

ADDENDUM No. 3

Date **December 15, 2011**

City of Austin

Project Name Harold Court East Regional Service Center Improvements

C.I.P. No. 5700.012

This Addendum forms a part of Contract and clarifies, corrects or modifies original Bid Documents, dated **November 14, 2011**. Acknowledge receipt of this addendum in space provided on bid form. Failure to do so may subject bidder to disqualification.

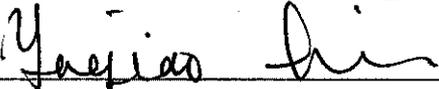
A. Project Manual Revisions:

1. Delete "Table of Contents" in its entirety, and replace with the attached "Table of Contents".
2. Delete Section 00300U, "Unit Price Bid Form" in its entirety, and replace with the attached, revised Section 00300U, "Unit Price Bid Form." Revised Section 300U "Unit Price Bid Form" now includes pay items for items shown on the approved plans:
 - a) 470S Curb Cuts for Sidewalk Ramps and Driveways
 - b) 606S Fertilizer
 - c) 824S Traffic Signs
 - d) 860S Pavement Marking Paint
 - e) 872S Prefabricated Pavement Markings
 - f) 874S Eliminate Existing Pavement Markings and Markers
 - g) 875S Pavement Surface Preparation for Markings
3. Add Standard Specification 470S, "Curb Cuts for Sidewalk Ramps and Driveways" as attached in its entirety.
4. Add Standard Specification 606S, "Fertilizer" as attached in its entirety.
5. Add Standard Specification 824S, "Traffic Signs" as attached in its entirety.
6. Add Standard Specification 860S, "Pavement Marking Paint" as attached in its entirety.
7. Add Standard Specification 872S, "Prefabricated Pavement Markings" as attached in its entirety.
8. Add Standard Specification 874S, "Eliminate Existing Pavement Markings and Markers" as attached in its entirety.
9. Add Standard Specification 875S, "Pavement Surface Preparation for Markings" as attached in its entirety.

B. Drawing Revisions:

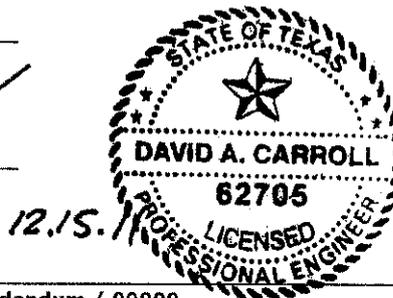
1. None

This addendum consists of 57 page(s)/ 0 sheet(s).


Approved by OWNER


Approved by ENGINEER/ARCHITECT

END



**Document
Number Title**

VOLUME 1

INTRODUCTORY INFORMATION

05/06/11 Title Page
11/21/11 Table of Contents

BIDDING REQUIREMENTS, CONTRACT FORMS, & CONDITIONS OF THE CONTRACT

Pre-Bid Information

00020 05/06/11 Invitation for Bids

Instructions to Bidders

00100 05/06/11 Instructions to Bidders

Information Available to Bidders

00220 05/06/11 Geotechnical Data

Bid Forms

00300U 05/06/11 Bid Form (Unit Price)

Supplements to Bid Forms

00400 05/06/11 Statement of Bidder's Experience
00405 09/25/05 Certificate of Non-Suspension or Debarment
00410 05/06/11 Statement of Bidder's Safety Experience
00425 05/06/11 Insurance Cost Form {ROCIP projects only}
00440 05/06/11 Affidavit - Prohibited Activities
00475 05/06/11 Nonresident Bidder Provisions

Agreement Form

00500 05/06/11 Agreement

Bonds and Certificates

00610 02/23/10 Performance Bond
00620 02/23/10 Payment Bond
00630 05/06/11 Nondiscrimination Certificate
00650 02/23/10 Certificate of Insurance
00670 09/13/10 Sales Tax Exemption Certificate
00680 06/05/06 Non-Use of Asbestos Affidavit (Prior to Construction)
00681 06/05/06 Non-Use of Asbestos Affidavit (After Construction)

General Conditions

00700 09/13/10 General Conditions

Supplementary Conditions

00810 05/06/11 Supplemental General Conditions
00820 05/06/11 Modifications to Bidding Requirements and Contract Forms
00830 06/05/06 Wage Rates and Payroll Reporting
00830HH 11/21/11 Wage Rates Highway Heavy

Document Number	Title
Addenda	
00900	02/23/10 Addendum
SPECIFICATIONS	
Division 1 - General Requirements	
01010	02/23/10 Summary of Work
01020	09/21/11 Allowances
01050	09/13/10 Grades Lines & Levels
01095	07/21/03 Reference Standards and Definitions
01096	05/06/11 Stormwater Pollution Prevention Plan (SWPPP)
01200	05/06/11 Project Meetings
01300	05/06/11 Submittals
01352	02/23/10 Sustainable Construction Requirements
01380	05/06/11 Construction Photography & Videos
01500	05/06/11 Temporary Facilities
01505	09/13/10 Construction and Demolition Waste Management
01510	02/23/10 Construction Indoor Air Quality Management Plan
01550	12/12/08 Public Safety and Convenience
01900	05/06/11 Prohibition of Asbestos Containing Materials
01900a	06/05/06 Statement of Non-Inclusion of Asbestos Containing Material (E/A Prior to Design)
01900b	06/05/06 Statement of Non-Inclusion of Asbestos Containing Material (E/A After Design)
City Standard Technical Specifications	
Series 100 - Earthwork	
102S	08/20/07 Clearing and Grubbing
110S	11/18/04 Street Excavation
111S	11/18/04 Excavation
130S	03/24/09 Borrow
132S	08/20/07 Embankment
Series 200 - Subgrade and Base Construction	
201S	08/20/07 Subgrade Preparation
210S	02/24/10 Flexible Base
230S	08/20/07 Rolling (Flat Wheel)
236S	08/20/07 Proof Rolling
Series 300 - Street Surface Courses	
301S	08/20/07 Asphalts, Oils and Emulsions
302S	08/20/07 Aggregates for Surface Treatments
306S	02/24/10 Prime Coat
307S	02/24/10 Tack Coat
312S	02/21/01 Seal Coat
340S	07/01/09 Hot Mix Asphaltic Concrete Pavement
Series 400 - Concrete Structures and Miscellaneous Concrete	
403S	01/04/11 Concrete for Structures
405S	11/13/07 Concrete Addmixtures
410S	11/13/07 Concrete Structures
414S	11/13/07 Concrete Retaining Walls
432S	01/04/10 Portland Cement Concrete Sidewalks
470S	03/26/08 Curb Cuts for Sidewalks Ramps and Driveways

**Document
Number**
Title**Series 500 – Pipe and Appurtenances**

503S	02/17/00	Frames, Grates, Rings and Covers
506	06/25/10	Manholes
508S	02/24/10	Miscellaneous Structures and Appurtenances
509S	02/24/10	Excavation Safety Systems
510	02/24/10	Pipe
591S	03/26/08	Riprap for Slope Protection
594S	04/05/99	Gabions and Revet Mattresses

Series 600 – Environmental Enhancement

601S	03/24/09	Salvaging and Placing Topsoil
604S	10/30/09	Seeding for Erosion Control
605S	06/21/07	Soil Retention Blanket
606S	06/21/07	Fertilizer
607S	05/23/00	Slope Stabilization Applications for Erosion Control
608S	06/16/08	Planting
610S	12/09/08	Preservation of Trees and Other Vegetation
620S	05/23/00	Filter Fabric
628S	10/30/09	Sediment Containment Dikes
639S	11/26/01	Rock Berm
641S	06/21/07	Stabilized Construction Entrance
642S	10/30/09	Silt Fence

Series 700 – Incidental Construction

700S	08/18/00	Mobilization
701S	06/16/08	Fencing
702S	05/20/02	Removal and Relocation of Existing Fences
710S	11/21/05	Bicycle Racks

Series 800 – Urban Transportation

803S	06/21/07	Barricades, Signs and Traffic Handling
824S	02/24/10	Traffic Signs
860S	05/23/00	Pavement Marking Paint
872S	11/21/05	Prefabricated Pavement Markings
874S	04/03/09	Eliminate Existing Pavement Markings and Markers
875S	11/21/05	Pavement Surface Preparation for Markings

Special Provisions to City Standard Technical Specifications

SP102S	Special Provision to Clearing and Grubbing
SP111S	Special Provision to Excavation
SP594S	Special Provision to Gabions and Revetment Mattresses
SP601S	Special Provision to Salvaging and Placing Top Soil
SP608S	Special Provision to Planting
SP628S	Special Provision to Sediment Containment Dikes
SP701S	Special Provision to Fencing
SP01020	Special Provision to Allowances

Document Number	Title
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Special Specifications

SS509S	Excavation Safety Systems
SS1700S	Irrigation System
SS5061	Stormwater Treatment System

VOL. 2 10/09/00 **MBE/WBE Procurement Program Package**

VOL. 3 11/29/10 **ROCIP Project Safety Manual**

END

Bidding Requirements, Contract Forms and Conditions of the Contract
UNIT PRICE BID FORM
Section 00300U

The undersigned, in compliance with the Invitation for Bids for construction of the following Project: Harold Court East Regional Service Center Improvements

(CIP ID# 5700.012) (IFB# 6100 CLMC322)
for the City of Austin, Texas, having examined the Project Manual, Drawings and Addenda, the site of the proposed Work and being familiar with all of the conditions surrounding construction of the proposed Project, having conducted all inquiries, tests and investigations deemed necessary and proper; hereby proposes to furnish all labor, permits, material, machinery, tools, supplies and equipment, and incidentals, and to perform all Work required for construction of the Project in accordance with the Project Manual, Drawings and Addenda within the time indicated for the following prices of:

Note: The Bidder will enter the line item subtotal in the "Amount" column below, which is the product of the estimated "Quantity" multiplied by the "Unit Price". Any mathematical errors will be corrected for the purpose of determining the correct Amount to be entered in the Bid Form. The Amounts, including any corrected Amounts, will then be totaled to determine the actual amount of the Bid.

No.	Bid Item	Quantity	Unit	Item Description	Unit Price	Amount
1	102S-A	7.78	AC	Clearing and Grubbing	\$ _____	\$ _____
2	110S-A	262	CY	Street Excavation	\$ _____	\$ _____
3	111S-A	6,698	CY	Excavation	\$ _____	\$ _____
4	130-T	7,880	CY	Class C (Topsoil), Plan Quantity	\$ _____	\$ _____
5	132S-A	31,997	CY	Embankment	\$ _____	\$ _____
6	201S	1,941	SY	Subgrade Preparation	\$ _____	\$ _____

No.	Bid Item	Quantity	Unit	Item Description	Unit Price	Amount
7	210S-A	1,006	CY	Flexible Base	\$ _____	\$ _____
8	340S-B-3C	1,314	SY	Hot Mix Asphaltic Concrete Pavement, <u>3</u> Inches, Type <u>C</u>	\$ _____	\$ _____
9	340S-B-2D	1,314	SY	Hot Mix Asphaltic Concrete Pavement, <u>2</u> Inches, Type <u>D</u>	\$ _____	\$ _____
10	403S-CY	149	CY	Concrete Splitter Box (Complete and In Place)	\$ _____	\$ _____
11	403S-SY-6	86	SY	6-Inch Reinforced Concrete Pad	\$ _____	\$ _____
12	414S-C	545	CY	Cast-in-place Portland Cement Concrete Retaining Wall, Including Reinforcement	\$ _____	\$ _____
13	432S-5	4,187	SF	P.C. Concrete Sidewalk, 5-Inch Thickness	\$ _____	\$ _____
14	470S-R	8	LF	Curb Cuts for Sidewalk Ramps	\$ _____	\$ _____
15	506-CNSW	1	EA	Connect to Existing 36" RCP Storm Drain On-Site	\$ _____	\$ _____
16	506-EDMSW	30	VF	Extra Depth Stormwater Manhole All Sizes	\$ _____	\$ _____

No.	Bid Item	Quantity	Unit	Item Description	Unit Price	Amount
17	506-JSW7	3	EA	Junction Box, 7 Ft x 7 Ft	\$ _____	\$ _____
18	506-MSW7	1	EA	Standard Precast Manhole w/Precast Base, 7 Ft. Dia.	\$ _____	\$ _____
19	506-MSW5	1	EA	Standard Precast Manhole w/Precast Base, 5 Ft. Dia.	\$ _____	\$ _____
20	508S-H48	1	EA	Headwalls, Type Std., 2-48 Inch Dia. RCP Pipes Including Energy Dissipators	\$ _____	\$ _____
21	508S-H8	1	EA	Headwalls, Type Std., 8 Inch Dia. SCH 40 PVC Pipe Including Energy Dissipators	\$ _____	\$ _____
22	508S-IG3	1	EA	Inlet, Grated - 3 Ft x 3 Ft Area	\$ _____	\$ _____
23	508S-I20S	1	EA	Inlet, Grated - 5 Ft x 5 Ft 4-Sided Area	\$ _____	\$ _____
24	508S-I10S	1	EA	Inlet, Standard 10 Ft Curb	\$ _____	\$ _____
25	509S-1	907	LF	Trench Excavation Safety Protective Systems (All Depths)	\$ _____	\$ _____

No.	Bid Item	Quantity	Unit	Item Description	Unit Price	Amount
26	510-ASD 48 Dia.	284	LF	Pipe, 48-Inch Dia., CI III Concrete (All Depths), Including Excavation and Backfill	\$ _____	\$ _____
27	510-ASD 36 Dia.	375	LF	Pipe, 36-Inch Dia., CI III Concrete (All Depths), Including Excavation and Backfill	\$ _____	\$ _____
28	510-ASD 6 Dia. SCH 80	77	LF	Pipe, 6-Inch Dia., SCH 80 PVC Perforated (All Depths), Including Excavation and Backfill	\$ _____	\$ _____
29	510-ASD 8 Dia. SCH 40	10	LF	Pipe, 8-Inch Dia., SCH 40 PVC Perforated (All Depths), Including Excavation and Backfill	\$ _____	\$ _____
30	551-8	118	LF	Pipe Underdrains, 8-Inch Dia., SCH 40 PVC (All Depths), Including Excavation and Backfill	\$ _____	\$ _____
31	551-6	394	LF	Pipe Underdrains, 6-Inch Dia., SCH 40 PVC Perforated (All Depths), Including Excavation and Backfill	\$ _____	\$ _____
32	559S- 5x3	248	LF	Precast Concrete Box Culvert, 5Ft. x 3Ft., Complete and In Place	\$ _____	\$ _____
33	559S- 6x4	461	LF	Precast Concrete Box Culvert, 6Ft. x 4Ft., Complete and In Place	\$ _____	\$ _____
34	591S-A 5-8	74	SY	Dry Rip Rap, 5-8 Inch Dia. Stone	\$ _____	\$ _____

No.	Bid Item	Quantity	Unit	Item Description	Unit Price	Amount
35	591S-A 4-6	2,415	SY	Dry Rip Rap, 4-6 Inch Dia. Stone	\$ _____	\$ _____
36	591S-A 2-3	2	SY	Dry Rip Rap, 2-3 Inch Dia. Gravel	\$ _____	\$ _____
37	591S-A 0.5-1.5	624	SY	Dry Rip Rap, 0.5-1.5 Inch Dia. Gravel, 9 Inch Thick	\$ _____	\$ _____
38	593S-A	4	CY	Portland Cement Concrete Retards	\$ _____	\$ _____
39	594S-A	20,268	CY	Gabions, Twisted Woven Wire	\$ _____	\$ _____
40	594S-C	99	CY	Revet Mattresses, Twisted Woven Wire	\$ _____	\$ _____
41	602S-A	1,023	SY	Bermuda Block Sodding	\$ _____	\$ _____
42	605S-A	5,200	SY	Soil Retention Blanket, Class 1, Type B	\$ _____	\$ _____
43	606S-B	1	100LB	Fertilizer	\$ _____	\$ _____
44	608S-1A	5	EA	Planting Type Cedar Elm, Size in Inches 3	\$ _____	\$ _____

No.	Bid Item	Quantity	Unit	Item Description	Unit Price	Amount
45	608S-1B	7	EA	Planting Type Live Oak, Size in Inches 3	\$ _____	\$ _____
46	608S-1C	7	EA	Planting Type Shumard Red Oak, Size in Inches 3	\$ _____	\$ _____
47	608S-1D	30	EA	Planting Type Mountain Laurel, Size in Inches 2.5	\$ _____	\$ _____
48	608S-1E	38	EA	Planting Type Possumhaw Holly, Size in Inches 3	\$ _____	\$ _____
49	608S-1F	22	EA	Planting Type Yaupon Holly, Size in Inches 3	\$ _____	\$ _____
50	609S-C	24,543	SY	Native Grassland Seeding and Planting	\$ _____	\$ _____
51	609S-E	24,543	SY	Watering	\$ _____	\$ _____
52	610S-A	852	LF	Protective Fencing, Type A Chain Link Fence	\$ _____	\$ _____
53	610S-R 8-12	135	EA	Removal of Existing Trees, 8-12 Inch Diameter	\$ _____	\$ _____
54	610S-R 13-20	33	EA	Removal of Existing Trees, 13-20 Inch Diameter	\$ _____	\$ _____
55	610S-R 21-28	7	EA	Removal of Existing Trees, 21-28 Inch Diameter	\$ _____	\$ _____

No.	Bid Item	Quantity	Unit	Item Description	Unit Price	Amount
56	620S	45,135	SY	Filter Fabric	\$ _____	\$ _____
57	628S-B	334	LF	Sediment Containment Dikes with Filter Fabric	\$ _____	\$ _____
58	628S-C	2	EA	Filter Curb Inlet Protection (New Inlet)	\$ _____	\$ _____
59	639S	115	LF	Rock Berm	\$ _____	\$ _____
60	641S	2	EA	Stabilized Construction Entrance	\$ _____	\$ _____
61	642S	4,210	LF	Silt Fence for Erosion Control	\$ _____	\$ _____
62	700S-TM	1	LS	Total Mobilization Payment	\$ _____	\$ _____
63	701S-CD	3	EA	Chain Link Vehicular Double Swing Gate, 6 Foot. X 6 Foot.	\$ _____	\$ _____
64	701S-H	875	LF	Security Fence, 6 Foot, High Type Chain Link	\$ _____	\$ _____
65	702S-G8	472	LF	Removing and Relocating Existing 8 Ft Wire Fence	\$ _____	\$ _____

No.	Bid Item	Quantity	Unit	Item Description	Unit Price	Amount
66	702S-G6	15	LF	Removing and Relocating Existing 6 Ft Wire Fence	\$ _____	\$ _____
67	710S-B	23	EA	Class III, Type 1 Bike Rack	\$ _____	\$ _____
68	803S-MO	12	MO	Barricades, Signs and Traffic Handling	\$ _____	\$ _____
69	824S	2	EA	Traffic Signs (HC Parking)	\$ _____	\$ _____
70	860S-CY	90	LF	Pavement Marking Paint (Reflectorized), 4 In. (Solid Yellow)	\$ _____	\$ _____
71	860S-CW	150	LF	Pavement Marking Paint (Reflectorized), 12 In. (Solid White)	\$ _____	\$ _____
72	872S-C	2	EA	Prefabricated Pavement Markings 48 Inches in Width, White in Color (HC Van Parking Symbol)	\$ _____	\$ _____
74	874S-A	54	LF	Eliminating Existing Pavement Markings: 4 inches in width	\$ _____	\$ _____
75	875S-C4	90	LF	Pavement Surface Preparation for Existing Asphalt Surface, 4 inches in width, for Asphalt Surface Type	\$ _____	\$ _____
76	875S-C12	150	LF	Pavement Surface Preparation for Existing Asphalt Surface, 12 inches in width, for Asphalt Surface Type	\$ _____	\$ _____

No.	Bid Item	Quantity	Unit	Item Description	Unit Price	Amount
77	SP601S	471	CY	Biofiltration Media Top Soil, Depth 18 Inch (Minimum)	\$ _____	\$ _____
78	SP608S-1A	184	EA	Planting Type Big Muhly, Size in Gallons 5	\$ _____	\$ _____
79	SP608S-1B	165	EA	Planting Type Soft Rush, Size in Gallons 3	\$ _____	\$ _____
80	SP608S-1C	161	EA	Planting Type Switch Grass, Size in Gallons 3	\$ _____	\$ _____
81	SP628S-E	1,248	SY	Geotextile Fabric for Filtration Underdrain System	\$ _____	\$ _____
82	SP701S-VS	890	LF	Owner Approved Screening Slats (Complete and In Place)	\$ _____	\$ _____
83	SS1700S	1	LS	Irrigation System, Complete In Place	\$ _____	\$ _____
84	SS5061	1	EA	Stormwater Treatment System	\$ _____	\$ _____

TOTAL BASE BID: \$ _____

Allowance #1 (See Section 01020) \$ 80,000

SUBTOTAL ALLOWANCE: \$ 80,000

TOTAL BID (BASE BID PLUS ALLOWANCE): \$ _____

In the event of a mathematical error, the correct product, determined by using the "Unit Price" and "Quantity", and the correct sum, determined by totaling the correct line item Amounts, will prevail over the amount entered by the Bidder. The unit prices shown above will be the unit prices used to tabulate the Bid and used in the Contract, if awarded by the City.

Notes:

- For information pertaining to Rolling Owner Controlled Insurance Program (ROCIP), see Sections 00810 and 00820.

Optional Information on Bid Prices Submitted by Computer Printout

In lieu of handwritten unit prices in figures in ink on the Bid forms above, Bidders, at their option, may submit an original computer printout sheet bearing certification by, and signature for, the Bidding firm. The unit prices shown on acceptable printouts will be the unit prices used to tabulate the Bid and used in the Contract if awarded by the City. As a minimum, computer printouts must contain all information and in the format shown on the attached page: "Example of Bid Prices Submitted by Computer Printout" form.

If a computer printout is used, the Bidder must still execute that portion of the unit price Bid form which acknowledges the Bid Guaranty, Time of Completion, Liquidated Damages, and all addenda that may have been issued.

Bids with unit prices by computer printout may be rejected, if:

1. The computer printout does not include the required certification, set forth in the attached "Example".
2. The computer printout is not signed in the name of the firm to whom the Project Manual was issued.
3. The computer printout is non-responsive or otherwise omits required Bid items or includes items not shown on the Bid forms in the Project Manual.
4. The other required Bid documents issued by the City are not fully executed as provided above.
5. The signed Section 00300U is not returned with the signed computer printout.

If the Bid submitted by the Bidder contains both the form furnished by the City, completed according to the instructions, and also a computer printout, completed according to the instructions, unit prices of only one will be considered. In this situation, the unit Bid prices shown on the computer printout will be used to determine the Bid.

BID GUARANTY: A Bid guaranty must be enclosed with this Bid, as required in Section 00020 or Section 00020S, in the amount of not less than five percent (5%) of the total Bid. Following the Bid opening, submitted Bids may not be withdrawn for a period of (90) Calendar Days. Award of Contract will occur within this period, unless mutually agreed between the parties. The Bid guaranty may become the property of the OWNER, or the OWNER may pursue any other action allowed by law, if:

- Bidder withdraws a submitted Bid within the period stated above;
- Bidder fails to submit the required post Bid information within the period specified in Section 00020S or 00100, or any mutually agreed extension of that period;
- or Bidder fails to execute the Contract and furnish the prescribed documentation (bonds, insurance, etc.) needed to complete execution of the Contract within five (5) calendar days after notice of award, or any mutually agreed extension of that period.

The Bid includes all Automobile Liability and Builder's Risk Insurance premiums required to meet the insurance limits in the Supplemental General Conditions and includes all premiums for a

Performance Bond and a Payment Bond in the sum of one hundred percent of the Contract Amount. The Bid excludes all costs for the insurance coverages and limits, up to the limits set forth in the Supplemental General Conditions, duplicated by those in the ROCIP, including the costs for all proposed Subcontractors for such coverages and limits as described in the Supplemental General Conditions, and as calculated in accordance with the Insurance Cost Form, Section 00425.

The Bid also includes the cost to provide and maintain through completion of Work all necessary safety rails, barricades, platforms, fences, covers, and signs necessary to adequately protect and safeguard all vehicular and pedestrian traffic within proximity of the Work. The safety information identified in the Project Safety Manual, and in the Supplemental General Conditions, outlines the minimum safety requirements for the Project. CONTRACTOR shall not limit the amount of effort directed toward its safety program based on the requirements identified in the Project Safety Manual. This program is in addition to CONTRACTOR's existing safety program, not in lieu of that program.

GEOTECHNICAL BASELINE ACKNOWLEDGEMENT: The undersigned bidder certifies that he/she has read and understands the Geotechnical Baseline Report (GBR), the Geotechnical Data Report, the Reflection Survey Report, and all other geological and geotechnical information and data as provided in the Contract Documents, including all Addenda. **The Bidder acknowledges and agrees that the GBR represents the contractual statement of the subsurface conditions reasonably anticipated to be encountered during construction. The GBR will be used to evaluate whether subsurface conditions differ materially from those indicated in the GBR.**

TIME OF COMPLETION: The undersigned Bidder agrees to commence work on the date specified in the written "Notice to Proceed" to be issued by the OWNER and to **substantially** complete construction of the improvements, as required by the Project Manual, Drawings and Addenda for the Work within **three hundred (300) Calendar Days**. **If a Substantial Completion date has been specified, the Bidder further agrees to reach Final Completion within thirty (30) Calendar Days after Substantial Completion as required by the Project Manual, Drawings and Addenda for the work.** The Bidder further agrees that should the Bidder fail to **substantially complete the Work or to finally** complete the Work within the number of days indicated in the Bid or as subsequently adjusted, Bidder shall pay the liquidated damages for each consecutive day thereafter as provided below; unless the OWNER elects to pursue any other action allowed by law.

WAIVER OF ATTORNEY FEES: In submitting its bid, in consideration for the waiver of its right to attorney's fees by the OWNER, the Bidder knowingly and intentionally agrees to and shall waive the right to attorney's fees under Section 271.153 of the Texas Local Government Code in any administrative proceeding, alternative dispute resolution proceeding, or litigation arising out of or connected to any Contract awarded pursuant to this solicitation process.

LIQUIDATED DAMAGES: The Bidder understands and agrees that the timely completion of the described Work is of the essence. The Bidder and OWNER further agree that the OWNER's actual damages for delay caused by failure to timely complete the Project are difficult, if not impossible to measure. However, with respect to the additional administrative and consultant costs to be incurred by OWNER, the reasonable estimate of such damages has been calculated and agreed to by OWNER and Bidder. Therefore, the Bidder and the OWNER agree that for each and every **Calendar Day** the Work or any portion thereof, remains incomplete after the **Substantial Completion** date as established by the above paragraph, "Time of Completion", payment will be due to the Owner in the amount of **one thousand two hundred** dollars (**\$1,200.00**) per **Calendar Day** as liquidated damages, not as a penalty, but for delay damages to the OWNER. **If both Substantial and Final Completion dates have been specified, the Bidder and the OWNER further agree that for each and every Calendar Day the Work or any portion thereof, remains incomplete after the Final date as established by the above paragraph, "Time of Completion", payment will be due to the OWNER in the amount of five hundred dollars (**\$500**) per Calendar Day as liquidated damages, not as a penalty, but for delay**

damages to the OWNER. Such amount shall be deducted by the OWNER from any Contract payment due. In the event of a default or breach by the CONTRACTOR and demand is made upon the surety to complete the project, in accordance with the Contract Documents, the surety shall be liable for liquidated damages pursuant to the Contract Documents in the same manner as the CONTRACTOR would have been.

OWNER reserves the right to reject any or all Bids and to waive any minor informality in any Bid or solicitation procedure (a minor informality is one that does not affect the competitiveness of the Bids).

The undersigned acknowledges receipt of the following addenda:

- Addendum No. 1 dated _____ Received _____
- Addendum No. 2 dated _____ Received _____
- Addendum No. 3 dated _____ Received _____
- Addendum No. 4 dated _____ Received _____
- Addendum No. 5 dated _____ Received _____

Secretary, *if Bidder is a Corporation

Bidder

(Seal)

Authorized Signature

Title

Date

Address

Telephone Number / FAX Number

Email Address for Person Signing Bid

Email Address for Bidder's Primary Contact Person

* Copy of Corporate Resolution and minutes with certificate of officer of Bidder as to authority of signatory to bind Bidder is to be signed and dated no earlier than one week before Bid date, and attached to this document.

Item No. 470S
Curb Cuts for Sidewalk Ramps and Driveways

470S.1 Description

This item shall govern horizontal and vertical curb saw cuts, which are undertaken on existing or newly placed Portland cement concrete curb, in order to accommodate the construction of new concrete sidewalk ramps and/or driveways at the locations indicated on the Drawings or as directed by the Engineer or designated representative. The curb cutting operation shall be conducted from the street side of the existing or newly placed curb.

This specification is optional and is applicable for projects or work involving either inch-pound or SI units. Within the text inch-pound units are given preference followed by SI units shown within parentheses.

470S.2 Submittals

The submittal requirements of this specification item include:

- A. Manufacturer and model number of saw to be used for curb cuts.
- B. Documentation that the saw that is to be used on the project is designated specifically to curb cuts.

470S.3 Materials

A diamond-blade-cutting saw shall be utilized for all required curb sawing/cutting. The saw shall be capable of cutting existing or newly placed curb material into the shape of a ramp and/or driveway; leaving a smooth, accurate top face. The saw shall be specifically designed for this purpose and shall be approved by the Engineer or designated representative prior to the start of any curb cut work.

A diamond-grinding wheel shall be used for rounding the sawed concrete edges.

470S.4 Construction Methods

The curb shall be sawn in accordance with City of Austin Standard Detail 470S-1 or as directed by the Engineer or designated representative. The sawing shall be made along neat lines and shall result in smooth edges and top faces. The length of curb face, which must be removed in order to conform to the proposed sidewalk ramp or driveway, shall be sawn full depth at the bottom of the curb face using a diamond saw blade.

The saw cutting of the curb face shall be initiated at an elevation ½ inch (12.5 millimeters) above the existing gutter and extended at an angle of ¾ inch per foot (63 mm per meter) upwards and away from the gutter pan to conform with the new sidewalk ramp or driveway grade. End cuts shall be sawn full depth on an angle so that the saw cut face provides a dimension of 55 to 60 inches (1.4 to 1.5 meters) for ADA ramps and 30 inches (750mm) for driveways (Standard Detail No. 470S-1). The corners of the tops of the end cuts shall be ground using a diamond-grinding wheel to a radius of ¼ inch (6 mm).

Special care shall be taken to insure that there is no disturbance or damage to the existing roadway pavement, sidewalk pavement or curbs scheduled to remain. Any

damage to remaining pavements, sidewalks and/or curb due to the Contractor's operations shall be repaired at the Contractor's sole cost and expense.

The work under this specification item shall also include the disposal of all concrete curb materials removed during the curb cutting operation. Disposal shall conform to the requirements of City of Austin Standard Specification Item No. 401S, "Structural Excavation and Backfill".

470S.5 Measurement

Accepted work as prescribed by this item shall include the removal and disposal of all sawn material and shall be measured by the number of lineal feet (lineal meters: 1 meter is equal to 3.281 feet) of sawcutting from top of curb cut at beginning to top of curb cut at ending for each proposed sidewalk ramp location that are completed in accordance with the Drawings, Standard Detail or as directed by the Engineer or designated representative.

470S.6 Payment

The work performed as prescribed by this item will be paid for at the unit bid price per lineal foot of "Curb Cuts" for sidewalk ramps and driveways. The bid price shall include full compensation for the cost of all labor, materials and equipment necessary to complete the Work, the removal and disposal of the curb cut, and the cost of any repairs necessitated from damage produced during the Contractor's operations.

Pay Item No. 470S-D: Curb Cuts for Driveways ----- Per Lineal Foot.

Pay Item No. 470S-R: Curb Cuts for Sidewalk Ramps ----- Per Lineal Foot.

End

<u>SPECIFIC</u> CROSS REFERENCE MATERIALS
Specification 470S, "Curb Cuts For Sidewalk Ramps and Driveways"

City of Austin Technical Specifications

<u>Designation</u>	<u>Description</u>
Item No. 401S	Structural Excavation and Backfill

City of Austin Standard Details

<u>Designation</u>	<u>Description</u>
470S-1	Typical Curb Cuts for Sidewalk Ramps

<u>RELATED</u> CROSS REFERENCE MATERIALS
Specification 470S, "Curb Cuts For Sidewalk Ramps and Driveways"

City of Austin Technical Specifications

<u>Designation</u>	<u>Description</u>
Item No. 104S	Removing Concrete
Item No. 110S	Street Excavation
Item No. 340S	Hot Mix Asphaltic Concrete Pavement
Item No. 360	Concrete Pavement
Item No. 370S	Concrete Pavers

Item No. 375S	Concrete Pavers for Sidewalk Ramps
Item No. 403S	Concrete for Structures
Item No. 410S	Concrete Structures
Item No. 430S	Concrete Curb and Gutter
Item No. 431S	Machine Laid Curb and Gutter
Item No. 432S	Concrete Sidewalks
Item No. 433S	Concrete Driveways

RELATED CROSS REFERENCE MATERIALS - Continued
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Specification 470S, "Curb Cuts For Sidewalk Ramps and Driveways"
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City of Austin Technical Specifications

<u>Designation</u>	<u>Description</u>
Item No. 434S	Concrete Median and Islands
Item No. 602S	Sodding for Erosion Control
Item No. 604S	Seeding for Erosion Control
Item No. 610S	Preservation of Trees and Other Vegetation

City of Austin Standard Details

<u>Designation</u>	<u>Description</u>
430S-1	Curb and Gutter Section
430S-3	Curb Expansion Joint Dowel Detail
430S-4	Concrete Backfill Under Curb & Gutter
432S-1	Sidewalk
432S-3	Intersection Curb Ramps
432S-3A	Curb Ramps at T-Type Intersections
432S-3B	Intersection Curb Ramps with Returned Curb
432S-3C	Curb Ramps with Returned Curb at T Intersections
432S-3D	Combined Curb Ramps
432S-3E	Combined Curb Ramp at T type Intersection
432S-3F	Combined Sidewalk Curb Ramp with Pavers
432S-5	Sidewalk Curb Ramp With Pavers (type I)
432S-5A	Sidewalk Curb Ramp With Pavers (type IA)
432S-5B	Sidewalk Curb Ramp With Pavers (type IB)
432S-6	Concrete Stamp
433S-1	Type I Driveway
433S-2	Type II Driveway
610S-1	Tree Protection Fence Locations

Texas Department of Transportation:
Standard Specifications for Construction and Maintenance
of Highways, Streets, and Bridges

<u>Designation</u>	<u>Description</u>
Item No. 104	Removing Concrete
Item No. 420	Concrete Structures

606S.1 Description

This item shall govern the provision and distribution of fertilizer over the areas indicated on the Drawings and in accordance with these specifications.

This specification is applicable for projects or work involving either inch-pound or SI units. Within the text, inch-pound units are given preference with SI units shown within parentheses.

606S.2 Submittals

The submittal requirements for this specification item shall include:

- A. Type of soil(s) at the site.
- B. Type(s) of re-vegetation (seeding, sodding, etc).
- C. Type(s) of fertilizer.
- D. Rate(s) of application of fertilizer.
- E. Chemical analysis of the fertilizer(s).

606S.3 Materials

All fertilizer used on site shall be delivered in bags or containers, which are clearly labeled and show the analysis. The figures in the analysis shall represent the percent of nitrogen, phosphoric acid and potash nutrients, respectively, as determined by the methods of the Association of Official Agricultural Chemists. The fertilizer may be subject to testing by the State Chemist in accordance with the Texas Fertilizer Law. A pelleted or granulated fertilizer shall be used.. Fifty percent or greater of the Nitrogen required shall be in the form of Nitrate Nitrogen (NO₃). The remaining Nitrogen required may be in the form of Urea Nitrogen [CO(NH₂)₂].

The total amount of nutrients furnished and applied per acre (hectare: 1 hectare equals 2.471 acres) shall equal or exceed that specified for each nutrient.

606S.4 Construction Methods

General requirements and criterion for vegetative activities, including fertilizing, for the City of Austin are presented in Section 1.4.4, "Vegetative Practice", and Section 1.5.4, "Revegetation Criteria" of the City of Austin Environmental Criteria Manual.

The fertilizer type and rate of application should be based on chemical tests of representative soil samples taken after completion of construction and ground work. Appropriate initial fertilizer application rates for the Austin area (in lieu of recommendations from soil testing) are provided in the sections of the City of Austin Environmental Criteria Manual identified below:

- A. Permanent seeding. - [Section 1.4.4.B.4].
- B. Restoring Climax Grasses - [Section 1.5.5.E].
- C. Sod. -. [Section 1.4.4.E.5].
- D. Maintenance of Mulch Sod. - [Section 1.4.4.C.4].

Pelleted or granulated fertilizer shall be applied uniformly into the soil to a depth of 4 inches (100 mm) over the area specified on the Drawings to be fertilized and in the manner directed for the particular item of work. The fertilizer shall be dry and in good physical condition. Fertilizer that is powdered or caked will be rejected. Distribution of the fertilizer for the particular item of work shall meet the approval of the Engineer or Designated Representative.

Maintenance fertilizing shall be applied every 6 months after the new sod or grass is placed or until the work is accepted by the City.

The fertilizer may also be applied with the hydromulch

606S.5 Measurement

Work and acceptable material for "Fertilizer" will be measured by the normal ton of 2,000 pounds (megagrams: 1 megagram equals 1.1023 tons) or by the 100 pounds (50 kilograms: 1 kilogram equals 2.205 pounds) as determined by approved scales or guaranteed weight of sacks shown by the manufacturer.

606S.6 Payment

The work performed and materials furnished and measured as provided under "Measurement" shall be included in the unit price bid for the item of construction in which fertilizer is used, unless specified in the Drawings as a Pay Item.

When fertilizer is specified on the Drawings as a pay item or included in the contract bid form, the work performed and materials furnished and measured as provided under "Measurement" will be paid for at the unit bid price for "Fertilizer" of the analysis specified on the Drawings. The unit bid price shall include full compensation for furnishing all materials and performing all operations necessary to complete the work.

Payment, when specified, will be made under one of the following:

Pay Item No. 606S-A:	Fertilizer	Per Ton.
Pay Item No. 606S-B:	Fertilizer	Per 100 Pounds.

End

SPECIFIC CROSS REFERENCE MATERIALS
Specification Item 606S "Fertilizer"

City of Austin Environmental Criteria Manual

<u>Designation</u>	<u>Description</u>
Section 1.4.4.B.4	Design Criteria of Section B. Critical Area Stabilization (with Permanent Seeding)
Section 1.4.4.C.4	Design Criteria of Section C. Critical Area Stabilization (with Mulch Sod)
Section 1.4.4.E.5	Site Preparation of Section E. Critical Area Stabilization (with Sod)
Section 1.5.5.E	Fertilizer, Section E of 1.5.5, "Restoring Climax Grasses"

RELATED CROSS REFERENCE MATERIALS
Specification Item 606S "Fertilizer"

City of Austin Technical Specifications

<u>Designation</u>	<u>Description</u>
Item No. 601S	Salvaging and Placing Topsoil
Item No. 602S	Sodding for Erosion Control
Item No. 604S	Seeding for Erosion Control
Item No. 605S	Soil Retention Blanket
Item No. 607S	Slope Stabilization
Item No. 608S	Planting
Item No. 609S	Native Grassland Seeding and Planting for Erosion Control
Item No. 610S	Preservation of Trees and Other Vegetation

824S.1 Description

This item shall govern furnishing and placement of Traffic Signs including excavation, posts, hardware and signs.

This specification is applicable for projects or work involving either inch-pound or SI units. Within the text, the inch-pound units are given preference followed by SI units shown within parentheses.

824S.2 Submittals

The submittal requirements of this specification item include:

- A. Identification of the types of materials proposed for traffic sign, i.e. faces, posts, clamps, etc.,
- B. Results of any State or Federal tests (reflectance, diffuse day color, specific intensity brightness, Weather-O-meter, etc.) performed on their products,

824S.3 Materials

The following ASTM Standards and documents, of the issue in effect on the date of Invitation for Bid, form a part of this specification to the extent herein.

- A. ASTM B 209 Specification for Aluminum and Aluminum Alloy Sheet and Plate
- B. ASTM D 523 Standard Method for Test for Specular Gloss
- C. ASTM D 4956 Standard Specification for Retroreflective Sheeting for Traffic Control
- D. ASTM E 284 Standard Definition of Terms Relating to Appearance of Materials
- E. ASTM E 308 Computing the Colors of Objects by Using the CIE System
- F. ASTM E 810 Standard Test Method for Coefficient of Retroreflection of Retroreflective Sheeting
- G. ASTM E 1164 Standard Practice for Obtaining Spectrophotometric Data for Object-Color Evaluation
- H. CIE Publication Number 39-2, Recommendation for Surface Colors for Visual Signaling
- I. FP-92 Standard Specifications for Construction of Roads and Bridges on Federal Highway Project
- J. Substrate. This shall be aluminum alloy 5052-H38 or 6061-T-6 and otherwise in conformance with ASTM B-209.
 1. Metal working. The aluminum shall be free of burrs and pits on both sides, including edges and holes, and shall be made ready for applications of the sheeting.

The aluminum shall be new and corrosion-free with holes drilled or punched, corners rounded to the radii shown in the standard detail sheet, and all edges smoothed prior to application of sheeting.

2. Size. The dimensions of substrate applications for regulatory, warning, and guide signs shall be as specified by the Engineer and as shown on the plans.
- K. Background, Legends, Symbols, and Colors. These shall be in accordance with the Standard Highway Sign Designs (SHSD) for Texas and with the Texas Manual of Uniform Traffic Control Devices (TMUTCD).
1. Retroreflective Materials. Retroreflective materials shall comply with Texas Department of Transportation Departmental Materials Specification 8300, Sign Face Materials. The materials requirements for Reflective Sheeting must meet all the requirements of ASTM D 4956.
 - a. Retroreflective Sheeting. Type III (High Intensity Prismatic): The materials as listed in these specifications shall comply with Texas Department of Transportation Departmental Materials Specification 8300, Sign Face Materials. The materials requirements for Reflective Sheeting must meet all the requirements of ASTM D 4956. Colors shall be as specified in specifications for Standard Highway Sign Colors (FHWA, HTO-21).
 - b. Retroreflective Sheeting. Type IX (Fluorescent yellow green): The materials shall comply with ASTM 4956. Designed to provide higher nighttime sign brightness in the legibility distance and brightness at high entrance angles. The minimum fluorescence luminance factor (YF) for new sheeting shall be 35%.
 2. Electronically Cuttable Film. Electronically cuttable film shall consist of flexible, transparent, durable acrylic colored films coated with a transparent pressure sensitive adhesive protected by a clear removable liner. These films are designed to be applied to retroreflective materials for the creation of traffic control signs and devices by either cutting by knife over roll (sprocket fed or friction fed) and flat bed electronic cutting machines. The films shall be available in standard traffic colors, be dimensionally stable, and be designed to optimally cut, weed, lift, and transfer. Use of electronic cuttable films will not require the release of any volatile organic compounds.

When electronic cuttable film is applied to retroreflective sheeting, the resulting color of the composite sheeting will conform to Texas Department of Transportation Departmental Materials Specification 8300, Sign Face Materials. The materials requirements for Reflective Sheeting must meet all the requirements of ASTM D 4956.

Only signage utilizing electronically cuttable film will be allowed. Silk screened sign faces will not be accepted.

- a. Color Test. Conformance to color requirements shall be determined by instrumental method in accordance with ASTM E 1164 on sheeting applied to aluminum test panels. The values shall be determined on a HunterLab Labscan 6000 0/45 Spectrocolorimeter with option CMR 559 [or approved equal 0/45 (45/0) instrument

with circumferential viewing (illumination)].

Computations shall be done in accordance with ASTM E 308 for the 2° observer.

- b. Coefficient of Retroreflection R^A . When electronic cuttable film is applied to retroreflective sheeting, the composite will conform to the percentage retained of the minimum coefficient of retroreflection specified by the using agency and the manufacturer for the retroreflective sheeting when the retroreflective sheeting is screen processed. The coefficient of retroreflection shall be determined in accordance with ASTM E 810. Coefficients of retroreflection R^A shall be specified in units of candelas as per foot candle per square foot (candelas per lux per square meter). The observation angles shall be 0.2 and 0.5 degrees unless otherwise specified. The entrance angles shall be -4 and 30 degrees unless otherwise specified. The electronic cuttable film shall have and 85° specular gloss of not less than 50 when tested in accordance with ASTM D 523.
- c. Processing and Cuttability. The electronic cuttable film shall permit cutting, weeding, masking with transfer tape, lifting, and application to retroreflective sheeting when used in accordance with manufacturer's recommendations at temperatures between 65° and 95° F and relative humidifies between 30% and 70%. The film shall lay flat with minimal edge curl and be dimensionally stable.
- d. Adhesive Liner. The protective liner attached to the adhesive shall be removable by peeling without soaking in water or other solutions, without breaking, tearing, or removing any adhesive from the electronic cuttable film. The liner shall have a controlled release from the adhesive coated film sufficient to allow cutting without the film popping off from the liner while still allowing the liner to easily be peeled from the film.
- e. Film. Film with punched edges for use on sprocket fed knife over roll cutters shall be edge scored and weeded to remove film in the punched area as a means of eliminating adhesive build up on the sprockets.
- f. Resistance to Accelerated Outdoor Weathering. When electronic cuttable film is applied to retroreflective sheeting, the surface of the film shall be weather resistant and show no appreciable cracking, blistering, crazing, or dimensional change after 2 years unprotected outdoor exposure, facing the equator and inclined 45° from the vertical. Following weather exposure, panels shall be washed in a 5% HCl solution for 45 seconds, rinsed thoroughly with clean water, blotted dry with a soft cloth and brought to equilibrium at standard conditions.

After cleaning, the coefficient of retroreflection shall not be less than the value specified by the using agency for the retroreflective sheeting when the retroreflective sheeting is screen processed. Show no appreciable evidence of cracking, scaling, pitting, blistering, edge lifting or curling or more than 1/32 inch shrinkage or expansion. Show good color fastness or better when tested. The electronic cuttable film shall not be removable from the retroreflective sheeting without damage.

3. Application Methods. The method of application of sheeting, letters, numbers, and symbols shall be precisely as prescribed in writing by the manufacturer.
 - a. Legend Spacing and Layout. Spacing and layout for all traffic control signs shall

conform to the Texas SHSD.

- L. Sign Posts. Steel post shall conform to the standard specification for hot rolled carbon sheet steel, structural quality, ASTM designation A570, Grade 50. Average minimum yield strength after cold forming is 60,000 psi. The cross section of the post shall be square tube formed steel, carefully rolled to size and shall be welded directly in the corner by high frequency resistance welding or equivalent process and externally scarified to agree with corner radii. Sign posts shall be hot dipped galvanized conforming to ASTM A653, G90.

1. Sizes. Perforated sign posts, anchors and sleeves shall be of the following size:

Size	USS Gauge	Weight
1 3/4" X 1 3/4 "	14	1.71
2" X 2"	12	2.42

On square tubing, holes shall be on centerline of each side in true alignment and opposite each other directly and diagonally. The length of each post shall have a permissible length tolerance of $\pm 1/4$ ".

The finished posts shall be straight and have a smooth, uniform finish. It shall be possible to telescope all consecutive sizes of square tubes freely and for not less than ten feet of their length without the necessity of matching any particular face to any other face. All holes and ends shall be free from burrs and ends shall be cut square.

- a. Tolerance on Outside Sizes

Nominal Outside Dimension	Outside Tolerances at Corners
1 3/4" X 1 3/4 "	± 0.008 "
2" X 2"	± 0.008 "

Note: Measurement from outside dimensions shall be made at least 2 inches from the end of the tube.

Permissible variation in wall thickness is $+0.011$ ", -0.005 ".

Convexity and concavity shall be measured in the center of the flat sides, tolerance in ± 0.010 ", determined at the corner.

- b. Squareness of Sides and Twist Permissible in 3" Length.

Nominal Outside Dimension	Squareness Tolerance	Twist
1 3/4" X 1 3/4 "	± 0.010 "	0.062"
2" X 2"	± 0.012 "	0.062"

Permissible variation in straightness is 1/16 of an inch in 3 feet. The standard outside corner radius shall be 5/32 of an inch $\pm 1/64$ inch.

2. Installation. The square end of the post shall not be modified or pointed.
- a. Mount Base. When sign post installation is required over building basements, bridges and cavities, a galvanized cast iron surface mount coupler shall be used. The square post surface mount base must be a NCHRP 350-Compliant breakaway system for use with 1 3/4 - inch square post.
 - b. Hardware. All ground mounted signs shall be attached to posts using 3/8" aluminum drive rivets. Stainless steel banding material, brackets and clips will be used for signs installed on light standards or mast arms.
 - c. Construction.
 1. Concrete specifications: Insert a 2" square x 30" 12 gauge into concrete with 1-2 inches exposed above ground. Make sure the anchor assembly is level. Attach the sign to the 1 3/4" square 14 gauge post (length varies with installation) at a minimum height of seven feet using drive rivets and nylon washers. Insert the post 6-8 inches into the anchor assembly. Bolt the signpost to the anchor assembly using a corner bolt and flange nut.
 2. Soil specifications: Drive a 2" square x 30" 12 gauge omni-directional anchor sleeve into soil with 1-2 inches exposed above ground. Make sure the anchor assembly is level. Attach the sign to the 1 3/4" square x 14 gauge post (length varies with installation) at a minimum height of seven feet using drive rivets and nylon washers. Insert the post 6-8 inches into the anchor assembly. Bolt the signpost to the anchor assembly using a corner bolt and flange nut.
- M. Maker's Mark Decals. Each sign shall be permanently marked on the lower right corner of the back side with the month and year of installation, and name of manufacturer.

Table 1
Minimum Coefficient of Retroreflectivity
[0.2° observation angle and -4° entrance angle]

Table 2
Minimum Coefficient of Retroreflectivity
[0.2° observation angle and -4° entrance angle]



824S.4 Equipment

Provide machinery, tools, and equipment necessary for proper execution of the work.

824S.5 Construction:

Construction shall be high quality with no visible defects in the finished product. Fabrication shall be in accordance with these specifications. Street name signs shall always be supplied and installed at each project intersection whether signs previously existed at the location or not.

- A. **Unsignalized Intersection.** At unsignalized intersections, ground-mounted street name signs of 9 inch height with 6 inch letters and 3 inch suffix and block numbers are required. Lettering on street name signs must be in upper/lower case letters.
- B. **Signalized Intersection.**
 - 1. **Ground Mounted Street Signs**
If a signalized intersection has either mast arms or span- wire on which overhead street name signs can be attached, no ground mounted streets name signs are required at that intersection.
 - 2. **Overhead Street Signs**
Signs shall be strapped to the mast arm or span wire. Attachments to mast arms shall be by means of a 3/4 inch stainless steel strap and a stainless steel flared strap bracket.
 - a. **Letter Heights**
Overhead street name signs shall be 18 inches high. Street name signs must be 8 inch (or larger) upper/lower case letters. The suffix and block numbers shall be at least 4 ½ inches high.
- C. **Existing Signs.**
The removal of existing signs shall be coordinated with the Austin Transportation Department to assure required signage is in place during all construction phases. When existing signs are to be removed, they will be removed from their post by hand and delivered to the Traffic Sign Shop (974 - 4055).
- D. **No Parking Signs**
No Parking signs with horizontal dimensions wider than 15" shall not be used unless specifically authorized in advance by the City. For 24 hour parking restriction see the attached detail for the typical No Parking sign.

824S.6 Measurement

Traffic signs shall be measured as each complete sign constructed and placed as indicated on the Drawings.

- D 822 Recommended Practice for Operating Light- and Water-Exposure Apparatus (Carbon-Arc Type) for Testing Paint, Varnish, Lacquer, and Related Products
- D 828 Test Method for Tensile Breaking Strength of Paper and Paperboard
- E 97 45-degree, 0-degree Directional Reflectance Factor of Opaque Specimens by Broad-Band Filter Reflectometry
- G 23 Recommended Practice for Operating Light- and Water-Exposure Apparatus (Carbon-Arc Type) for Exposure of Nonmetallic Materials

Other Specifications

- Federal Specification A-G-90
- Federal Test Method 8801
- Federal Specification O-G-93 (stick only)
- Federal Specification TT-P-64lb.

<u>RELATED CROSS REFERENCE MATERIALS</u>
Specification Item No. 824S, "Traffic Signs"

Texas Department of Transportation Technical Documents:

<u>Designation</u>	<u>Description</u>
(TMUTCD)	Texas Manual on Uniform Traffic Control Devices

City of Austin Standard Details

<u>Designation</u>	<u>Description</u>
824S-1	Standard Street-End Markers

Texas Department of Transportation: Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges

<u>Designation</u>	<u>Description</u>
Item No. 445	Galvanizing
Item No. 636	Aluminum Signs (Type A)
Item No. 637	Aluminum Signs (Type G)
Item No. 642	Aluminum Signs (Type O)
Item No. 646	Small Roadside Sign Supports
Item No. 647	Large Roadside Sign Supports
Item No. 656	Foundations for Signs, Traffic Signals and Roadway Illumination Assemblies

Texas Department of Transportation: Departmental Materials Specifications

<u>Designation</u>	<u>Description</u>
DMS-7110	Aluminum Sign Blanks
DMS-7120	Sign Hardware
DMS-8310	Flexible Roll-up Reflective Signs
DMS-8320	Vinyl, Non-reflective Decal Sheeting

860S.1 Description

This item shall govern the installation of reflectorized paint pavement marking. The width of the line shall be 4 inches (100 millimeters) and the color as indicated on the Drawings.

This specification is applicable for projects or work involving either inch-pound or SI units. Within the text and accompanying tables, the inch-pound units are given preference followed by SI units shown within parentheses.

860S.2 Submittals

The submittal requirements of this specification item include:

- A. Proposed paint color(s), brand names, raw materials and products for traffic paint.
- B. Sampling and testing procedures and specific test results for pigment, calcium carbonate, acrylic resins and other materials used in the traffic paints.
- C. Proposed shipping requirements including container type(s) (drums and/or buckets), and labeling.
- D. Manufacturer's recommendations for mixing, storage and application of the traffic glass beads and traffic paint.
- E. All applicable Materials Safety data Sheets for the traffic paint.

860S.3 Materials

A. Traffic Stripe Reflective Glass Traffic Beads

1. The glass spheres shall not contain more than 30 percent (by weight {mass}) irregular shaped particles when tested in accordance with TxDOT Test Method-832-B. The no. 20 (850 μm) sieve shall have a maximum of 35% by weight (mass) allowed irregular particles, based on a visual inspection.

Unless noted otherwise on the Drawings or designated in writing by the Engineer or designated representative, the application rate of the glass traffic beads shall not be less than 6 pounds per gallon (0.7 kilograms per liter). Glass traffic beads shall be essentially free of sharp angular particles and particles showing milkiness or surface scarring or scratching. Glass traffic beads shall be water white in color.

2. The glass traffic beads shall meet the following graduation requirements when tested in accordance with TxDOT Test Method Tex-831-B:

US Sieve	SI Sieve	% weight (mass) retained
# 20	(850 μm)	3 to 10
# 30	(600 μm)	20 to 40
# 40	(425 μm)	30 to 50
# 50	(300 μm)	15 to 35
# 80	(180 μm)	0 to 10

3. Index of Refraction: The glass traffic beads, when tested by the liquid immersion method at 77°F (25°C), shall show an index of refraction within the range of 1.50 to 1.53.

4. Wetting: The glass traffic beads shall be capable of being readily wet with water, when tested according to TxDOT Test Method Tex-826-B.
5. Stability: The glass traffic beads shall show no tendency toward decomposition, surface etching, change in retroreflective characteristics or change in color after
 - (a) One-hour exposure to concentrated hydrochloric acid at 77°F (25°C),
 - (b) 24 hours exposure to weak acids, weak alkali, and
 - (c) 100 hours of weather-o-meter (Atlas, Sunshine Type) exposure, ASTM G-23, Method 1, Type EH.
6. Contaminants: Glass traffic beads shall:
 - (a) contain less than 1/4 of 1 percent moisture by weight (mass).
 - (b) free of trash, dirt, etc.
 - (c) show no evidence of objectionable static electricity when flowing through a regular traffic bead dispenser.
7. Sampling and Testing (TxDOT Test Method Tex-801-B) shall be in accordance with the latest applicable procedures included in the TxDOT Manual on Testing. Applicable test methods include but are not limited to the following:
 - Tex 806-B, "Method for Determining Grind and Oversize Pigment Particles"
 - Tex-810-B, "Test Method for Color and Color Stability of Opaque Colored Pigments"
 - Tex-811-B, "Skinning Characteristics of Coatings"
 - Tex-822-B, "Method for Determining Refractive Index of Glass Beads"
 - Tex-826-B, "Water Absorption Test of Beads"
 - Tex-828-B, "Determining Functional Characteristics of Pavement Markings"
 - Tex-830-B, "Method for Sampling Traffic Stripe Beads"
 - Tex-831-B, "Method for Determining The Gradation of Glass Traffic-Stripe Beads"
 - Tex-832-B, "Methods for Determining the Roundness of Glass Spheres"

B. Pavement Marking Paint

1. Functional Requirements

- (a) All paint-type materials that are applied at ambient or slightly elevated temperatures shall conform to TxDOT Departmental Materials Specifications DMS-8200, YPT 10 and/or WPT-10 and DMS-8290.
- (b) The paint shall be homogenous, well ground to a uniform and smooth consistency and shall not skin nor settle badly nor cake, liver, thicken, curdle or gel in the container.
- (c) The paint, when applied to a bituminous pavement surface under normal field conditions at the required rate of .015 inch (0.4 mm) wet film thickness, shall have a maximum "no pickup" drying time of 15 minutes to prevent displacement or discoloration under traffic.
- (d) In preparation of the paint, the pigments shall be dispersed in the vehicle by appropriate methods so that a fineness reading of not less than 4 is obtained with a Hegman grind gauge.

- (e) Consistency viscosity, measured with a Krebs-Modified-Stormer Viscometer at 77°F (25°C), shall be from 80-90 K.U (with water deleted).
- (f) A thin film of paint spread on a glass plate and allowed to dry thoroughly shall not darken or show any discoloration when subjected to ultraviolet rays for a period of 5 minutes.

2. Material Requirements

(a) Raw Materials

- (1) The exact brands and types of raw materials used in the wet standards are listed for the purpose of facilitating the selection of parallel materials that are equal, not only in quality and composition but also in physical and chemical behavior after aging in the finished product.
- (2) After proposed brand names and types of raw materials by the City of Austin, no substitution will be allowed during the manufacture without prior agreement with the City.
- (3) It shall be the responsibility of the Contractor to utilize materials that not only meet the individual raw material specification, but that also produce a coating that meets the specific formula requirements.
- (4) All materials required to meet TxDOT, Federal and ASTM specifications must meet the latest specification as indicated on the Drawings in effect on the date of the proposal or invitation to bid.

(b) Pigments

- (1) Titanium Dioxide:

Titanium Dioxide shall meet ASTM D-476, Type II requirements.

- (2) Yellow Pigment:

Yellow Pigment CI 65 (Reddish Yellow)	
Characteristic	Values
Specific Gravity	1.74 to 1.76
Oil Absorption	20 to 30 %
Moisture	0.5 % maximum
Pigment retained on #325 (45 µm) sieve	0.1 % maximum
C.I. Number	11740
Heat Stability	266°F (130°C)

In addition to the requirements identified above, evidence shall be provided that the infrared spectrum matches the standard spectrum on file with TxDOT's Construction Division, Materials Section (CSTM)

- (3) Calcium Carbonate: Calcium Carbonate shall conform to ASTM D-1199, Type GC, Grade I, with a minimum of 95% CaCO₃ and Type PC, with a minimum of 98% CaCO₃.
- (c) Acrylic Traffic Resins: The acrylic traffic resin shall be similar and equal to the standard sample submitted by the manufacturer. The resin shall be approved prior to the contract award for the proposed use of the pavement paint.

Acrylic Traffic Emulsion

Characteristic	Values
Solids Content	49.5 to 50.5
Viscosity, #2 Spindle, 60 rpm, 77°F (25°C), cps	250 maximum
pH	10.0 to 10.6
Film appearance, 3 mil (75 µm) dry	Smooth, clear, continuous

In addition to the requirements identified above, evidence shall be provided that the infrared spectrum matches the standard spectrum on file with TxDot's Construction Division, Materials Section (CSTM)

(d) Miscellaneous Materials: These materials shall be similar and equal to the standard sample submitted by the vendor. The specific materials shall be approved prior to the contract award for the proposed use of the pavement paint.

- 1) Dispersant
 - Byk 156
 - Tamol 850
 - Colloids 226/35
- 2) Surfactant
 - Triton X-405
 - Colloids CA-407
- 3) Defoamer
 - Foamaster 111
 - Drew 493
 - Colloids 654
- 4) Hydroxy Ethyl Cellulose
 - Natrosol 250 HBR
 - Bermocoll E431FQ
 - Cellosize QP - 30,000
- 5) Coalescent
 - Texanol
 - Exxate 1200
- 6) Preservative
 - Troysan
 - Dowicil 75
 - Nuosept 101
- 7) Methyl Alcohol
 - ASTM D-1152, 1.3320 maximum

(e) Standard Formulae:

The following tables represent the Standard Formulae to be followed by the manufacturer when manufacturing paint to be used by the Contractor on City of Austin paint striping contracts.

Formula: White Traffic Paint

WPT-11 - LEAD FREE WHITE TRAFFIC PAINT		
Component	Pounds	Kilograms
Acrylic Emulsion, 50% Solids, Fastrack 2706	540.	245.
Coalescent, Texanol	20.	9.1
Titanium Dioxide, Rutile, Type II, Tiona RCL-9	100.	45.4
Calcium Carbonate, Type PC, Mississippi M-60	150.	68.
Calcium Carbonate, Type GC, Hubercarb M-4	440.	199.6
Hydroxy Ethyl Cellulose, Natrosol 250 HBR (*)	0.5	0.2
Defoamer, Foamaster 111	5.	2.3
Dispersant, Colloids 226/35	9.	4.1
Surfactant, Triton X-405	2.	0.9
Methyl Alcohol	30.	13.6
Preservative, Troysan 192	2.	0.9
Water, Potable (**)	18.**	8.1**
TOTALS	1316.5	597.2

- (*) The Hydroxy Ethyl Cellulose amount may be varied up to two (2) pounds [0.9 kilograms].
- (**) Only 10 pounds (4.5 kilograms) shall be used in the actual manufacture of the pavement paint. The remaining 8 pounds (3.6 kilograms) shall be used as a drum float.

Formula: Yellow Traffic Paint

YPT-11 - LEAD FREE YELLOW TRAFFIC PAINT		
Component	Pounds	Kilograms
Acrylic Emulsion, 50% Solids, Fastrack 2706	540	245.
Coalescent, Texanol	20	9.1
C.I. Pigment Yellow 65, Sunglow Yellow 1244	30.	13.6
Titanium Dioxide, Rutile, Type II, Tiona RCL-9(***)	20.	9.1
Calcium Carbonate, Type PC, Mississippi M-60	150	68.
Calcium Carbonate, Type GC, Hubercarb M-4	450	204.1
Hydroxy Ethyl Cellulose, Natrosol 250 HBR (*)	0.5	0.2
Defoamer, Foamaster 111	5.	2.3
Dispersant, Colloids 226/35	9.	4.1
Surfactant, Triton X-405	2.	0.9
Methyl Alcohol	30.	13.6
Preservative, Troysan 192	2.	0.9
Water, Potable (**)	18.**	8.1**
TOTALS	1276.5	579.0

Additional Criteria for Pavement Paint

Item	Requirements
Grind Particles:	4 minimum, 8 maximum (TxDoT Test Method Tex-806-B)
Gallon Weight:	± 0.10 lbs. of theoretical gallon weight

(Liter mass:)	(± 0.012 kilograms of theoretical liter mass)
Consistency:	80 to 90 K.U.
PH:	a minimum of 9.6
Skinning:	No skinning within 48 hours (TxDoT Test Method Tex-811-B)

- (*) The Hydroxy Ethyl Cellulose amount may be varied up to two (2) pounds [0.9 kilograms]
- (**) Only 10 pounds (4.5 kilograms) shall be used in the actual manufacture of the pavement paint. The remaining 8 pounds (3.6 kilograms) shall be used as a drum float.
- (***) Titanium Dioxide, Rutile, Special, Hilox will be allowed as a substitute in the YPT-11 formula only.

(f) Container and Marking

- 1) Shipment: Shipment shall be made in suitable, strong, well-sealed containers that meet this specification, State of Texas, and federal requirements and are sufficiently sturdy to withstand normal shipping and handling.
- 2) Drum Package Requirements. The paint shall be provided in a new, serviceable, non-leaking, 55 gallon (209 liter) lined, steel drum meeting all applicable federal regulations. Drums are to be non-returnable with full removable heads, three (3) rolling hoops and 12 gauge locking rings with 5/8 inch (15.9 millimeter) locking nut bolt. The nominal metal thickness is to be 0.044 inch (1.1 mm). Each drum is to be equipped with a natural sponge-rubber cord, high-density gasket. The rubber shall be approximately 0.4375 inch (10.9 mm) thick. The gasket, when compressed, shall produce an airtight closure when the drum is sealed.

When a locking nut is used on drum rings, the locking nut shall be in a non-locking position while tightening the ring. After the ring is tight, the locking nut shall be secured in the locking position.

A seal shall be affixed to each drum in a manner that the contents of the drum cannot be adulterated without destroying the seal.
- 3) Bucket Packaging Requirements: Paint is to be furnished in new 5 gallon (19 liter) lined, 24 gauge steel, non-leaking buckets.
- 4) Filling Instructions: The paint drums will be filled at 54.5 gallons (206.4 liters) by weight (mass) with a water float of 0.53 gallons (2.0 liters).

The paint buckets will be filled at 4.95 gallons (18.75 liters) by weight (mass) with a water float of 0.05 gallons (0.18 liters).
- 5) Labeling: Finished paint product containers and cases shall be plainly and securely labeled with:
 - a) City of Austin
 - b) Name and designation of the product,
 - c) Requisition number,
 - d) Batch number,
 - e) Manufacturing date,
 - f) Gross weight, and
 - g) Manufacturer's name.

Labeling shall be prominently displayed on the sides of containers and cases and must be moisture resistant to withstand outdoor storage for a minimum of one year. When the finished product is palletized for

shipment, the labels shall be displayed on the outside for easy identification. Once the finished product has been labeled properly, the label shall not be modified or changed in any manner without specific approval from the City of Austin. (Note: The material manufacturer shall supply a Materials Safety Data Sheet to comply with OSHA's "Hazard Communication Standard 29 CFR § 1910.1200").

860S.4 Construction Methods

The Contractor shall use a crew, that is experienced in the work of installing pavement markings and in the necessary traffic control for such operations on the roadway surface, and shall supply all the equipment, personnel, traffic control and materials necessary for the placement of the pavement markings as indicated on the Drawings or directed by the Engineer or designated representative. All work shall conform to the current edition of the Texas Manual of Uniform Traffic Control Devices (TMUTCD), The City of Austin Transportation Criteria Manual, Standard Details 804S-3C and 804S-3D, and this standard specification item.

The pavement surface to receive the pavement markings shall be thoroughly cleaned of all dirt, organic growth or other material that will prevent adhesion of the paint to the roadway surface.

The pavement markings shall be placed in the proper alignment with guides established on the roadway. Deviation from the alignment established shall not exceed 2 inches (50 millimeters) and in addition, the deviation in alignment of the markings being placed shall not exceed 1 inch per 200 feet (25 millimeters per 30 meters) of roadway nor shall any deviation be abrupt.

When deemed necessary by the Engineer or designated representative, the Contractor, at his expense, shall place any additional pilot markings required to facilitate the placement of the permanent markings in the alignment specified. Any and all additional markings placed on the roadway for alignment purposes shall be temporary in nature and shall not establish a permanent marking on the roadway.

Materials used for pilot markings and equipment used to place such markings shall be approved by the Engineer or designated representative.

Paint markings on the roadway that are not in alignment or sequence as indicated shall be totally and completely removed by any effective method approved by the Engineer or designated representative, except that grinding will not be permitted.

Paint shall be applied at a rate of not less than 15 gallons nor more than 20 gallons per mile of solid 4 inch stripe (not less than 35 liters nor more than 45 liters per kilometer of solid 100-mm stripe). Application rate for solid 8-inch (200-mm) stripe shall be between 30 and 40 gallons per mile (between 70 and 90 liters per kilometer). (These rates yield wet film thickness from 15 to 20 mils [0.4 to 0.5 mm].)

Beads shall be applied to the paint markings at a uniform rate sufficient to achieve the retroreflective characteristics specified when observed conforming to TxDoT Test Method Tex-828-B. All markings placed shall have uniform and distinctive retroreflective characteristics.

Applied markings shall be protected from traffic until they have dried sufficiently so as not to be damaged or tracked by normal traffic movements.

860S.5 Equipment

Paint striping equipment used to place 4 inch (100 mm) solid or broken lines shall have the capability of placing a minimum of 60,000 linear feet (18 300 lineal meters) of marking per working day. Equipment used for placing markings in widths other than 4 inches (100 mm) shall have capabilities similar to 4 inch (100 mm) marking equipment and shall be capable of placing linear markings up to 8 inches (200 mm) in width in 1 pass.

The equipment shall be maintained in satisfactory operating condition. The equipment shall be equipped so that one 4-inch (100-mm) broken line and either 1 or 2 solid lines can be placed at the same time in alignment and spacing as indicated on the drawings. Four inch (100 mm) marking equipment will be considered as unsatisfactorily maintained if it fails to attain an average hourly placement rate of 7000 linear feet (2 100 linear meters) in any 5 consecutive working days of 7 hours or more.

The equipment shall be equipped with an automatic cutoff device (with manual operating capabilities) to provide clean, square marking ends and to provide a method of applying broken line in a stripe to gap ratio of 15 to 25. The length of the stripe shall not be less than 15 feet nor longer than 15.5 feet (less than 4.5 meters nor longer than 4.7 meters). The total length of the stripe-gap cycle shall not be less than 39.5 feet nor longer than 40.5 feet (less than 12 meters nor longer than 12.3 meters) in variance from one cycle to the next nor shall the average total length of a cycle for a road mile (1.6 kilometer) of broken line exceed 40.5 feet or be less than 39.5 feet (exceed 12.3 meters or be less than 12 meters).

The equipment shall be capable of placing lines of all widths with clean edges and of uniform cross section. Four-inch (100-mm) lines shall be 4 inches (100 mm) plus or minus 1/8 inch (3 mm). Eight inch (200 mm) lines shall be 8 inches (200 mm) minimum and 8 1/4 inches (210 mm) maximum in width.

The equipment shall be equipped with an outrigger or outriggers as required to place edge-lines as called for in the plans.

The equipment shall be equipped with traffic glass bead dispensers, 1 for each paint spray gun, placed on the equipment so that beads are applied to the paint almost instantly as the marking is being placed on the roadway surface. The traffic glass bead dispensers shall be designed and aligned so that the beads are applied uniformly to the entire surface of the marking. The traffic glass bead dispensers shall be equipped with automatic cutoff controls, synchronized with the cutoff of the marking equipment. Paint pots or tanks shall be equipped with an agitator that will keep the paint thoroughly mixed and may be either a pressurized or non-pressurized type.

860S.6 Measurement

Work for Pavement Marking Paint lines will be measured by the lineal foot (lineal meter: 1 meter equals 3.28 feet) of the various widths. Work for pavement marking, paint letter or figures will be measured by the square foot (square meter: 1 square meter equals 10.76 square feet).

860S.7 Payment

Work performed as prescribed by this item, measured as provided under "Measurement", shall be paid for at the unit bid price for "Pavement Marking Paint" per lineal foot or square foot of the various widths specified. This price shall include full compensation for furnishing

all labor, tools, equipment, materials and incidentals necessary to complete the work specified.

Payment will be made under one of the following:

- Pay Item No. 860S-A: Pavement Marking Paint, ____ In. Per Lineal Foot.
- Pay Item No. 860S-B: Pavement Marking Paint Per Square Foot.
- Pay Item No. 860S-C: Pavement Marking Paint (Reflectorized), __In. Per Lineal Foot.
- Pay Item No. 860S-D: Pavement Marking Paint (Reflectorized) Per Square Foot.

End

SPECIFIC CROSS REFERENCE MATERIALS
Specification Item 860S "Pavement Marking Paint (Reflectorized)"

Texas Department of Transportation: Manual of Testing Procedures

<u>Designation</u>	<u>Description</u>
Tex 801-B	Testing Coatings and Related Materials
Tex 806-B	Method for Determining Grind and Oversize Pigment Particles
Tex-810-B	Test Method for Color and Color Stability of Opaque Colored Pigments
Tex-811-B	Skinning Characteristics of Coatings
Tex-822-B	Method for Determining Refractive Index of Glass Beads
Tex-826-B	Water Absorption Test of Beads
Tex-828-B	Determining Functional Characteristics of Pavement Markings
Tex-830-B	Method for Sampling Traffic Stripe Beads
Tex-831-B	Method for Determining The Gradation of Glass Traffic-Stripe Beads
Tex-832-B	Methods for Determining the Roundness of Glass Spheres

Texas Department of Transportation: Departmental Materials Specifications

<u>Designation</u>	<u>Description</u>
DMS-8200	Pavement Paint
YPT-11 and/or WPT-11	Pavement Paint

American Society for Testing and Materials (ASTM)

<u>Designation</u>	<u>Description</u>
D 476	Specification for Titanium Dioxide Pigments
D 1152	Specification for Methanol (Methyl Alcohol) with Refractive Index
D 1199	Specification for Calcium Carbonate Pigments
G-23	Recommended Practice for Operating Light-and- Water-Exposure Apparatus (Carbon-Arc Type) for Exposure of Nonmetallic Materials

Federal Specifications - OSHA 29 CFR

<u>Designation</u>	<u>Description</u>
§ 1910.1200	Hazard Communication Standard."

City of Austin Standard Details

<u>Designation</u>	<u>Description</u>
804S-3C	Parking Stalls, Crosswalk, and Stop Bars
804S-3D	General Notes

City of Austin Transportation Criteria Manual

<u>Designation</u>	<u>Description</u>
Section 8	Traffic Control

SPECIFIC CROSS REFERENCE MATERIALS
Specification Item 860S "Pavement Marking Paint (Reflectorized)"

State of Texas Manual on Uniform Traffic Control Devices for Streets and Highways

<u>Designation</u>	<u>Description</u>
Part III	Markings
Part VI	Traffic Controls for Street and Highway Construction, Maintenance,

Part VI, Article D Utility and Incident Management Operations
 Part VI, Article F Markings
 Control of Traffic Through Work Areas

RELATED CROSS REFERENCE MATERIALS
Specification Item 860S "Pavement Marking Paint (Reflectorized)"

City of Austin Standard Specifications

<u>Designation</u>	<u>Description</u>
Item No. 863S	Reflectorized Pavement Markers
Item No. 864S	Abbreviated Pavement Markings
Item No. 865S	Non-Reflectorized Traffic Buttons
Item No. 866S	Jiggle Bar Tile
Item No. 867S	Epoxy Adhesive
Item No. 870S	Work Zone Pavement Markings
Item No. 871S	Reflectorized Pavement Markings
Item No. 872S	Prefabricated Pavement Markings
Item No. 873S	Raised Pavement Markers
Item No. 874S	Eliminating Existing Pavement Markings and Markers
Item No. 875S	Pavement Surface Preparation For Markings

Texas Department of Transportation: Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges

<u>Designation</u>	<u>Description</u>
Item No. 662	Work Zone Pavement Markings
Item No. 666	Reflectorized Pavement Markings
Item No. 667	Prefabricated Pavement Markings
Item No. 672	Raised Pavement Markers
Item No. 677	Eliminating Existing Pavement Markings and Markers
Item No. 678	Pavement Surface Preparation For Markings

Texas Department of Transportation: Manual of Testing Procedures

<u>Designation</u>	<u>Description</u>
Tex-829-B	Method For Measuring Pavement Temperature

American Society for Testing and Materials (ASTM)

<u>Designation</u>	<u>Description</u>
D-235	Specification for Mineral Spirits
D-362	Specification for Industrial Grade Toluene
D-600	Specification for Liquid Paint Driers
D-605	Specification for Magnesium Silicate Pigment (Talc)
D-740	Specification for Methyl Ethyl Ketone
D-1210	Test Method For Fineness Of Dispersion Of Pigment-Vehicle Systems

Item No. 872S
Prefabricated Pavement Markings

872S.1 Description

This item shall govern furnishing and placement of prefabricated pavement markings of the colors, types, shapes, and sizes indicated on the Drawings.

This specification is applicable for projects or work involving either inch-pound or SI units. Within the text inch-pound units are given preference followed by SI units shown within parentheses.

872S.2 Materials

Prefabricated pavement marking materials shall conform to TxDOT Departmental Materials Specification DMS-8240.

Materials shall be stored in weatherproof enclosure in such a manner to prevent damage.

872S.3 Sampling.

Sampling will be conducted in accordance with TxDOT Test Method Tex-732-I.

872S.4 Construction Methods

A. General.

When required by the Engineer, the Contractor and the Engineer or designated representative shall review the sequence of Work to be followed and the estimated progress schedule. Waste generated by this Work shall be removed from the job site before the end of each working day.

Guides to mark the lateral location of pavement markings shall be established as shown on the Drawings or as directed by the Engineer or designated representative. The Contractor shall establish the pavement marking guide and the Engineer or designated representative will verify the location of the guides prior to installation.

The pavement markings shall be placed in proper alignment with the guides. The deviation rate in alignment shall not exceed 1 inch per 200 feet {25 mm per 60 meters} of street. The maximum deviation shall not exceed 2 inches {50 millimeters} nor shall any deviation be abrupt.

B. Seasonal Limitation.

Unless otherwise directed in writing by the Engineer or designated representative, pavement-marking materials shall not be placed between September 30 and March 1, subject to temperature and moisture limitations specified.

C. Dimensions.

Markings shall be in accordance with the color, length, width, shape and configuration indicated on the Drawings. The alignment and location shall be as shown on the Drawings or as directed in writing by the Engineer or designated representative.

D. Methods.

All material placement shall be in accordance with the material manufacturer's instructions, unless otherwise directed in writing by the Engineer or designated representative. In addition to the manufacturer's instructions, material placement shall be in accordance with the surface condition, moisture and temperature requirements specified by this specification item.

E. Surface Preparation

Surface preparation shall be accomplished by any cleaning method approved by the Engineer or designated representative that effectively removes contaminants, loose materials and conditions deleterious to proper adhesion. Surface preparation by blast cleaning will not be required unless shown on the Drawings. When required, blast cleaning shall be done in accordance with 875S, "Pavement Surface Preparation for Markings". Surfaces shall be further prepared after cleaning by sealing or priming, as recommended by the manufacturer of the pavement marking material or as directed in writing by the Engineer or designated representative.

Adhesive, when required, shall be of the type and quality recommended by the manufacturer of the pavement marking material. Portland cement concrete pavement surfaces shall not be cleaned by grinding.

F. Moisture.

The pavement shall be completely dry before the material is applied. Pavements shall be considered dry if, on a sunny day after observation for 15 minutes, no condensation occurs on the underside of a 1 foot square (300-mm square) piece of clear plastic that has been placed on the pavement and weighted on the edges.

G. Temperature

The pavement and ambient air temperature requirements recommended by the material manufacturer shall be followed. If no temperature requirements are established by the material manufacturer, the material shall not be placed, if the pavement temperature is below 60°F (16°C) or above 120°F (49°C).

872S.5 Performance Requirements.

A. Adhesion.

Installed pavement markings shall not lift, shift, smear, spread, flow or tear by traffic action.

B. Appearance.

Pavement markings shall present a neat, uniform appearance, free of excessive adhesive, ragged edges and irregular or contours.

C. Visibility.

Installed pavement markings shall have uniform and distinctive retroreflectance when observed in accordance with TxDOT Test Method Tex-828-B.

D. Observation Period.

Unless otherwise shown on the Drawings, pavement markings shall meet all the requirements of this technical specification for a minimum of 15 calendar days after installation. Pavement markings that fail to meet all requirements of this specification shall be removed and replaced by the Contractor at its own expense. The Contractor shall replace all pavement markings failing the requirements of this technical specification within 30 calendar days following notification by the Engineer or designated representative of such failing. All replacement markings shall also meet all

requirements of this technical specification for a minimum of 15 calendar days after installation.

872S.6 Measurement

This Specification Item will be measured by the lineal foot (lineal meter) by each word(s), shape or symbol, or by any other unit as shown on the Drawings.

872S.7 Payment

The work performed and materials furnished in accordance with this Specification Item and measured as provided under "Measurement" will be paid for at the Unit bid price for "Prefabricated Pavement Markings" of the various types, colors, shapes and sizes specified. This price shall include full compensation for cleaning the pavement by any suitable means other than blast cleaning; for furnishing and placing all materials; and for all other labor, tools, equipment and incidentals necessary to complete the Work, except as described below.

Surface Preparation, when indicated on the Drawings, will be paid for under Specification Item 875S, "Pavement Surface Preparation for Markings."

Payment will be made under one or more of the following:

Pay Item 872S-A:	Prefabricated Pavement Markings ___inches in width, _____ in color	<u>Words.</u> per each.
Pay Item 872S-B:	Prefabricated Pavement Markings ___inches in width, _____ in color	<u>Shapes</u> per each.
Pay Item 872S-C:	Prefabricated Pavement Markings ___inches in width, _____ in color	<u>Symbols.</u> per each.

END

<i>SPECIFIC</i> CROSS REFERENCE MATERIALS	
Specification Item No. 872S, "Prefabricated Pavement Markings"	

City of Austin Contract Documents

<u>Designation</u>	<u>Description</u>
Section 00300U	Bid Form (Unit Prices)

City of Austin Standard Specifications

<u>Designation</u>	<u>Description</u>
Item No. 875S	Pavement Surface Preparation For Markings

Texas Department of Transportation: Departmental Materials Specifications

<u>Designation</u>	<u>Description</u>
DMS-8240	Prefabricated Marking Materials

Texas Department of Transportation: Manual of Testing Procedures

<u>Designation</u>	<u>Description</u>
Tex-732-I	Sampling of Prefabricated Pavement marking Materials
Tex-828-B	Determining Functional Characteristics of Pavement Markings

<i>RELATED</i> CROSS REFERENCE MATERIALS	
Specification Item No. 872S, "Prefabricated Pavement Markings"	

City of Austin Standard Specifications

<u>Designation</u>	<u>Description</u>
Item No. 301S	Asphalts, Oils and Emulsions
Item No. 302S	Aggregates for Surface Treatments
Item No. 310S	Emulsified Asphalt Treatment

Item No. 311S	Emulsified Asphalt Repaving
Item No. 312S	Seal Coat
Item No. 313S	Rubber Asphalt Joint and Crack Sealant
Item No. 315S	Milling Asphaltic Concrete Paving
Item No. 320S	Two Course Surface Treatment
Item No. 340S	Hot Mix Asphaltic Concrete Pavement
Item No. 341S	Paving Fabric
Item No. 350S	Heating, Scarifying and Repaving
Item No. 360	Concrete Pavement
Item No. 801S	Construction Detours
Item No. 803S	Barricades, Signs and Traffic Handling
Item No. 860S	Pavement Marking Paint (Reflectorized)
Item No. 863S	Reflectorized Pavement Markers
Item No. 864S	Abbreviated Pavement Markings
Item No. 865S	Non-Reflectorized Traffic Buttons
Item No. 866S	Jiggle Bar Tile
Item No. 867S	Epoxy Adhesive
Item No. 870S	Work Zone Pavement Markings
Item No. 871S	Reflectorized Pavement Markings
Item No. 873S	Raised Pavement Markers
Item No. 874S	Eliminating Existing Pavement Markings and Markers

City of Austin Standard Details

<u>Designation</u>	<u>Description</u>
863S-1	Pavement Buttons (Reflectorized-Type I & Type II)
865S-1	Traffic Buttons (Non-Reflectorized)

Texas Department of Transportation: Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges

<u>Designation</u>	<u>Description</u>
Item No. 302	Aggregates for Surface Treatments
Item No. 314	Emulsified Asphalt Treatment
Item No. 315	Emulsified Asphalt Seal

<u>RELATED CROSS REFERENCE MATERIALS - Continued</u>
Specification Item No. 872S, "Prefabricated Pavement Markings"

Texas Department of Transportation: Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges

<u>Designation</u>	<u>Description</u>
Item No. 316	Surface Treatments
Item No. 334	Hot Mix-Cold Laid Asphaltic Concrete Pavement
Item No. 340	Hot Mix Asphaltic Concrete Pavement
Item No. 342	Plant Mix Seal
Item No. 351	Repairing Existing Flexible Pavement Structure
Item No. 354	Planing and/or Texturing Pavement
Item No. 358	Asphaltic Concrete Surface Rehabilitation
Item No. 360	Concrete Pavement
Item No. 421	Hydraulic Cement Concrete
Item No. 427	Surface Finishes for Concrete
Item No. 428	Concrete Surface Treatment
Item No. 662	Work Zone Pavement Markings
Item No. 666	Reflectorized Pavement Markings
Item No. 667	Prefabricated Pavement Markings
Item No. 672	Raised Pavement Markers
Item No. 677	Eliminating Existing Pavement Markings and Markers
Item No. 678	Pavement Surface Preparation For Markings

Texas Department of Transportation: Manual of Testing Procedures

<u>Designation</u>	<u>Description</u>
Tex 729-I	Sampling of Traffic Markers
Tex-829-B	Method For Measuring Pavement Temperature
Tex-854-B	Evaluation Of Thermoplastic Striping For Uniformity And Thickness
Texas Department of Transportation: <u>Departmental Materials Specifications</u>	
<u>Designation</u>	<u>Description</u>
DMS-4100	Jiggle Bar Tile
DMS-4200	Pavement Markers (Reflectorized)
DMS-4300	Traffic Buttons
DMS-4210	Pavement Markers
DMS-6130	Bituminous Adhesive
DMS-8200	Pavement Paint
DMS-8220	Thermoplastic marking material
DMS-8241	Removable Tape
DMS-8290	Pavement Paint
YPT-10 and/or WPT-10	Pavement Paint

**Item No. 874S
Eliminating Existing Pavement
Markings and Markers**

874S.1 Description

This item shall govern the elimination of existing pavement markings of various types and sizes, and pavement markers as shown on the Drawings or as directed, in writing, by the Engineer or designated representative.

874S.2 Materials

All surface treatment material application rates shall be as directed by the Engineer or designated representative. Unless otherwise shown on the Drawings, surface treatment materials shall conform to the requirements of Specification Item 301S, "Asphalts, Oils and Emulsions", and Specification Item 302S, "Aggregates for Surface Treatment". Testing of surface treatment materials may be waived by the Engineer or designated representative. Asphalt and aggregate types and grades shall be as shown on the Drawings or as approved by the Engineer or designated representative.

874S.3 Construction Methods

Elimination of existing pavement markings and markers shall be accomplished by one or more of the following methods as approved by the Engineer or designated representative.

A. Markings on Asphaltic Surfaces.

1. Placement of a surface treatment a minimum of two (2) feet {600 mm} wide to cover the existing marking.
2. Placement of a surface treatment, thin overlay or microsurfacing a minimum of one (1) lane in width in areas where directional changes of traffic are involved or other areas as directed by the Engineer or designated representative. Construction methods for surface treatments shall conform to Specification Item 320S, "Two Course Surface Treatment".

B. Markings on Concrete Surfaces.

Removal by an approved burning method.

C. Markings on Asphaltic or Concrete Surfaces.

Removal by water, water-sand blasting techniques or any other method(s) proven satisfactory to the Engineer.

D. Markers on Asphaltic or Concrete Surfaces.

Removal by any mechanical method to remove marker and adhesive.

