SECTION 02891 TRAFFIC CONTROL SIGNS

PART 1 - SCOPE

1.01 Traffic control signs include all regulatory, warning, and guidance signs designed to convey a message to users of the streets and highways. The work covered by this Specification Section shall consist of the construction of foundations and supports and the fabrication, furnishing, assembly, and erection of traffic control signs on the supports.

PART 2 - MATERIALS AND EQUIPMENT

2.01 GENERAL REQUIREMENTS

A. Traffic control and traffic information signs shall be constructed and erected in accordance with these Specifications and at such locations and in conformity with the lines and grades indicated on the Plans or as otherwise directed by the Owner.

B. All signs shall be of the size, dimensions, shape, and legend as indicated on the Plans and/or as shown in the Tennessee Department of Transportation Manual on Uniform Traffic Control Devices, Current Edition (MUTCD). All materials and construction of traffic control signs furnished, fabricated, and/or installed under these Specifications shall be certified and/or guaranteed to the City by the Contractor according to the requirements of Specification Section 00710 Article 18.

2.02 SIGNS

A. All signs shall be fabricated from flat aluminum sheets meeting the requirements of these Specifications and covered with the reflective sheeting material specified herein, unless otherwise specified. