at or below the TOB of Salado Creek, including all activities associated with the items listed in Section 1.02.
  - 3. Provide a detailed step-by-step procedure for diverting water and establishing, maintaining, and removing the BMPs listed above.
  - 4. A remedial action plan should the plan previously described fail, all or in part.

#### **1.05 GROUNDWATER INFORMATION**

- A. The geologic descriptions, drawings, logs of subsurface exploration, and water-level elevations, shown on the drawings or given elsewhere in these specifications are presented solely for the information of the bidders and for the contractor in planning the construction operations. The Owner and the Engineer assume no responsibility for any deductions, interpretations, or conclusions which may be made from this information.

## **1.06 CARE OF WATER**

- A. The Owner shall observe the Contractor's Care of Water, diversion and dewatering facilities, erosion and sediment control measures, and response to performance issues throughout the duration of the Contract. Any deviations from the accepted Care of Water Plan shall be submitted to TCI EMD for review and acceptance a minimum of 3 working days prior to installation of controls in the field, unless immediate action is required for the proper care and diversion of storm water flows due to runoff from a precipitation event or the failure of a control.
- B. Adequacy of the Contractor's measures will be determined based upon the avoidance of degradation to the water quality of Salado Creek and waterways within and immediately downstream of the work area and the avoidance of increased flood risk to properties adjacent to and upstream of the work area. Should degradation occur, the Contractor shall take all reasonable steps consistent with the requirements herein to provide additional facilities to alleviate the cause of degradation and to rehabilitate the affected area(s).

## **PART 2 – PRODUCTS**

### **2.01 MATERIALS**

- A. The Contractor shall supply all labor, equipment, materials, and services required for the appropriate diversion and care of water at or below the TOB of Salado Creek.

### **2.02 OTHER MATERIALS**

- A. The Contractor shall supply Temporary Erosion, Sedimentation and Water Pollution Prevention Control devices. The following list provides example measures. This list is not all-inclusive.
- filter bags
  - filter socks
  - rock filter dams
  - erosion control matting
  - hay bale structures
  - floating baffle curtains
  - temporary sedimentation basins
  - coffer dams
- B. Should an alternate device/measure be required (other than those listed above), the Contractor shall receive approval from the TCI EMD prior to implementing those devices/measures. The Contractor shall demonstrate that any such substitutions would provide at least the equivalent performance of the measures listed above.

## **PART 3 – EXECUTION**

### **3.01 GENERAL**

- A. This Care of Water Specification holds the Contractor responsible for the care of water related to work at or below the TOB of Salado Creek and in no way eliminates or supersedes the SWPPP plans or narrative described in the design plans. The Contractor shall provide, operate, and maintain all ditches, basins, sumps, culverts, cofferdams, site grading, and pumping facilities required to divert, collect, filter, and remove water from the work areas.
  
- B. All water removed from the work areas, shall be pumped or diverted to settling ponds, or through other erosion and sedimentation controls as appropriate for the flow quantity and velocity, before being allowed to discharge into natural drainage ways at locations approved by the Owner. Water discharged into natural drainage ways or water bodies shall be of equal or better quality than the receiving waters.

### **3.02 DEWATERING**

- A. Groundwater seepage and leaking diversion devices are anticipated to be a source of water into the Contractor's construction work areas. This will be augmented by direct precipitation and resultant runoff from the construction work area, upstream drainage areas, and existing and proposed closed systems which outfall within the project limits.
  
- B. The Contractor shall be responsible for providing all facilities required to divert, collect, filter, control, and evacuate water from all construction work areas and excavations. Water shall generally be conducted away from all construction work areas or to temporary drainage conveyances within the work areas.
  
- C. Temporary or natural drainage conveyances shall have sufficient capacity to provide continuous evacuation to avoid prolonged flooding of work areas. Temporary or natural drainage conveyances shall be arranged and altered, with approval from TCI EMD, so as to avoid degradation of the water quality of Salado Creek and waterways immediately downstream of the project area.
  
- D. The Contractor shall utilize all necessary erosion and sedimentation control measures as needed and approved by TCI EMD to avoid construction related degradation of the natural water quality.
  
- E. Excavation dewatering shall be accomplished so as to prevent siltation of land or designated water bodies. Sumps shall be located and shaped so as to minimize entry of silt to dewatering pumps. Settling basins will be provided by the Contractor to receive pumped water when directed by the Owner.

**3.03 EROSION AND SEDIMENTATION CONTROL**

- A. The Contractor shall utilize Temporary Erosion, Sedimentation, and Water Pollution Prevention Control devices recommended in Section 2.02a or approved alternative sediment trapping methods and temporary sedimentation basins along the edge of, within, and downstream of the work area to trap sediment and minimize soil erosion in areas affected by construction activities. The Contractor should also employ site management strategies to minimize the potential for erosion. Such strategies shall include, but not be limited to the following:
1. Conducting construction operations to minimize the duration of exposure of bare earth surfaces,
  2. Prompt stabilization of disturbed areas,
  3. Controlling rainfall runoff, and
  4. Effective maintenance of erosion and sediment control measures during the construction period.
- B. Methods used for handling, collecting, filtering, and discharging runoff from disturbed areas shall be in accordance with Section 401 (of the Clean Water Act) requirements and will be subject to review by the Owner.
- C. Temporary diversion of drainage conveyances shall be accomplished to avoid erosion at the diversion location. Culverts or channel linings shall be provided where it is not possible to construct stable earth diversion conveyances.
- D. Streams and water bodies in or adjacent to the construction area shall be protected from disturbance by construction operations. Measures to protect streams and water bodies shall include the following:
1. Avoidance by excessive equipment traffic,
  2. Preventing siltation of streams or water bodies by construction of water conveyances, diversions, and sedimentation and erosion controls as appropriate, and
  3. Cleanout and restoration where sedimentation occurs as a result of construction operations.
- E. Earth moving and land grading shall be conducted in a manner to minimize erosion impact.
- F. Soils and stockpiles shall not be placed in floodplain or in locations where blockage of natural drainage ways can occur.

- G. Sediment depositions resulting from construction operations which are damaging or potentially damaging to the site or land offsite shall be removed and disposed of as directed by the Owner.
- H. Haul and access roads shall be wetted with water on a frequent basis as required to prevent excessive dust.
- I. The contractor shall make frequent periodic inspections of the site and installed erosion and sedimentation control measures to check effectiveness of control measures and to determine conditions needing remedial action. Control measures shall be maintained to function at full effectiveness throughout the construction period. The Contractor shall refer to the TPDES General Permit (Part III, Section F, 7(a)) to determine the standard frequency of inspection, though it is the COSA preference for 7-day inspections as documented in the SWPPP narrative sheet in the design plans. However, inspections may be required at more frequent intervals based upon the performance of the control measures.
- J. The Contractor shall submit copies of the inspection reports to the Owner within 2 working days of the inspection.

**3.04 STABILIZATION OF DISTURBED AREAS**

- A. Excess excavated material is for the Contractor’s use in developing laydown areas, access roads, and associated drainage features and may also be used to stabilize disturbed areas. These materials shall be used in conjunction with geotextile stabilization fabric to stabilize disturbed areas as quickly and efficiently as possible to minimize potential further disturbance.

**3.05 FLOOD CONTROL**

- A. The Contractor shall ensure the means and methods of construction, diversion and care of water, and any related activities do not increase the risk of flooding for properties adjacent to the project area. Table 1 below provides flow information for multiple theoretical storm events within the project area. Hydrologic and hydraulic models of the existing site conditions may be made available, upon request, for the Contractor’s use.

**Table 1 – Salado Creek Flow**

Estimated Storm Event	Flow (cfs)
10 Year	18,554
25 Year	N/A
50 Year	31,427
100 Year	37,660

**PART 4 – MEASUREMENT AND PAYMENT**

- A. Payment for diversion and care of water will be made as a lump sum price bid in the bid schedule paid monthly after TCI EMD monthly review and approval. The price shall include all costs to complete the work required for the diversion and care of water including all labor, equipment, materials; and the cost of repair and maintenance of the controls.
  
- B. Measures used to complete diversion and care of water tasks must comply with all requirements put forth in this specification and related regulatory documents and meet TCI EMD approval before payment will be made. If measures fail or do not comply, payment will be withheld until measures comply with all requirements and are adequate to prevent the degradation of downstream waterways and prevent flooding of adjacent and upstream properties.
  
- C. The work performed, materials furnished, equipment, labor, tools, and incidentals will not be measured or paid for directly, but will be subsidiary to the cost of TxDOT Bid Item 403-6006 (TEMPORARY SPL SHORING (COFFERDAM)).

**END OF SPECIFICATION**

## ITEM SP.2

### SPECIAL SPECIFICATION 2 – SWING GATE

#### PART 1 GENERAL

- 1.1 DESCRIPTION: This item shall govern for steel swing gates erected complete in place as shown in the plans, specified herein, or as directed by the inspector.
- 1.2 MATERIALS: Before installation of the swing gate, furnish certification from the swing gate materials manufacturer stating that all swing gate materials comply with the requirements of this Item. Use only new materials.
- A. General: Furnish Materials in accordance with the following:
1. Concrete. Item 300, "Concrete," Class "B."
  2. Galvanizing. Texas Department of Transportation Item 445, "Galvanizing."
- B. Materials: Vertical posts shall be standard weight and conform to ASTM Specification A53 Grade B or A501.
- C. Welds:
1. All shop and field welds shall be made by welders who have been qualified and certified to make the required welds within the previous year in accordance with the latest American Welding Society Specifications AWS D.1I.
  2. All welds shall be full penetration welds all around unless noted.
  3. Grind and weld splatter smooth.
  4. Remove all slag prior to finishing.
- D. Finish:
1. Galvanizing: Hot Dipped galvanized.
- 1.3 QUALITY ASSURANCE
- A. Manufacturer: Swing gate units of all types must be supplied by a single manufacturer having the resources to provide consistent quality in appearance and physical properties.
- B. Materials: Steel shall be US domestic mill certified steel. The main body of the product must be constructed from ASTM A500 steel and be accompanied with steel mill certifications/test reports for the steel being used to ensure the durability and performance of the product. Secondary and non-ASTM steel may not be substituted.
- 1.4 DELIVERY, STORAGE AND HANDLING
- A. Package units appropriately to protect finish. Inspect materials to ensure that specified materials have been received.
- B. Store units to avoid damage from moisture, abrasion, and other construction activities.

## PART 2 EXECUTION

### 2.1 INSTALLATION

- A. Comply with manufacturer's recommendations for installation and approved submittals and the following:
  - 1. Install swing gates level and true and in proper relation to adjacent surfaces.
  - 2. Test for proper operation and adjust if necessary.
- B. Protect swing gates from damage during construction operations.

## PART 3 MEASUREMENT & PAYMENT

### 3.1 MEASUREMENT

- A. Measurement shall be based on the number of satisfactorily installed swing gates.

### 3.2 PAYMENT

- A. The accepted quantities shall be paid at the contract unit price for the swing gate which shall be full compensation for furnishing of all materials, galvanizing, labor, tools, equipment, and supplies to construct swing gates as shown on the plans or as specified herein.

END OF SECTION

**SECTION 02225**  
**DEMOLITION**  
(FOR MONUMENTS ONLY)

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Selective demolition of built site elements.

**1.02 RELATED SECTIONS**

- A. Section 01100 - Summary: Limitations on Contractor's use of site and premises.

**1.03 REFERENCES**

- A. 29 CFR 1926 - U.S. Occupational Safety and Health Standards; current edition.
- B. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; current edition.

**1.04 SUBMITTALS**

- A. Project Record Documents: Accurately record actual locations of capped and active utilities and subsurface construction.

**1.05 PROJECT CONDITIONS**

- A. Minimize production of dust due to demolition operations; do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.
- B. Comply with other requirements specified in Section 01700.

**PART 2 PRODUCTS**

**2.01 MATERIALS**

- A. Removal of material as determined on plans

**PART 3 EXECUTION**

**3.01 SCOPE**

- A. Remove paving and curbs as required to accomplish new work
- B. Within area of new construction, remove foundation walls and footings to a minimum of 2 feet below finished grade.

**3.02 GENERAL PROCEDURES AND PROJECT CONDITIONS**

- A. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
  - 1. Obtain required permits.
  - 2. Comply with applicable requirements of NFPA 241.
  - 3. Use of explosives is not permitted.

4. Take precautions to prevent catastrophic or uncontrolled collapse of structures to be removed; do not allow worker or public access within range of potential collapse of unstable structures.
  5. Provide, erect, and maintain temporary barriers and security devices.
  6. Use physical barriers to prevent access to areas that could be hazardous to workers or the public.
  7. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
  8. Do not close or obstruct roadways or sidewalks without permit.
  9. Conduct operations to minimize obstruction of public and private entrances and exits; do not obstruct required exits at any time; protect persons using entrances and exits from removal operations.
  10. Obtain written permission from owners of adjacent properties when demolition equipment will traverse, infringe upon or limit access to their property.
- B. Do not begin removal until receipt of notification to proceed from Owner.
  - C. Do not begin removal until built elements to be salvaged or relocated have been removed.
  - D. Do not begin removal until vegetation to be relocated has been removed and specified measures have been taken to protect vegetation to remain.
  - E. Protect existing structures and other elements that are not to be removed.
    1. Provide bracing and shoring.
    2. Prevent movement or settlement of adjacent structures.
    3. Stop work immediately if adjacent structures appear to be in danger.
  - F. If hazardous materials are discovered during removal operations, stop work and notify Design consultant and Owner; hazardous materials include regulated asbestos containing materials, lead, PCB's, and mercury.
  - G. Hazardous Materials: Comply with 29 CFR 1926 and state and local regulations.
  - H. Perform demolition in a manner that maximizes salvage and recycling of materials.
    1. Dismantle existing construction and separate materials.
    2. Set aside reusable, recyclable, and salvageable materials; store and deliver to collection point or point of reuse.
  - I. Partial Removal of Paving and Curbs: Neatly saw cut at right angle to surface.

### 3.03 EXISTING UTILITIES

- A. Coordinate work with utility companies; notify before starting work and comply with their requirements; obtain required permits.
- B. Protect existing utilities to remain from damage.
- C. Do not disrupt public utilities without permit from authority having jurisdiction.
- D. Do not close, shut off, or disrupt existing life safety systems that are in use without at least 7 days prior written notification to Owner.
- E. Do not close, shut off, or disrupt existing utility branches or take-offs that are in use without at least 3 days prior written notification to Owner.
- F. Locate and mark utilities to remain; mark using highly visible tags or flags, with identification of utility type; protect from damage due to subsequent construction, using substantial barricades if necessary.
  1. shall be responsible to notify Texas One Call (800-245-4545) a minimum of 72 hours prior to initiation of any demolition or excavation activity.
- G. Remove exposed piping, valves, meters, equipment, supports, and foundations of disconnected

and abandoned utilities.

1. Note dimensioned locations of underground abandoned items left in place on record drawings.

### **3.04 SELECTIVE DEMOLITION FOR ALTERATIONS**

- A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only; casual field observation only; existing record documents only; .
  1. Verify that construction and utility arrangements are as shown.
  2. Report discrepancies to Design Consultant before disturbing existing installation.
  3. Beginning of demolition work constitutes acceptance of existing conditions.
- B. Separate areas in which demolition is being conducted from other areas that are still occupied.
  1. Provide, erect, and maintain temporary dustproof partitions of construction specified in Section 01500.
- C. Maintain weatherproof exterior building enclosure except for interruptions required for replacement or modifications; take care to prevent water and humidity damage.
- D. Remove existing work as indicated and as required to accomplish new work.
  1. Remove rotted wood, corroded metals, and deteriorated masonry and concrete; replace with new construction specified.
  2. Remove items indicated on drawings.
- E. Protect existing work to remain.
  1. Prevent movement of structure; provide shoring and bracing if necessary.
  2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
  3. Repair adjacent construction and finishes damaged during removal work.
  4. Patch as specified for patching new work.

### **3.05 DEBRIS AND WASTE REMOVAL**

- A. Remove debris, junk, and trash from site.
- B. Leave site in clean condition, ready for subsequent work.
- C. Clean up spillage and wind-blown debris from public and private lands.

**END OF SECTION**

# **SECTION 02230 SITE CLEARING**

(FOR MONUMENTS ONLY)

## **PART 1 GENERAL**

### **1.01 SECTION INCLUDES**

- A. Clearing and protection of vegetation.
- B. Removal of existing debris.

### **1.02 RELATED SECTIONS**

- A. Section 01100 - Summary: Limitations on Contractor's use of site and premises.
- B. Section 01575 - Temporary Erosion and Sedimentation Control.

### **1.03 PROJECT CONDITIONS**

- A. Comply with other requirements specified in Section 01700.

## **PART 2 PRODUCTS**

### **2.01 MATERIALS**

- A. Fill Material: As specified in Section 02310 – Grading

## **PART 3 EXECUTION**

### **3.01 EXISTING UTILITIES AND BUILT ELEMENTS**

- A. Coordinate work with utility companies; notify before starting work and comply with their requirements; obtain required permits.
- B. Protect existing utilities to remain from damage.
- C. Do not disrupt public utilities without permit from authority having jurisdiction.
- D. Protect existing structures and other elements that are not to be removed.

### **3.02 VEGETATION**

- A. Scope: Remove trees, shrubs, brush, and stumps in areas to be covered by new improvements.
  - 1. Stake out layout of improvements for approval by Landscape Architect and Owner prior to initiating clearing activity.
  - 2. Place barricade fencing:
    - a. Obtain approval of installation of barricade fencing from COSA Tree Inspector, Landscape Architect and Owner prior to initiating clearing activity.
  - 3. Adjustments in location of pedestrian paving and trails as may be required for field conditions including but not limited to existing trees/vegetation and site features as may be directed by Landscape Architect and Owner to the extent that the overall value of the work is not substantially changed.

- a. In the event of a substantial change in the work, as determined by agreement between Contractor and Owner, a Field Alteration/Change Order will be issued.
- B. Do not begin clearing until vegetation to be relocated has been removed.
- C. Do not remove or damage vegetation beyond the following limits:
  1. 40 feet outside the building perimeter.
  2. 5 feet each side of roadway curbs.
  3. 5 feet; 2 feet each side of walkways and trails.
  4. 5 feet; 3 feet each side of utility trenches.
  5. 5 feet each side of roadway curbs, walkways, and main utility trenches.
  6. 25 feet outside perimeter of pervious paving areas that must not be compacted by construction traffic.
- D. Install substantial, highly visible fences at least 4 feet high to prevent safety hazards to the public
- E. In areas where vegetation must be removed but no construction will occur other than pervious paving, remove vegetation with minimum disturbance of the subsoil.
- F. Vegetation Removed: Do not burn, bury, landfill, or leave on site, except as indicated.
  1. Chip, grind, crush, or shred vegetation for mulching, composting, or other purposes; preference should be given to on-site uses.
  2. Trees: Treat as specified for other vegetation removed; remove stumps and roots to depth of 18 inches.
  3. Existing Stumps: Treat as specified for other vegetation removed; remove stumps and roots to depth of 18 inches.
  4. Fill holes left by removal of stumps and roots, using suitable fill material, with top surface neat in appearance and smooth enough not to constitute a hazard to pedestrians.
- G. Dead Wood: Remove all dead trees (standing) and limbs which are within a distance of the new improvements determined by the height of the tree; treat as specified for vegetation removed.
- H. Dead Wood: Remove all dead trees (standing or down), limbs, and dry brush on entire site; treat as specified for vegetation removed.
- I. Restoration: If vegetation outside removal limits or within specified protective fences is damaged or destroyed due to subsequent construction operations, replace at no cost to Owner.

### **3.03 DEBRIS**

- A. Remove debris, junk, and trash from site.
- B. Leave site in clean condition, ready for subsequent work.
- C. Clean up spillage and wind-blown debris from public and private lands.

**END OF SECTION**

**SECTION 02316**  
**FILL AND BACKFILL**  
(FOR MONUMENTS ONLY)

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Filling, backfilling, and compacting for footings.

**1.02 RELATED SECTIONS**

- A. Section 02310 - Grading: Site grading.
- B. Section 02225 – Demolition: Removal and handling of soil to be re-used.

**1.03 UNIT PRICES**

- A. See Section 01270 - Unit Prices, see general requirements applicable to unit prices for earthwork.

**1.04 REFERENCES**

- A. ASTM C 33 - Standard Specifications for Concrete Aggregates; 2003.
- B. ASTM C 136 - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates; 2005.

**1.05 DEFINITIONS**

- A. Finish Grade Elevations: Indicated on drawings.
- B. Subgrade Elevations: As required to establish finish grade elevations.

**1.06 SUBMITTALS**

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Fill Composition Test Reports: Results of laboratory tests on proposed and actual materials used.
- C. Compaction Density Test Reports.

**1.07 PROJECT CONDITIONS**

- A. Provide sufficient quantities of fill if needed to supplement material obtained from the site to meet project schedule and requirements. When necessary, store materials on site in advance of need.

**PART 2 PRODUCTS**

**2.01 FILL MATERIALS**

- A. General: Provide approved borrow soil materials from off-site when sufficient approved soil materials are not available from excavations.
- B. General Fill- Backfill and fill materials ASTM D 2487 soil classification groups GW, GP, GM, SW, SP, and SM: free from rock or gravel larger than 2 inches in any dimension, debris, waste, frozen materials, vegetation and other deleterious matter and having a plasticity index (PI) of less than 30.
  - 1. Unsatisfactory soil materials include ASTM D 2487 soil classification groups GC, SC, ML, MH, CL, CH, OL, OH, and PT.
  - 2. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.
- C. Sand - ASTM C 33; fine aggregate, natural or manufactured sand.

**2.02 ACCESSORIES**

- A. Filter Fabric: N/A

**2.03 SOURCE QUALITY CONTROL**

- A. See Section 01400 - Quality Requirements, for general requirements for testing and analysis of soil material.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A. Identify required lines, levels, contours, and datum locations.

### **3.02 PREPARATION**

- A. Scarify and proof roll subgrade surface to a depth of 6 inches to identify soft spots.
- B. Compact subgrade to density equal to or greater than requirements for subsequent fill material.
- C. Until ready to fill, maintain excavations and prevent loose soil from falling into excavation.

### **3.03 FILLING**

- A. Fill to contours and elevations indicated using unfrozen materials.
- B. Fill up to subgrade elevations unless otherwise indicated.
- C. Employ a placement method that does not disturb or damage other work.
- D. Systematically fill to allow maximum time for natural settlement. Do not fill over porous, wet, frozen or spongy subgrade surfaces.
- E. Maintain optimum moisture content of fill materials to attain required compaction density.
- F. Granular Fill: Place and compact materials in equal continuous layers not exceeding 6 inches compacted depth.
- G. Soil Fill: Place and compact material in equal continuous layers not exceeding 8 inches compacted depth.
- H. Slope grade away from structures and improvements minimum 2 inches in 10 feet, unless noted otherwise. Make gradual grade changes. Blend slope into level areas.
- I. Correct areas that are over-excavated.
- J. Compaction Density Unless Otherwise Specified or Indicated:
  - 1. Under paving, slabs-on-grade 95 percent of maximum dry density.
  - 2. At other locations: 90 percent of maximum dry density.

### **3.04 FILL AT SPECIFIC LOCATIONS**

- A. Use general fill unless otherwise specified or indicated.
- B. Structural Fill:
  - 1. Use structural fill.
  - 2. Fill up to subgrade elevations.
  - 3. Maximum depth per lift: 6 inches, compacted.
  - 4. Compact to minimum 95 percent of maximum dry density.
- C. At Lawn Areas:
  - 1. Use general fill.
  - 2. Fill up to 6 inches below finish grade elevations.
  - 3. Compact to 95 percent of maximum dry density.
  - 4. See Section 02310 for topsoil placement.
- D. Under Monolithic Paving:
  - 1. Compact subsoil to 95 percent of its maximum dry density before placing fill.
  - 2. Use general fill.
  - 3. Fill up to subgrade elevation.
  - 4. Compact to 95 percent of maximum dry density.
  - 5. See Section 02721 for aggregate base course placed over fill.

### **3.05 TOLERANCES**

- A. Top Surface of General Filling: Plus or minus 1 inch from required elevations.

- B. Top Surface of Filling Under Paved Areas: Plus or minus 1/2 inch from required elevations.

### **3.06 FIELD QUALITY CONTROL**

- A. See Section 01400 - Quality Requirements, for general requirements for field inspection and testing.
- B. Perform compaction density testing on compacted fill in accordance with ASTM D1556 or ASTM D2167
- C. Proof roll compacted fill at surfaces that will be under slabs-on-grade, pavers, and paving.

### **3.07 CLEAN-UP**

- A. Leave unused materials in a neat, compact stockpile.
- B. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water. Unused material may be distributed on site at approval of Owner's Representative.
- C. Leave borrow areas in a clean and neat condition. Grade to prevent standing surface water.

**END OF SECTION**

**SECTION 02751**  
**PORTLAND CEMENT CONCRETE PAVING**  
(FOR MONUMENTS ONLY)

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Concrete sidewalks, integral curbs, gutters, plaza, monument foundation, retaining walls and sloped transition to existing concrete sidewalks.

**1.02 RELATED SECTIONS**

- A. Section 02310 - Grading: Preparation of site for paving and base.
- B. Section 02316 - Fill and Backfill: Compacted subbase for paving.

**1.03 UNIT PRICES**

- A. See Section 01270 - Unit Prices, for additional unit price requirements.
- B. Concrete Placed: By the square yd per specified inch thickness. Includes preparing base, placing, floating and finishing, testing.

**1.04 REFERENCES**

- A. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete; American Concrete Institute International; 1991 (Reapproved 2002).
- B. ACI 301 - Specifications for Structural Concrete for Buildings; American Concrete Institute International; 2005.
- C. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete; American Concrete Institute International; 2000.
- D. ACI 305R - Hot Weather Concreting; American Concrete Institute International; 1999.
- E. ACI 306R - Cold Weather Concreting; American Concrete Institute International; 1988.
- F. ASTM A 615/A 615M - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement; 2004b.
- G. ASTM C 33 - Standard Specification for Concrete Aggregates; 2003.
- H. ASTM C 39/C 39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens; 2004a.
- I. ASTM C 94/C 94M - Standard Specification for Ready-Mixed Concrete; 2004a.
- J. ASTM C 150 - Standard Specification for Portland Cement; 2004a.
- K. ASTM D 1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (nonextruding and Resilient Bituminous Types); 2004.

**1.05 SUBMITTALS**

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on joint filler, admixtures, and curing compound.
- C. Samples: Provide sample panel a minimum 5' X 5' X 4" thick indicating concrete finish and other

detailing for approval by *Design Consultant*. Remove sample(s) after completion of concrete paving work. Sample may be portion of sidewalk to be constructed pending acceptance of Owner.

### **1.06 QUALITY ASSURANCE**

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

### **1.07 ENVIRONMENTAL REQUIREMENTS**

- A. Do not place concrete when base surface temperature is less than 40 degrees F, or surface is wet or frozen.

## **PART 2 PRODUCTS**

### **2.01 FORM MATERIALS**

- A. Form Materials: Conform to ACI 301.
- B. Wood or Steel form material, profiled to suit conditions.
- C. Joint Filler: Preformed; non-extruding bituminous type (ASTM D 1751).
  - 1. Thickness: 1/2 inch.

### **2.02 REINFORCEMENT**

- A. Reinforcing Steel: ASTM A 615/A 615M Grade 40 (280); deformed billet steel bars; unfinished finish.
- B. Joint Dowel Bars: Plain steel bars, ASTM A 615, Grade 60; unfinished finish. Cut bars true to length with ends square and free of burrs.

### **2.03 CONCRETE MATERIALS**

- A. Concrete Materials: As specified in Section 03300.
- B. Cement: ASTM C 150 Normal - Type I Portland type, grey color.
- C. Cement: ASTM C150 Normal- Type 1 Portland type, color to match existing concrete sidewalks.
- D. Use one brand of cement throughout project,
- E. Normal Weight Aggregates: ASTM C 33, and as herein specified. Provide aggregates from a single source for exposed concrete.
- F. For exterior exposed surfaces, do not use fine or course aggregates containing spalling- causing deleterious substances.
- G. Course Aggregate: Crushed rock or washed gravel with minimum size between 3/4 inch and 1 1/2 inch, and with a maximum size number 4.
- H. Fine Aggregate: Natural washed sand of hard and durable particles varying from fine to particles passing a 3/8 inch screen, of which at least 12% shall pass a 50- mesh screen.
- I. Exposed Aggregate: Colorado River Rock, washed natural mineral aggregate, 1/2 inch minimum and 3/4" inch maximum size, brown/red color, from a single source.
- J. Water: Clean, and not detrimental to concrete.

## 2.04 ACCESSORIES

- A. Acid Etch Solution: Muriatic type mixed to a \_\_\_\_ percent solution.
- B. Curing Compound: ASTM C 309, Type 1;1-D, or 2, Class A.
- C. Joint Sealer: Type as specified in Section 07900.

## 2.05 CONCRETE MIX DESIGN

- A. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.
- B. Concrete Strength: Establish required average strength for each type of concrete on the basis of trial mixtures, as specified in ACI 301.
  - 1. For trial mixtures method, employ independent testing agency acceptable to Design Consultant for preparing and reporting proposed mix designs.
  - 2. Do not use Owner's field quality-control testing agency as the independent testing agency.
- C. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended by manufacturer.
- D. Fiber Reinforcement: Add to mix at rate of 1.5 pounds per cubic yard, or as recommended by manufacturer for specific project conditions.
- E. Concrete Properties:
  - 1. Compressive Strength, when tested in accordance with ASTM C 39/C 39M at 28 days: 3000 psi. As scheduled; or As indicated on drawings.
    - a. General Pedestrian Paving: 3000 psi.
    - b. Skate Park Slab: 6000 psi.
  - 2. Cement Content: Minimum 480 lb per cubic yard.
  - 3. Water-Cement Ratio: Maximum 40 percent by weight.
  - 4. Total Air Content: 4 percent, determined in accordance with ASTM C 173/C 173M.
  - 5. Maximum Slump: 5 inches.
  - 6. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having an air content as follows with a tolerance of plus or minus 1 1/2 percent.
    - a. Air Content: 5.5 percent for 1 1/2 inch maximum aggregate.
    - b. Air Content: 6.0 percent for 1 inch maximum aggregate.
    - c. Air Content: 6.00 percent for 3/4 inch maximum aggregate.
  - 7. Mix adjustments may be requested by Contractor when characteristics of materials, project conditions, weather, test results, or other circumstances warrant.
  - 8. Maximum Aggregate Size: 1 1/2 inch. Minimum size between 3/4 inch and 1 1/2 inch.

## 2.06 MIXING

- A. Transit Mixers: Comply with ASTM C 94, except as may be modified by the following:
  - 1. Delete references for allowing additional water to be added to batch for material with slump. Addition of water to the batch will not be permitted.
  - 2. During hot weather, or under conditions contributing to rapid setting of concrete, a shorter mixing time than specified in ASTM C 94 may be required.
  - 3. When air temperature is in between 85 degrees F and 90 degrees F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes, and when air temperature is above 90 degrees F, reduce mixing and delivery time to 60 minutes.

## PART 3 EXECUTION

### **3.01 EXAMINATION**

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

### **3.02 SUBBASE**

- A. See Section 02721 for construction of base course for work of this Section.

### **3.03 PREPARATION**

- A. Moisten base to minimize absorption of water from fresh concrete.
- B. Coat surfaces of manhole; catch basin; and imbedded items manholes and catch basin frames with oil to prevent bond with concrete pavement.
- C. Notify Design Consultant minimum 24 hours prior to commencement of concreting operations.

### **3.04 FORMING**

- A. Place and secure forms to correct location, dimension, profile, and gradient.
- B. Assemble formwork to permit easy stripping and dismantling without damaging concrete.
- C. Place joint filler vertical in position, in straight lines. Secure to formwork during concrete placement.

### **3.05 REINFORCEMENT**

- A. Place reinforcement as indicated.
- B. Interrupt reinforcement at expansion joints.
- C. Place dowels; or reinforcement to achieve pavement alignment as detailed.
- D. Provide doweled joints 24 inch on center at transverse joints; interruptions of concrete; with one end of dowel set in capped sleeve to allow longitudinal movement.

### **3.06 PLACING CONCRETE**

- A. Place concrete in accordance with ACI 304R.
- B. Ensure reinforcement, inserts, embedded parts and formed joints are not disturbed during placement of concrete.
- C. Place concrete continuously over the full width of the panel and between predetermined construction joints. Do not break or interrupt successive pours such that cold joints occur.
- D. Place concrete to pattern indicated.
- E. Apply surface retarder to all exposed surfaces in accordance with manufacturer's instructions.

### **3.07 JOINTS**

- A. Align sidewalk joints.
- B. Place 1/2 inch wide expansion joints at 20 foot; 40 foot maximum intervals and to separate paving from vertical surfaces and other components and in pattern indicated; or None - N/A.
  - 1. Form joints with joint filler extending from bottom of pavement to within 1/2 inch of finished surface.
  - 2. Secure to resist movement by wet concrete.
- C. Provide scored or sawn joints:
  - 1. At intervals equal in width to pavement unless indicated otherwise.
- D. Saw cut contraction joints 3/16 inch wide at an optimum time after finishing. Cut 1/3 into depth of

slab.

### **3.08 EXPOSED AGGREGATE**

- A. Wash scheduled concrete surfaces with acid etch solution exposing aggregate.
- B. Wash concrete surfaces to which surface retarder has been applied with clean water, and scrub with stiff bristle brush or water blast exposing aggregate to match sample panel.
- C. Sand blast concrete surfaces to achieve aggregate exposure of (max. 35%) of unit aggregate surface.
- D. Include broadcast spreading of aggregate into plastic concrete.

### **3.09 FINISHING**

- A. Monument Plaza Area and New Adjoining Sidewalk Paving: Exposed aggregate, radiused edge 1/4 inch radius
- B. New Sidewalk Paving Adjacent to Monuments: Exposed aggregate, radiused edge 1/4 inch radius.
- C. Curbs and Gutters: Light broom, texture parallel to pavement direction; texture perpendicular to pavement direction – MATCHING ADJOINING EXISTING.
- D. Pedestrian Ramps: Medium Broomed perpendicular to slope.
- E. Place curing compound on exposed concrete surfaces immediately after finishing. Apply in accordance with manufacturer's instructions

### **3.10 JOINT SEALING**

- A. See Section 07900 for joint sealer requirements.

### **3.11 TOLERANCES**

- A. Maximum Variation of Surface Flatness: 1/4 inch in 10 ft.
- B. Maximum Variation From True Position: 1/4 inch.

### **3.12 FIELD QUALITY CONTROL**

- A. An independent testing agency will perform field quality control tests.
  - 1. Provide free access to concrete operations at project site and cooperate with appointed firm.
  - 2. Submit proposed mix design of each class of concrete testing firm for review prior to commencement of concrete operations.
  - 3. Tests of concrete and concrete materials may be performed at any time to ensure conformance with specified requirements.
- B. Compressive Strength Tests: ASTM C 39/C 39M. For each test, mold and cure three concrete test cylinders. Obtain test samples for every 75 cu yd or less of each class of concrete placed.
  - 1. Take one additional test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents.
  - 2. Perform one slump test for each set of test cylinders taken.
- C. Maintain records of placed concrete items. Record date, location of pour, quantity, air

temperature, and test samples taken.

### **3.13 PROTECTION**

- A. Immediately after placement, protect pavement from premature drying, excessive hot or cold temperatures, and mechanical injury.
- B. Do not permit pedestrian or vehicular traffic over pavement until 75 percent design strength of concrete has been achieved.

### **3.14 SCHEDULES**

- A. Pedestrian Walk: 3000 psi 28 day concrete, 5 inches thick, #4 rebar at 18 inch on center each way reinforcement, wood float finish.

**END OF SECTION**

# SECTION 02871 SITE AND STREET FURNISHINGS

(FOR MONUMENTS ONLY)

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

- A. Chop-Block Limestone Seating - at Monument "A" only
- B. Rock mound at Monument "A" Sign/Monument

### 1.03 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Selection Samples: Two complete sets of product samples representing full range of colors and textures available to supplier.

### 1.04 DELIVERY, STORAGE, AND HANDLING

- A. Coordinate delivery requirements with Owner and other installers.
- B. Store products in manner to prevent damage prior to installation.
- C. Where products need to be stored outdoors, store off the ground and place so that water will drain.

## PART 2 PRODUCTS

### 2.01 MATERIALS

- A. CHOP BLOCK LIMESTONE SEAT: Limestone: Texas Hill Country; complying with ASTM C 568 Classification I – Low Density.
  - 1. Grade: Select, per ILI Handbook.
  - 2. Color: Buff.
  - 3. Surface: Split face.
- B. COLORADO RIVER ROCK or TEXAS BLEND - LARGE STONE MOUND – MONUMENT "A":
  - 1. Average Size: 3"-4" dia
  - 2. Color: Browns and Reds.
  - 3. Surface: Smooth.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Do not set seating block until all elements of monument have been installed

### 3.02 COLOR SELECTION

- A. Colors for site and street furnishings to be selected from manufacturer's availability color range. Samples of available colors are to be submitted by Contractor for selection by Owner and Design Consultant.

### 3.03 PREPARATION

- A. Clean surfaces thoroughly prior to installation.

### 3.05 INSTALLATION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.
- C. Replace damaged products with new replacements.

**END OF SECTION**

**SECTION 04720**  
**CAST STONE**  
(FOR MONUMENTS ONLY)

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Architectural cast stone.
- B. Units required are indicated on the drawings as "cast concrete stone masonry".

**1.02 RELATED SECTIONS**

- A. Section 04810 - Unit Masonry Assemblies: Installation of cast stone in conjunction with masonry.
- B. Section 07900 - Joint Sealers: Materials and execution methods for sealing soft joints in cast stone work.

**1.03 REFERENCES**

- A. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; American Concrete Institute International; 2005.
- B. ASTM A 123/A 123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2002.
- C. ASTM A 615/A 615M - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement; 2004b.
- D. ASTM C 33 - Standard Specification for Concrete Aggregates; 2003.
- E. ASTM C 150 - Standard Specification for Portland Cement; 2004a.
- F. ASTM C 270 - Standard Specification for Mortar for Unit Masonry; 2004a.
- G. ASTM C 494/C 494M - Standard Specification for Chemical Admixtures for Concrete; 2004.
- H. ASTM C 642 - Standard Test Method for Density, Absorption, and Voids in Hardened Concrete; 1997.
- I. ASTM C 979 - Standard Specification for Pigments for Integrally Colored Concrete; 2005.
- J. ASTM C 1364 - Standard Specification for Architectural Cast Stone; 2003.

**1.04 SUBMITTALS**

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Include elevations, dimensions, layouts, profiles, cross sections, reinforcement, exposed faces, arrangement of joints, anchoring methods, anchors, and piece numbers.
- C. Verification Samples: Pieces of actual cast stone components not less than 12 inches square, illustrating range of color and texture to be anticipated in components furnished for the project.

**1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: A current producer member of the Cast Stone Institute with a minimum of 5 years of experience in producing cast stone of the types required for project and:
  - 1. Adequate plant capacity to furnish quality, sizes, and quantity of cast stone required without delaying progress of the work.
  - 2. Products previously produced by plant and exposed to weather that exhibit satisfactory appearance.

**1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver cast stone components secured to shipping pallets and protected from damage and discoloration. Protect corners from damage.
- B. Number each piece individually to match shop drawings and schedule.

- C. Store cast stone components on pallets with nonstaining, waterproof covers. Ventilate under covers to prevent condensation. Prevent contact with dirt.
- D. Protect cast stone components during handling and installation to prevent chipping, cracking, or other damage.

## **PART 2 PRODUCTS**

### **2.01 ARCHITECTURAL CAST STONE**

- A. Cast Stone: Architectural concrete product manufactured to simulate appearance of natural limestone, complying with ASTM C 1364.
  - 1. Compressive Strength: As specified in ASTM C 1364; calculate strength of pieces to be field cut at 80 percent of uncut piece.
  - 2. Freeze-Thaw Resistance: Demonstrated by field experience.
  - 3. Surface Texture: Fine; Medium; or \_\_\_\_\_; grained texture, with no bugholes, air voids, or other surface blemishes visible from distance of 20 feet.
  - 4. Color: Selected by Design Consultant from manufacturer's full range.
  - 5. Remove cement film from exposed surfaces before packaging for shipment.
- B. Shapes: Provide shapes indicated on drawings.
  - 1. Variation from Any Dimension, Including Bow, Camber, and Twist: Maximum of plus/minus 1/8 inch or length divided by 360, whichever is greater, but not more than 1/4 inch.
  - 2. Unless otherwise indicated on drawings, provide:
    - a. Wash or slope of 1:12 on exterior horizontal surfaces.
    - b. Drips on projecting components, wherever possible.
    - c. Raised fillets at back of sills and at ends to be built in.
- C. Reinforcement: Provide reinforcement as required to withstand handling and structural stresses; comply with ACI 318.
  - 1. Pieces More than 12 inches Wide: Provide full length two-way reinforcement of cross-sectional area not less than 0.25 percent of unit cross-sectional area.

### **2.02 MATERIALS**

- A. Portland Cement: ASTM C 150.
  - 1. For Units: Type I or II, white.
  - 2. For Mortar: Type I or II, except Type III may be used in cold weather.
- B. Coarse Aggregate: ASTM C 33, except for gradation; granite, quartz, or limestone.
- C. Fine Aggregate: ASTM C 33, except for gradation; natural or manufactured sands.
- D. Pigments: ASTM C 979, inorganic iron oxides; do not use carbon black.
- E. Admixtures: ASTM C 494/C 494M.
- F. Water: Potable.
- G. Reinforcing Bars: ASTM A 615/A 615M deformed bars, galvanized.
- H. Embedded Anchors, Dowels, and Inserts: ASTM A 123/A 123M hot-dip galvanized steel, of type and size as required for conditions.
- I. Shelf Angles and Similar Structural Items: Hot-dip galvanized steel per ASTM A123/A 123M, of shapes and sizes as required for conditions.
- J. Mortar: Portland cement-lime, ASTM C 270, Type N; do not use masonry cement.
- K. Sealant: As specified in Section 07900.
- L. Cleaner: General-purpose cleaner designed for removing mortar and grout stains, efflorescence, and other construction stains from new masonry surfaces without discoloring or damaging masonry surfaces; approved for intended use by cast stone manufacturer and by cleaner manufacturer for use on cast stone and adjacent masonry materials.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Examine construction to receive cast stone components. Notify Design Consultant if construction is not acceptable.
- B. Do not begin installation until unacceptable conditions have been corrected.

### **3.02 INSTALLATION**

- A. Install cast stone components in conjunction with masonry, complying with requirements of Section 04810.
- B. Mechanically anchor each cast stone unit.
- C. Setting:
  - 1. Drench cast stone components with clear, running water immediately before installation.
  - 2. Set units in a full bed of mortar unless otherwise indicated.
  - 3. Fill vertical joints with mortar.
  - 4. Fill dowel holes and anchor slots completely with mortar or non-shrink grout.
- D. Joints: Make all joints 3/8 inch, except as otherwise detailed.
  - 1. Rake mortar joints 3/4 inch for pointing. Scrub face of each stone to remove excess mortar before it sets.
  - 2. Point joints with mortar in layers 3/8 inch thick and tool to a slight concave profile.
  - 3. Leave the following joints open for sealant:
    - a. Head joints in top courses, including copings, parapets, cornices, sills, and steps.
    - b. Joints in projecting units.
    - c. Joints between rigidly anchored units, including soffits, panels, and column covers.
    - d. Joints below lugged sills and stair treads.
    - e. Joints below ledge and relieving angles.
    - f. Joints labeled "expansion joint".
- E. Sealant Joints: Install sealants as specified in Section 07900.
- F. Installation Tolerances:
  - 1. Variation from Plumb: Not more than 1/8 inch in 10 feet or 1/4 inch in 20 feet or more.
  - 2. Variation from Level: Not more than 1/8 inch in 10 feet or 1/4 inch in 20 feet, or maximum.
  - 3. Variation in Joint Width: Not more than 1/8 inch in 36 inches or 1/4 of nominal joint width, whichever is less.
  - 4. Variation in Plane Between Adjacent Surfaces (Lipping): Not more than 1/16 inch difference between planes of adjacent units or adjacent surfaces indicated to be flush with units.

### **3.03 CLEANING AND PROTECTION**

- A. Repair chips and other surface damage noticeable when viewed in direct daylight at 10 feet.
  - 1. Repair with matching touchup material provided by the manufacturer and in accordance with manufacturer's instructions.
  - 2. Repair methods and results subject to Design Consultant 's approval.
- B. Clean cast stone components as work progresses; remove mortar fins and smears before tooling joints.
- C. Clean exposed cast stone after mortar is thoroughly set and cured.
  - 1. Wet surfaces with water before applying cleaner.
  - 2. Apply cleaner to cast stone in accordance with manufacturer's instructions.
  - 3. Remove cleaner promptly by rinsing thoroughly with clear water.
  - 4. Do not use acidic cleaners.
- D. Protect from splashing by mortar and other damage.

**END OF SECTION**

# SECTION 04810 UNIT MASONRY ASSEMBLIES

(FOR MONUMENTS ONLY)

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

- A. Concrete Block.
- B. Reinforcement and Anchorage.
- C. Accessories.

### 1.02 RELATED SECTIONS

- A. Section 04852 - Stone Masonry Veneer: Stone bonded to masonry back-up.

### 1.03 REFERENCES

- A. ACI 530.1/ASCE 6/TMS 602 - Specification For Masonry Structures; American Concrete Institute International; 2005.
- B. ASTM A 82 - Standard Specification for Steel Wire, Plain, for Concrete Reinforcement; 2002.
- C. ASTM A 153/A 153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2004.
- D. ASTM A 615/A 615M - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement; 2004b.
- E. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2004a.
- J. ASTM C 91 - Standard Specification for Masonry Cement; 2003a.
- K. ASTM C 129 - Standard Specification for Nonloadbearing Concrete Masonry Units; 2003.
- L. ASTM C 144 - Standard Specification for Aggregate for Masonry Mortar; 2004.
- M. ASTM C 150 - Standard Specification for Portland Cement; 2004a.
- N. ASTM C 207 - Standard Specification for Hydrated Lime for Masonry Purposes; 2004.
- P. ASTM C 270 - Standard Specification for Mortar for Unit Masonry; 2004a.
- S. ASTM D 226 - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing; 1997a.
- T. IMIABC (CW) - Recommended Practices & Guide Specifications for Cold Weather Masonry Construction; International Masonry Industry All-Weather Council; 1993.
- U. IMIABC (HW) - Recommended Practices & Guide Specifications for Hot Weather Masonry Construction; International Masonry Industry All-Weather Council; current edition.

### 1.04 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data for masonry units, fabricated wire reinforcement, mortar, and masonry accessories.

## **1.05 QUALITY ASSURANCE**

- A. Installers:
  - 1. Minimum 5 years documented experience with projects of similar complexity.

## **1.06 PRE-INSTALLATION MEETING**

- A. N;/A.

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

- A. Deliver, handle, and store masonry units by means that will prevent mechanical damage and contamination by other materials.

## **1.08 ENVIRONMENTAL REQUIREMENTS**

- A. Cold and Hot Weather Requirements: Comply with requirements of ACI 530.1/ASCE 6/TMS 602 or applicable building code, whichever is more stringent.
- B. Cold Weather Requirements: Comply with recommendations of IMIAWC (CW).
- C. Hot Weather Requirements: Comply with IMIAWC (HW).

## **PART 2 PRODUCTS**

### **2.01 CONCRETE MASONRY UNITS**

- A. Concrete Block: Comply with referenced standards and as follows:
  - 1. Size: Standard units with nominal face dimensions of 16 x 8 inches and nominal depths as indicated on the drawings for specific locations.
  - 2. Special Shapes: Provide non-standard blocks configured for corners, lintels, headers, control joint edges, and other detailed conditions.
  - 3. Load-Bearing Units: ASTM C 90, normal weight.
    - a. Both hollow and solid block, as indicated.
    - b. Exposed faces: Manufacturer's standard color and texture.
  - 4. Non-Loadbearing Units: ASTM C 129.
    - a. Normal weight.

### **2.02 BRICK UNITS**

- A. N/A

### **2.03 MORTAR AND GROUT MATERIALS**

- A. Masonry Cement: ASTM C 91, Type N.
  - 1. Colored mortar: Premixed cement as required to match Design Consultant's color sample.
- B. Portland Cement: ASTM C 150, Type I; color as required to produce approved color sample.
  - 1. Not more than 0.60 percent alkali.
  - 2. Hydrated Lime: ASTM C 207, Type S.
  - 3. Mortar Aggregate: ASTM C 144.
  - 4. Grout Aggregate: ASTM C 404.
- C. Pigments for Colored Mortar: Iron or chromium oxides with demonstrated stability and colorfastness.
- D. Water: Clean and potable.
- E. Accelerating Admixture: Nonchloride type for use in cold weather.
- F. Moisture-Resistant Admixture: Water repellent compound designed to reduce capillarity.

## 2.04 REINFORCEMENT AND ANCHORAGE

- A. Manufacturers of Joint Reinforcement and Anchors:
  - 1. Dur-O-Wal: [www.dur-o-wal.com](http://www.dur-o-wal.com).
  - 2. Heckmann Building Products, Inc: [www.heckmannbuildingprods.com](http://www.heckmannbuildingprods.com).
  - 3. Hohmann & Barnard, Inc: [www.h-b.com](http://www.h-b.com).
  - 4. Masonry Reinforcing Corporation of America: [www.wirebond.com](http://www.wirebond.com).
  - 5. Substitutions: See Section 01600 - Product Requirements.
- B. Reinforcing Steel: ASTM A 615/A 615M Grade 60 (420) deformed billet bars; uncoated.
- C. Single Wythe Joint Reinforcement: Truss type; ASTM A 82 steel wire, hot dip galvanized after fabrication to ASTM A 153/A 153M, Class B; 0.1483 inch side rods with 0.1483 inch cross rods; width as required to provide not more than 1 inch and not less than 1/2 inch of mortar coverage on each exposure.
- D. Flexible Anchors: 2-piece anchors that permit differential movement between masonry and building frame, sized to provide not more than 1 inch and not less than 1/2 inch of mortar coverage from masonry face.
  - 1. Concrete frame: Dovetail anchors of bent steel strap, nominal 1 inch width x 0.024 in thick, with corrugated strap ties of nominal 1 inch width and 0.075 inch thick, hot dip galvanized to ASTM A 153/A 153M, Class B.
  - 2. Steel frame: Crimped wire anchors for welding to frame, 0.25 inch thick, with trapezoidal wire ties 0.1875 inch thick, hot dip galvanized to ASTM A 153/A 153M, Class B.
- E. Wall Ties: Corrugated formed sheet metal, 7/8 inch wide by 0.05 inch thick, hot dip galvanized to ASTM A 153/A 153M, Class B, sized to provide not more than 1 inch and not less than 1/2 inch of mortar coverage from masonry face.
- F. Masonry Veneer Anchors: 2-piece anchors that permit differential movement between masonry veneer and structural backup, hot dip galvanized to ASTM A 153/A 153M, Class B.
  - 1. Anchor plates: Not less than 0.075 inch thick, designed for fastening to structural backup through sheathing by two fasteners.
  - 2. Wire ties: Manufacturer's standard shape, 0.1875 inch thick.
  - 3. Vertical adjustment: Not less than 2 inches.

## 2.05 FLASHINGS

- A. N/A

## 2.06 ACCESSORIES

- A. Weeps: Polyethylene tubing.
- B. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials.

## 2.07 MORTAR AND GROUT MIXES

- A. Mortar for Unit Masonry: ASTM C 270, using the Property Specification.
  - 1. Masonry below grade and in contact with earth: Type S.
  - 2. Exterior, loadbearing masonry: Type N.
  - 3. Exterior, non-loadbearing masonry: Type N.
- B. Refractory Bonding Mortar:
  - 1. Air-setting type mortar.
  - 2. No. 2986 manufactured by BNZ, Inc. 800-955-8650 or approved equal.
- C. Colored Mortar: Proportion selected pigments and other ingredients to match Design Consultant's sample, without exceeding manufacturer's recommended pigment-to-cement ratio.
- F. Mixing: Use mechanical batch mixer and comply with referenced standards.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that field conditions are acceptable and are ready to receive masonry.
- B. Verify that related items provided under other sections are properly sized and located.
- C. Verify that built-in items are in proper location, and ready for roughing into masonry work.

### **3.02 PREPARATION**

- A. Direct and coordinate placement of metal anchors supplied for installation under other sections.
- B. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.

### **3.03 COURSING**

- A. Establish lines, levels, and coursing indicated. Protect from displacement.
- B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.
- C. Concrete Masonry Units:
  - 1. Bond: As indicated for different locations.
  - 2. Coursing: One unit and one mortar joint to equal 8 inches.
  - 3. Mortar Joints: Concave.

### **3.04 PLACING AND BONDING**

- A. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.
- B. Lay hollow masonry units with face shell bedding on head and bed joints.
- C. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.
- D. Remove excess mortar and mortar smears as work progresses.
- E. Interlock intersections and external corners, except for units laid in stack bond.
- F. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.
- G. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.
- H. Cut mortar joints flush where wall tile is scheduled, cement parging is required, resilient base is scheduled, or bitumen dampproofing is applied.
- I. Isolate masonry partitions from vertical structural framing members with a control joint.
- J. Isolate top joint of masonry partitions from horizontal structural framing members and slabs or decks with compressible joint filler.

### **3.05 WEEPS/CAVITY VENTS**

- A. Install weeps in veneer and cavity walls at 24 inches on center horizontally above through-wall flashing.
- B. Install cavity mortar diverter at base of cavity as recommended by manufacturer to prevent mortar droppings from blocking weep/cavity vents.

### **3.06 REINFORCEMENT AND ANCHORAGE - GENERAL**

- A. Unless otherwise indicated on drawings or specified under specific wall type, install horizontal joint reinforcement 16 inches on center.
- B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.
- C. Place continuous joint reinforcement in first and second joint below top of walls.
- D. Lap joint reinforcement ends minimum 6 inches.
- E. Reinforce stack bonded unit joint corners and intersections with strap anchors 16 inches on center.
- F. Fasten anchors to structural framing and embed in masonry joints as masonry is laid. Unless otherwise indicated on drawings or closer spacing is indicated under specific wall type, space anchors at maximum of 36 inches horizontally and 24 inches vertically.

### **3.07 REINFORCEMENT AND ANCHORAGE - SINGLE WYTHE MASONRY**

- A. Install horizontal joint reinforcement 8 inches on center.
- B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.
- C. Place continuous joint reinforcement in first and second joint below top of walls.
- D. Lap joint reinforcement ends minimum 6 inches.
- E. Reinforce stack bonded unit joint corners and intersections with strap anchors 16 inches on center.

### **3.08 REINFORCEMENT AND ANCHORAGE - MASONRY VENEER**

- A. Install horizontal joint reinforcement 16 inches on center.
- B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.
- C. Place continuous joint reinforcement in first and second joint below top of walls.
- D. Lap joint reinforcement ends minimum 6 inches.
- E. Masonry Back-Up: Embed anchors to bond veneer at maximum 16 inches on center vertically and 36 inches on center horizontally. Place additional anchors at perimeter of openings and ends of panels, so maximum spacing of anchors is 8 inches on center.
- F. Reinforce stack bonded unit joint corners and intersections with strap anchors 16 inches on center.

### **3.09 REINFORCEMENT AND ANCHORAGES - CAVITY WALL MASONRY**

- A. Install horizontal joint reinforcement 16 inches on center.
- B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of openings.
- C. Place continuous joint reinforcement in first and second joint below top of walls.
- D. Lap joint reinforcement ends minimum 6 inches.
- E. Fasten anchors to structural framing and embed in masonry joints as masonry is laid. Space anchors at maximum of 24 inches horizontally and 16 inches vertically.
- F. Reinforce stack bonded unit joint corners and intersections with strap anchors 16 inches on center.

### **3.10 REINFORCEMENT AND ANCHORAGES - MULTIPLE WYTHE UNIT MASONRY**

- A. N/A

### **3.11 MASONRY FLASHINGS**

- A. N/A

### **3.12 LINTELS**

- A. N/A

### **3.13 GROUTED COMPONENTS**

- A. N/A

### **3.14 CONTROL AND EXPANSION JOINTS**

- A. N/A

### **3.15 BUILT-IN WORK**

- A. As work progresses, install fabricated metal frames, anchor bolts, and plates and other items to be built into the work and furnished under other sections.
- B. Install built-in items plumb, level, and true to line.
- C. Do not build into masonry construction organic materials that are subject to deterioration.

### **3.16 TOLERANCES**

- A. Maximum Variation from Alignment of Columns and Pilasters: 1/4 inch.
- B. Maximum Variation From Unit to Adjacent Unit: 1/16 inch.
- C. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft and 1/2 inch in 20 ft or more.
- D. Maximum Variation from Plumb: 1/4 inch per story non-cumulative; 1/2 inch in two stories or more.
- E. Maximum Variation from Level Coursing: 1/8 inch in 3 ft and 1/4 inch in 10 ft; 1/2 inch in 30 ft.
- F. Maximum Variation of Joint Thickness: 1/8 inch in 3 ft.
- G. Maximum Variation from Cross Sectional Thickness of Walls: 1/4 inch.

### **3.17 CUTTING AND FITTING**

- A. Cut and fit to Coordinate with other sections of work to provide correct size, shape, and location.
- B. Obtain approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.

### **3.18 PARING**

- A. N/A

### **3.19 CLEANING**

- A. Remove excess mortar and mortar droppings.
- B. Replace defective mortar. Match adjacent work.
- C. Clean soiled surfaces with cleaning solution.

### **3.20 PROTECTION OF FINISHED WORK**

- A. Without damaging completed work, provide protective boards at exposed external corners which are subject to damage by construction activities

**END OF SECTION**

**SECTION 04852**  
**STONE MASONRY VENEER**  
(FOR MONUMENTS ONLY)

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Cut, Field, rubble stone veneer at exterior walls.
- B. Metal anchors and accessories.
- C. Setting mortar and pointing mortar.

**1.02 RELATED SECTIONS**

- A. Section 04810 - Unit Masonry Assemblies: Joint reinforcement, Ties, and Anchors.
- B. Section 04720 – Cast Stone

**1.03 REFERENCES**

- A. ASTM A 36/A 36M - Standard Specification for Carbon Structural Steel; 2005.
- B. ASTM A 123/A 123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2002.
- C. ASTM C 91 - Standard Specification for Masonry Cement; 2003a.
- D. ASTM C 270 - Standard Specification for Mortar for Unit Masonry; 2004a.
- E. ASTM C 568 - Standard Specification for Limestone Dimension Stone; 2003.
- F. ILI (HB) - Indiana Limestone Handbook; Indiana Limestone Institute of America, Inc.; 2003, 21st Edition.
- G. IMIAWC (CW) - Recommended Practices & Guide Specifications for Cold Weather Masonry Construction; International Masonry Industry All-Weather Council; 1993.

**1.04 SUBMITTALS**

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Samples: Submit two stone samples illustrating minimum and maximum stone sizes, color range, texture, and markings.

**1.05 QUALITY ASSURANCE**

- A. Installer Qualifications: Company specializing in performing work of the type required by this section, with minimum 5 years of documented experience.

**1.06 MOCK-UP**

- A. Construct stone wall mock-up, 4 feet long by 2 feet wide, which includes stone anchor accessories, corner condition, and typical control joint.
- B. Mock-up may remain as part of the Work.

**1.07 DELIVERY, STORAGE, AND PROTECTION**

- A. Protect stone from discoloration during storage on site.

**1.08 PROJECT CONDITIONS**

- A. Sequence work to coordinate the installation of stone work with installation of adjacent construction.

## **1.09 ENVIRONMENTAL REQUIREMENTS**

- A. Cold Weather Requirements: Comply with recommendations of IMIAWC (CW).
- B. Maintain materials and ambient air at minimum of 40 degrees F (5 degrees C) prior to, during, and for 48 hours after completion of work.

## **PART 2 PRODUCTS**

### **2.01 STONE**

- A. Limestone: Texas Hill Country; complying with ASTM C 568 Classification I - Low Density.
  - 1. Grade: Select, per ILI Handbook.
  - 2. Color: Buff.
  - 3. Surface: Split face.

### **2.02 MORTAR**

- A. Masonry Cement: ASTM C 91, Type N.
- B. Setting Mortar: ASTM C 270, Type S, using the Property Method.
- C. Pointing Mortar: Type S, using the Property Method.

### **2.03 ACCESSORIES**

- A. Horizontal Joint Reinforcement: Truss type; steel wire, hot dip galvanized per ASTM A 123/A 123M, 3/16 inch side rods with 0.1483 inch cross ties.
- B. Wall Ties: Formed steel wire, 10 gage diameter, hot dip galvanized per ASTM A 123/A 123M, eye and pintle type, with provision for vertical adjustment after attachment.
- C. Other Anchors in Direct Contact with Stone: ASTM A 36/A 36M steel, galvanized after fabrication to ASTM A 123/A 123M, of sizes and configurations required for support of stone and applicable superimposed loads.
- D. Setting Buttons and Shims: Plastic.
- E. Weep/Cavity Vents: Polyethylene tubing.
- G. Cleaning Solution: Type which will not harm stone, joint materials, or adjacent surfaces.

### **2.04 STONE FABRICATION**

- A. Nominal Thickness: 4 inch.
- B. Nominal Face Size: 6 inch x 10 inch.
- C. Pattern and Coursing: Random
- D. Fabricate for 3/8 inch beds and joints.
- E. Bed and Joint Surfaces:
  - 1. Cut or sawn full square for full thickness of unit.
  - 2. Sawn or cut full square at least two-thirds of unit thickness; from that point back under square not more than 1 inch in 12 inches.
  - 3. Sawn or cut full square 2 inches back from face; from that point back under square not more than 1 inch in 12 inches.
- F. Backs: Rough or Split.
- G. Form stone corners to irregular joint profile. Clean jagged corners from stone in preparation for setting.
- H. Slope exposed top surfaces of stone and horizontal sill surfaces for shedding water.
- I. Cut drip slot in bottom surface of work projecting more than 1/2 inch over openings and reveals.

Size slot not less than 3/8 inch wide and 1/4 inch deep for full width of projection.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that support work and site conditions are ready to receive work of this section.
- B. Verify that items built-in under other sections are properly located and sized.

### **3.02 PREPARATION**

- A. Establish lines, levels, and coursing. Protect from disturbance.
- B. Clean stone prior to erection. Do not use wire brushes or implements which can mark or damage exposed surfaces.
- C. Clean sawn surfaces of rust stains and iron particles.
- D. Coat back surfaces not to be in contact with setting mortar with back coating material. Allow coating to cure.

### **3.03 INSTALLATION**

- A. Cut stone at site to produce clean faces.
- B. Size stone units to fit opening dimensions and perimeter conditions.
- C. Wet absorptive stone in preparation for placement to minimize moisture suction from mortar.
- D. Arrange stone pattern to provide color uniformity and minimize visual variations, and provide a uniform blend of stone unit sizes.
- E. Provide setting and pointing mortar.
  - 1. If water is lost by evaporation, re-temper mortar only within two hours after mixing.
  - 2. At ambient air temperature 80 degrees F and above, use mortar within two hours after mixing; at ambient air temperature below 50 degrees F, use mortar within two-and-one-half hours after mixing.
- F. Fill dowel holes in stone units with mortar.
- G. Arrange stone coursing in running/stack/ashlar bond with consistent joint width.
- H. Set stone in full mortar setting bed to fully support stone over bearing surface. Use setting buttons or shims to maintain correct joint width.
- I. Install weep/cavity vents in vertical stone joints at 36 inches on center horizontally; immediately above horizontal flashings, above shelf angles and supports, and at top of each cavity space; do not permit mortar accumulation in cavity space.

### **3.04 REINFORCEMENT AND ANCHORAGE**

- A. Install horizontal joint reinforcement 16 inches on center.
- B. Place horizontal joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.
- C. Place joint reinforcement continuous in first and second joint below top of walls.
- D. Lap joint reinforcement ends minimum 6 inches.
- E. Embed wall ties in masonry back-up to bond veneer to back-up at maximum 16 inches on center vertically and 36 inches on center horizontally.
- F. In addition, place wall ties at maximum 3 inches on center each way around perimeter of openings, within 12 inches of openings.

- G. Reinforce stack bonded unit joint corners and intersections with strap anchors 16 inches on center.

### **3.05 JOINTS**

- A. Leave the following joints open for sealant:
  - 1. Head joints in top courses, including copings, parapets, cornices, sills, and steps.
  - 2. Joints in projecting units.
  - 3. Joints between rigidly anchored units, including soffits, panels, and column covers.
  - 4. Joints below lugged sills and stair treads.
  - 5. Joints below ledge and relieving angles.
- B. Hold back mortar joints 5/8 to 3/4 inch from face of wall.
- C. Rake out mortar joints 5/8 to 3/4 inch and brush joints clean to accommodate pointing mortar. Fill joints with pointing mortar.
- D. Pack mortar into joints and work into voids. Neatly tool surface to concave joint.
- E. At joints to be sealed, clean mortar out of joint before it sets. Brush joints clean.

### **3.06 CLEANING**

- A. Remove excess mortar as work progresses, and upon completion of work.
- B. Clean soiled surfaces with cleaning solution.
- C. Use non-metallic tools in cleaning operations.

### **3.07 PROTECTION OF FINISHED WORK**

- A. During temporary storage on site, at the end of working day, and during rainy weather, cover stone work exposed to weather with non-staining waterproof coverings, securely anchored.

**END OF SECTION**

# **SECTION 05500**

## **MISSCELLANEOUS METALS – STEEL & ALUMINUM**

(FOR MONUMENTS ONLY)

### **PART 1 GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Shop fabricated steel items
- B. Miscellaneous Steel Shapes
- C. Aluminum Sheets/Panels
- D. Steel Pipe Railing and Handrails

#### **1.02 RELATED SECTIONS**

- A. Section 04810 - Unit Masonry Assemblies: Placement of metal fabrications in masonry

#### **1.03 REFERENCES**

- A. ASTM B 209, 3303-H14 – Standard Specification for Perforated Aluminum Sheets
- B. ASTM A 36/A 36M - Standard Specification for Carbon Structural Steel; 2005.
- C. ASTM B 209, Standard Specification for Aluminum Sheets
- D. ASTM A 123/A 123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2002.
- H. ASTM A 325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength; 2004b.

#### **1.04 SUBMITTALS**

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories.
  - 1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.

### **PART 2 PRODUCTS**

#### **2.01 MATERIALS - STEEL**

- A. Steel Sections: ASTM A 36/A 36M.
- B. Steel Tubing: ASTM A 500, Grade B cold-formed structural tubing.
- C. Plates: ASTM A 283..
- D. Bolts, Nuts, and Washers: ASTM A 325 (ASTM A 325M), Type 1, galvanized to ASTM A 153/A 153M where connecting galvanized components.
- E. Welding Materials: AWS D1.1; type required for materials being welded.
- F. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

#### **2.02 MATERIALS - ALUMINUM**

- A. Anodized Aluminum sheets:
  - 1. Thickness ½" thick

- B. Aluminum sheets Perforated : ASTM – B209, 3303-H14
  1. Thickness: .125" (1/8") thick – minimum
  2. Hole size: 1/2" dia
  3. Hole Type/Spacing Pattern: Round Hole/11/16" centers

- C. Aluminum shapes

### **2.03 FINISHES - STEEL**

- A. Galvanizing of Structural Steel Members: Galvanize after fabrication to ASTM A 123/A 123M requirements. Provide minimum 1.7 oz/sq ft galvanized coating.
- B. Galvanizing of Non-structural Items: Galvanize after fabrication to ASTM A 123/A 123M requirements.

### **2.04 STEEL PIPE RAILINGS AND HANDRAILS**

- A. General: Fabricate pipe railing, and hand rails to comply with requirements indicated for design, dimensions, details, finish, and member sizes, including wall thickness of pipe, post spacings, and anchorage, but not less than that required to support structural loads.
- B. Interconnect railing and handrail members by butt-welding or welding with internal connectors, at fabricator's option, unless otherwise indicated.
- C. All handrail fabrications to be performed in stand alone sections as a single unit and galvanized as a single unit to avoid welding in the field

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that field conditions are acceptable and are ready to receive work.

### **3.02 PREPARATION**

- A. Clean and strip primed steel items to bare metal where site welding is required.
- B. Supply setting templates to the appropriate entities for steel items required to be cast into concrete.

### **3.03 INSTALLATION**

- A. Install items plumb and level, accurately fitted, free from distortion or defects.
- B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
- C. All fabricated items requiring welding to be performed in shop prior to galvanizing. Fabricated items to be galvanized as a complete unit
- D. Field welding to be avoided, obtain approval prior to site cutting or making adjustments that would require welding not scheduled.
- E. Handrails to be installed pre-installed gal steel pipe sleeves set in concrete with pipe sleeve ID sized to receive handrail post .

### **3.04 ERECTION TOLERANCES**

- A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.
- B. Maximum Offset From True Alignment: 1/4 inch.
- C. Maximum Out-of-Position: 1/4 inch

**END OF SECTION**

**SECTION 10420**  
**ARCHITECTURAL LETTERS, PLAQUES, IMAGE ETCHING ON ALUMINUM**  
**PANELS**  
(FOR MONUMENTS ONLY)

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Cast Aluminum plaques
- B. Laser Image Etching on Aluminum Panels
- C. Cast Anodized Individual Aluminum Letters.

**PART 2 PRODUCTS**

**2.01 PLAQUES**

TYPE 1: Furnish and install 9 different - 16" x 24" aluminum plaques with each plaque averaging 200 letter characters per plaque – no images. Plaques designated on plans as Plaques "A", "B", "C", "D", "E", "F", "G", "H" & "I"

TYPE 2: Furnish and install 2 identical City of San Antonio Parks & Recreation plaques - 12" x 16" with each plaque featuring a maximum of 20 letters and a single image .

- 1) Cast virgin ingots, F-214 aluminum alloy. Casting shall be free of pits and gas holes and all letters shall be sharp and hand tooled.
- 2) Single line border. Border and faces of raised letters are to be satin finish and plaque background to be leatherette texture. Background shall be sprayed with black acrylic lacquer. Plaque shall be chemically cleaned and etched and treated with alodine. Two coats of clear acrylic lacquer shall be sprayed on completed plaque.
- 3) A maximum of three (3) different letter styles are to be provided with each plaque using a maximum of two (2) letter styles or sizes.
- 4) Plaques shall be mounted flush on rock/stone wall with concealed fastening.
- 5) Architect will furnish plaque design and general layout. Contractor will furnish scaled artwork/rubbing of each of the for owner's approval prior to casting.

**2.02 IMAGE ETCHING ON ALUMINUM PANELS:**

Provide computerized laser image etching process in black finish for artwork image on anodized aluminum panels/sheet for the silhouette images on the two (2) ½" thick 3'-4" x 11'-0" anodized aluminum panels and two (2) images of City of San Antonio Parks & Recreation logo/image for Monument "A" and the silhouette images on the two (2) ½" thick 3'-4" x 3'-6" anodized aluminum panels for Monument "B". Provide computerized laser image etching process in black and shades of gray for artwork image on anodized aluminum panel/sheet on ½" thick 4' x 8' anodized aluminum panel for Monument "C",

**2.03 CAST ANODIZED INDIVIDUAL ALUMINUM LETTERS:**

- 1) Allow for five (5) groups of twenty (20) letter characters (same wording in each group), 8" height, 3/4" thick die cast anodized aluminum – alloy 356 - letters. Letter font style to be selected by Architect.
- 2) Letters shall be mounted on exterior to aluminum panel or rock wall face with concealed anchors projecting letter ½" from mounting surface.

**PART 3 EXECUTION**

**2.01 INSTALLATION**

- A. Install signage level, plumb and at height required for disabled accessibility as required by Texas Accessibility Standards (TAS) and ADA. Locate signage as directed by Architect.

- B. All architectural signage items shall be securely mounted with first quality anchors; mechanical mounting with sheet metal/wood or tap-in (for concrete block) screws, full threaded, one-way tightening with epoxy encapsulated threads for theft resistant. Mount level and square to surrounding surfaces. Location as directed by Architect.
- C. At completion of work, clean signage in accordance with manufacturer's instructions.

END OF SECTION 10420

## SPECIAL SPECIFICATION

Section 129302

Removable Bollards

### PART 1 GENERAL

#### 1.1 SECTION INCLUDES

- A. Removable bollards and base (ground sleeve) units for traffic control.

#### 1.2 SUBMITTALS

- A. Product Data: Submit manufacturer's product literature, including color charts and installation details.
- B. USGBC LEED Materials and Resources Credit MR 4 - Recycled Content: For projects seeking LEED certification, submit manufacturer's documentation of recycled content for steel for products provided under this specification section.
- C. Buy American Requirements: For projects subject to Buy American 49 CFR Part 661 requirements, submit manufacturer's documentation that iron, steel, and manufactured products provided under this specification section are produced in the United States.
- D. ARRA Requirements: For projects subject to the US American Recovery and Reinvestment Act (ARRA), submit manufacturer's documentation that products provided under this specification section are produced in the United States.

#### 1.3 QUALITY ASSURANCE

- A. Performance: Bollard shall remove completely from the base unit. The bollard body shall be no more than eight (8) inches below grade to allow for minimal lifting efforts (excludes ASTM and DOS units).
- B. Manufacturer: Bollard units of all types must be supplied by a single manufacturer having the resources to provide consistent quality in appearance and physical properties.
- C. Materials: Steel shall be US domestic mill certified steel. The main body of the product must be constructed from ASTM A500 steel and be accompanied with steel mill certifications/test reports for the steel being used to ensure the durability and performance of the product. Secondary and non-ASTM steel may not be substituted.

#### 1.4 DELIVERY, STORAGE AND HANDLING

- A. Package units appropriately to protect finish. Inspect materials to ensure that specified materials have been received.
- B. Store units to avoid damage from moisture, abrasion, and other construction activities.

### PART 2 PRODUCTS

#### 2.1 MANUFACTURER

- A. Acceptable Manufacturer: Blue Ember Technologies, LLC. MaxiForce Bollards line of products, Sykesville, MD 21784, Tel 410-552-9888, Fax 410-552-9939, Website: <http://www.maxiforcebollards.com> or **approved equal**.

## 2.2 REMOVABLE BOLLARDS

- A. Removable Bollards: Provide MaxiForce Removable Bollards by Blue Ember Technologies or approved equal.
  - 1. Body Style:
    - a. MRHP Heavy Duty, Padlock Operated.
  - 2. Head Style: Removable and interchangeable.
    - a. RS2 - Round Style 2 Head for Round or HD Body Style.
  - 3. Base Type: As required for installation.
    - a. HDH – Heavy Duty Hinge Top (only for HD units). Cover plate replaceable without the use of tools. Cover plate and locking pin constructed of stainless steel for corrosion resistance.
  - 4. Padlock Operated Unit (without wrench operation): Unlock and remove the padlock to allow the bollard to be removed. Reverse the sequence to return bollard to its original and locked position. Bollard may be returned to its original locked position without the use of any tools or other devices.
  - 5. Materials: Free from surface blemishes and defects where exposed to view in the finished installation.
    - a. Steel Plate: A36; ASTM A36/A36M.
    - b. Steel Tube: A500; ASTM A500.
    - c. Stainless components: Series 300 Stainless Steel
    - d. Fasteners: Series 300 Stainless Steel.
  - 6. Finish: Factory applied after surface imperfections removed and exposed faces of welded joints dressed smooth.
    - a. Galvanizing (Option): Hot Dipped galvanized.
    - b. Galvanizing and Powder Coat Finish (Option): Hot Dipped galvanized and powder coated.
    - c. Base (Ground Sleeve) Units: Powder coated with a black textured powder coating to help reduce slippery surfaces when the bollard units are removed.
    - d. Factory Applied Reflective Tape (Option): Manufacturer’s standard tape, color, size and configuration unless custom application is required.

## PART 3 EXECUTION

### 3.1 INSTALLATION

- A. Comply with manufacturer’s recommendations for installation and approved submittals and the following:
  - 1. Install bollards level and true and in proper relation to adjacent surfaces.
  - 2. Install base units with top plate flush with the finished surface to avoid tripping hazard.
  - 3. Insert bollard into base unit after the base is leveled and cured.
  - 4. Test for proper operation and adjust if necessary.
- B. Protect bollards from damage during construction operations.

## PART 4 MEASUREMENT & PAYMENT

### 4.1 MEASUREMENT

- A. Measurement shall be based on the number of satisfactorily installed removable bollards.

## 4.2 PAYMENT

- A. The accepted quantities shall be paid at the contract unit price for the removable bollard which shall be full compensation for furnishing of all materials, galvanizing, powder coating, painting, labor, tools, equipment, and supplies to construct removable bollards as shown on the plans or as specified herein.

END OF SECTION

## **SPECIAL SPECIFICATION**

Section 129303

Fixed Bollards

### **PART 1 GENERAL**

#### **1.1 SECTION INCLUDES**

- A. Fixed bollards for traffic control.

#### **1.2 SUBMITTALS**

- A. Product Data: Submit manufacturer's product literature, including color charts and installation details.
- B. USGBC LEED Materials and Resources Credit MR 4 - Recycled Content: For projects seeking LEED certification, submit manufacturer's documentation of recycled content for steel for products provided under this specification section.
- C. Buy American Requirements: For projects subject to Buy American 49 CFR Part 661 requirements, submit manufacturer's documentation that iron, steel, and manufactured products provided under this specification section are produced in the United States.
- D. ARRA Requirements: For projects subject to the US American Recovery and Reinvestment Act (ARRA), submit manufacturer's documentation that products provided under this specification section are produced in the United States.

#### **1.3 QUALITY ASSURANCE**

- A. Performance: Provide bollards which install as a single unit in a pier footing or as an array in a continuous footer installation with specified dimensions and is secured in the ground.
- B. Manufacturer: Bollard units of all types must be supplied by a single manufacturer having the resources to provide consistent quality in appearance and physical properties.
- A. Materials: Steel shall be US domestic mill certified steel. The main body of the product must be constructed from ASTM A500 steel and be accompanied with steel mill certifications/test reports for the steel being used to ensure the durability and performance of the product. Secondary and non-ASTM steel may not be substituted.

#### **1.4 DELIVERY, STORAGE AND HANDLING**

- A. Package units appropriately to protect finish. Inspect materials to ensure that specified materials have been received.
- B. Store units to avoid damage from moisture, abrasion, and other construction activities.

### **PART 2 PRODUCTS**

#### **2.1 MANUFACTURER**

- A. Acceptable Manufacturer: Blue Ember Technologies, LLC MaxiForce Bollards line of products, Sykesville, MD 21784, Tel 410-552-9888, Fax 410-552-9939, Website: <http://www.maxiforcebollards.com> or approved equal.

## 2.2 FIXED BOLLARDS

- A. Fixed Bollards: Provide MaxiForce Fixed Bollards by Blue Ember Technologies or approved equal.
  - 1. Body Style: MFR Round Style.
    - a. RS2 - Round Style 2 Head for Round Body.
  - 2. Materials: Free from surface blemishes and defects where exposed to view in the finished installation.
    - a. Steel Plate: A36; ASTM A36/A36M.
    - b. Steel Tube: A500; ASTM A500.
    - c. Fasteners: Series 300 Stainless Steel.
  - 3. Finish: Factory applied after surface imperfections removed and exposed faces of welded joints dressed smooth.
    - a. Galvanizing (Option): Hot Dipped galvanized.

## PART 3 EXECUTION

### 3.1 INSTALLATION

- A. Comply with manufacturer's recommendations for installation and approved submittals. Install bollards level and true and in proper relation to adjacent surfaces.
- B. Protect bollards from damage during construction operations.

## PART 4 MEASUREMENT & PAYMENT

### 4.1 MEASUREMENT

- A. Measurement shall be based on the number of satisfactorily installed fixed bollards.

### 4.2 PAYMENT

- A. The accepted quantities shall be paid at the contract unit price for the fixed bollard which shall be full compensation for furnishing of all materials, galvanizing, powder coating, painting, labor, tools, equipment, and supplies to construct removable bollards as shown on the plans or as specified herein.

END OF SECTION

# **SECTION 4**

**STANDARD  
SPECIFICATIONS FOR  
CONSTRUCTION AND  
MAINTENANCE OF  
HIGHWAYS, STREETS,  
AND BRIDGES**

**Adopted by the  
Texas Department of Transportation  
November 1, 2014**

**TXDOT ITEM 420 CONCRETE SUBSTRUCTURES** is revised as follows:

**Section 4.12 Defective Work:** add the following paragraph:

A maximum of 2% of the overall concrete quantity covered under this item shall receive patching or repair. Damaged concrete in excess of 2% of the overall quantity shall be removed and replaced at the contractor's expense. Elements to be replaced shall be saw cut and removed to the nearest construction joint and replaced with new materials free of defects. Elements to be repaired shall first be approved by the Engineer/Owner.

**TXDOT ITEM 422 CONCRETE SUPERSTRUCTURES** is revised as follows:

**Section 4.12 Defective Work:** add the following paragraph:

A maximum of 2% of the overall concrete quantity covered under this item shall receive patching or repair. Damaged concrete in excess of 2% of the overall quantity shall be removed and replaced at the contractor's expense. Elements to be replaced shall be saw cut and removed to the nearest construction joint and replaced with new materials free of defects. Elements to be repaired shall first be approved by the Engineer/Owner.

**TXDOT ITEM 528 COLORED TEXTURED CONCRETE AND LANDSCAPE PAVERS** is revised as follows:

**Section 2.1 Colored Textured Concrete:** add the following:

Contractor shall use Davis Colors Flagstone Brown No. 641 or approved equal.

**MANUFACTURER:**

Davis Colors  
3700 East Olympic Blvd.  
Los Angeles, CA 90023  
Ph: 800.356.4848 or 323.269.7311

**AND in Section 3.1 Colored Textured Concrete:** revise the last paragraph as follows:

Place dies with a repetitive pattern on the concrete surface and hand-tamp to create the required texture or imprint shown on the plans. **Colored textured concrete to be trowel finished in accordance with manufacturer's directions.** Final surface to be slip resistant. Sample Mock-ups to be approved by engineer or owner prior to installation. Apply colored curing and finishing compound in accordance with the manufacturer's directions.