Existing pavement markings and markers on both concrete and asphaltic surfaces shall be removed in such a manner that color and/or texture contrast of the pavement surface will be held to a minimum.

Removal of pavement markings on concrete surfaces by blast cleaning shall be accomplished in accordance with Specification Item 875S, "Pavement Surface Preparation for Markings", except for measurement and payment. Blast cleaning shall be performed in such a manner that damage to the Portland cement concrete surface is held to a minimum.

When thermoplastic pavement markings or prefabricated pavement markings are encountered, the application of heat may be used to remove the bulk of the marking material prior to blast cleaning. When heat is used, care shall be taken to prevent spalling of Portland cement concrete surfaces.

A burner may be used for complete removal of pavement markings. Broom removal or light blast cleaning may be used for removal of minor residue.

Damage to asphaltic surfaces, such as spalling, shelling, etc., that is greater than ¼ inch (6 mm) in depth and is caused by the removal of pavement markers shall be repaired by the application of a two (2) foot (600 mm) wide surface treatment for longitudinal markers with no directional change or a minimum of one (1) lane width surface treatment in areas where directional changes of traffic are involved.

Grinding is not an acceptable method of marker or marking removal. However, equipment utilizing special milling flails is considered acceptable in the removal of markings and markers on asphalt and Portland cement concrete surfaces.

874S.4 Measurement

This Specification Item will be measured by the square yard (square meter: 1 square meter is equal to 1.196 square yards) of surface treatment, thin overlay or microsurfacing (full lane width) placed; by each word, symbol or shape eliminated; by the lineal foot (lineal meter: 1 lineal meter is equal to 3.281 lineal feet) of markings eliminated; or by any other unit as shown on the Drawings.

Payment for revised quantities will be paid for at the unit price bid for that bid item.

The elimination of pavement markers required in conjunction with the elimination of longitudinal markings will not be measured for payment.

874S.5 Payment

The work performed and materials furnished in accordance with this Specification Item and measured as provided under "Measurement" will be paid for at the unit bid price for "Eliminating Existing Pavement Markings and Markers" of the various types specified. This price shall include full compensation for blast cleaning, mechanical cleaning and/or other cleaning methods; for all materials, tools, equipment and incidentals necessary to complete the Work, except as specified below.

Item No. 413S	Cleaning and/or Sealing Joints and Cracks (Portland Cement Concrete)
Item No. 801S	Construction Detours
Item No. 803S	Barricades, Signs and Traffic Handling
Item No. 860S	Pavement Marking Paint (Reflectorized)
Item No. 863S	Reflectorized Pavement Markers
Item No. 864S	Abbreviated Pavement Markings
Item No. 865S	Non-Reflectorized Traffic Buttons
Item No. 866S	Jiggle Bar Tile
Item No. 867S	Epoxy Adhesive
Item No. 870S	Work Zone Pavement Markings
Item No. 871S	Reflectorized Pavement Markers
Item No. 872S	Prefabricated Pavement Markings
Item No. 873S	Raised Pavement Markings

City of Austin Standard Details

<u>Designation</u>	<u>Description</u>
863S-1	Pavement Buttons (Reflectorized-Type I & Type II)
865S-1	Traffic Buttons (Non-Reflectorized)

Texas Department of Transportation: Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges

<u>Designation</u>	<u>Description</u>
Item No. 302	Aggregates for Surface Treatments
Item No. 314	Emulsified Asphalt Treatment
Item No. 315	Emulsified Asphalt Seal
Item No. 316	Surface Treatments
Item No. 334	Hot Mix-Cold Laid Asphaltic Concrete Pavement
Item No. 340	Hot Mix Asphaltic Concrete Pavement
Item No. 342	Plant Mix Seal
Item No. 351	Repairing Existing Flexible Pavement Structure
Item No. 354	Planing and/or Texturing Pavement
Item No. 358	Asphaltic Concrete Surface Rehabilitation
Item No. 360	Concrete Pavement
Item No. 421	Hydraulic Cement Concrete
Item No. 427	Surface Finishes for Concrete
Item No. 428	Concrete Surface Treatment
Item No. 662	Work Zone Pavement Markings
Item No. 666	Reflectorized Pavement Markings
Item No. 667	Prefabricated Pavement Markings
Item No. 672	Raised Pavement Markers
Item No. 677	Eliminating Existing Pavement Markings and Markers
Item No. 678	Pavement Surface Preparation For Markings

RELATED CROSS REFERENCE MATERIALS - Continued

Specification Item No. 874S, "Eliminating Existing Pavement Markings And Markers"

Texas Department of Transportation: Manual of Testing Procedures

<u>Designation</u>	<u>Description</u>
Tex 729-I	Sampling of Traffic Markers
Tex-828-B	Determining Functional Characteristics of Pavement Markings
Tex-829-B	Method For Measuring Pavement Temperature
Tex-854-B	Evaluation Of Thermoplastic Striping For Uniformity And Thickness

Texas Department of Transportation: Departmental Materials Specification

874S 04/03/09

<u>Designation</u>	<u>Description</u>
DMS-4100	Jiggle Bar Tile
DMS-4200	Pavement Markers (Reflectorized)
DMS-4300	Traffic Buttons
DMS-4210	Pavement Markers
DMS-6130	Bituminous Adhesive
DMS-8200	Pavement Paint
DMS-8220	Thermoplastic marking material
DMS-8240	Prefabricated Marking Materials
DMS-8241	Removable Tape
DMS-8290	Pavement Paint
YPT-10 and/or WPT-10	Pavement Paint

**Item No. 875S
Pavement Surface Preparation For Markings**

875S.1 Description

This item shall govern the surface preparation of pavement surface areas prior to placement of pavement markings or raised pavement markers.

This specification is applicable for projects or work involving either inch-pound or SI units. Within the text the inch-pound units are given preference followed by SI units shown within parentheses.

875S.2 Materials

Abrasive blasting medium, when used, shall be a quality commercial product capable of producing the specified surface cleanliness without the deposition of deleterious materials on the cleaned surface. Water used in blasting operations shall be potable.

875S.3 Equipment

Equipment shall be maintained in good condition. Air compression equipment shall utilize moisture and oil traps, in working order, of sufficient capacity to remove contaminants from blasting air and prevent the deposition of moisture, oil or other contaminants on the street surface.

875S.4 Construction Methods

Widths, lengths and shapes of the prepared surfaces shall be of sufficient size to include the full area of pavement markings or raised pavement markers shown on the Drawings.

Surface preparation of Portland cement concrete surfaces shall be sufficient to remove contaminants. Damage to the street due to over-blasting shall be held to a minimum. Asphaltic surfaces shall be cleaned by brushing, washing, compressed air, high pressure water or any combination thereof to remove all forms of contamination and loose materials. All other surfaces to be cleaned by blast cleaning shall be cleaned sufficiently to remove loose and flaking materials from the street surface.

When existing markings are encountered, they shall be cleaned sufficiently to remove all loose and flaking materials. Small spots of old markings or contaminants of up to 0.5 square inch (320 mm²) in area may remain if the contaminant is not removed by the following test:

Firmly press a 10 inch (250 mm) long, two-inch (50 mm) wide strip of monofilament tape onto the surface to be tested, leaving approximately 2 inches {50 mm} free. Grasp the free end and remove the tape with a sharp pull.

Blasting pressure and technique shall be controlled to prevent damage to the pavement surface. Portland cement concrete surfaces shall not be cleaned by grinding.

875S.5 Measurement

This Specification Item will be measured by the lineal foot (lineal meter: 1 lineal meter is equal to 3.281 lineal feet) of the various widths, by each of the various words, symbols or shapes, or by any other unit as shown on the Drawings.

Payment for revised quantities will be paid for at the unit price bid for that bid item.

875S.6 Payment

The work performed and materials furnished in accordance with this Specification Item and measured as provided under "Measurement" will be paid for at the unit bid price for "Pavement Surface Preparation for Markings" of the various types specified. This price shall include full compensation for all materials, tools, equipment, labor and incidentals necessary to complete the Work.

Payment shall be made by one or more of the following:

- Pay Item 875S-A:** Pavement Surface Preparation for existing pavement surface
 ___ inches in width, for ___ Surface Type per lineal foot
- Pay Item 875S-B:** Pavement Surface Preparation for existing Words
 ___ inches in width, for ___ Surface Type per each
- Pay Item 875S-C:** Pavement Surface Preparation for existing Shapes
 ___ inches in width, for ___ Surface Type per each
- Pay Item 875S-D:** Pavement Surface Preparation for existing Symbols
 ___ inches in width, for ___ Surface Type per each

END

SPECIFIC CROSS REFERENCE MATERIALS	
Specification Item No. 874S, "Eliminating Existing Pavement Markings And Markers"	

City of Austin Contract Documents

<u>Designation</u>	<u>Description</u>
Section 00300U	Bid Form (Unit Prices)

RELATED CROSS REFERENCE MATERIALS	
Specification Item No. 875S, "Pavement Surface Preparation For Markings"	

City of Austin Technical Specifications

<u>Designation</u>	<u>Description</u>
Item No. 301S	Asphalts, Oils and Emulsions
Item No. 302S	Aggregates for Surface Treatments
Item No. 310S	Emulsified Asphalt Treatment
Item No. 311S	Emulsified Asphalt Repaving
Item No. 312S	Seal Coat
Item No. 313S	Rubber Asphalt Joint and Crack Sealant
Item No. 315S	Milling Asphaltic Concrete Paving
Item No. 320S	Two Course Surface Treatment
Item No. 340S	Hot Mix Asphaltic Concrete Pavement

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Item No. 341S	Paving Fabric
Item No. 350S	Heating, Scarifying and Repaving
Item No. 360	Concrete Pavement
Item No. 801S	Construction Detours
Item No. 803S	Barricades, Signs and Traffic Handling
Item No. 860S	Pavement Marking Paint (Reflectorized)
Item No. 863S	Reflectorized Pavement Markers
Item No. 864S	Abbreviated Pavement Markings
Item No. 865S	Non-Reflectorized Traffic Buttons
Item No. 866S	Jiggle Bar Tile
Item No. 867S	Epoxy Adhesive
Item No. 870S	Work Zone Pavement Markings
Item No. 871S	Reflectorized Pavement Markers
Item No. 872S	Prefabricated Pavement Markings
Item No. 873S	Raised Pavement Markings
Item No. 874S	Eliminating Existing Pavement Markings and Markers

City of Austin Standard Details

<u>Designation</u>	<u>Description</u>
863S-1	Pavement Buttons (Reflectorized-Type I & Type II)
865S-1	Traffic Buttons (Non-Reflectorized)

Texas Department of Transportation: Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges

<u>Designation</u>	<u>Description</u>
Item No. 302	Aggregates for Surface Treatments
Item No. 314	Emulsified Asphalt Treatment
Item No. 315	Emulsified Asphalt Seal
Item No. 316	Surface Treatments

RELATED CROSS REFERENCE MATERIALS (Continued)
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Specification Item No. 875S, "Pavement Surface Preparation For Markings"
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Texas Department of Transportation: Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges (Continued)

<u>Designation</u>	<u>Description</u>
Item No. 334	Hot Mix-Cold Laid Asphaltic Concrete Pavement
Item No. 340	Hot Mix Asphaltic Concrete Pavement
Item No. 342	Plant Mix Seal
Item No. 351	Repairing Existing Flexible Pavement Structure
Item No. 354	Planing and/or Texturing Pavement
Item No. 358	Asphaltic Concrete Surface Rehabilitation
Item No. 360	Concrete Pavement
Item No. 421	Hydraulic Cement Concrete
Item No. 427	Surface Finishes for Concrete
Item No. 428	Concrete Surface Treatment
Item No. 662	Work Zone Pavement Markings
Item No. 666	Reflectorized Pavement Markings
Item No. 667	Prefabricated Pavement Markings
Item No. 672	Raised Pavement Markers

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Item No. 677 Eliminating Existing Pavement Markings and Markers
 Item No. 678 Pavement Surface Preparation For Markings

Texas Department of Transportation: Manual of Testing Procedures

<u>Designation</u>	<u>Description</u>
Tex 729-I	Sampling of Traffic Markers
Tex-828-B	Determining Functional Characteristics of Pavement Markings
Tex-829-B	Method For Measuring Pavement Temperature
Tex-854-B	Evaluation Of Thermoplastic Striping For Uniformity And Thickness

Texas Department of Transportation: Departmental Materials Specification

<u>Designation</u>	<u>Description</u>
DMS-4100	Jiggle Bar Tile
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DMS-6130	Bituminous Adhesive
DMS-8200	Pavement Paint
DMS-8220	Thermoplastic marking material
DMS-8240	Prefabricated Marking Materials
DMS-8241	Removable Tape
DMS-8290	Pavement Paint
YPT-10 and/or WPT-10	Pavement Paint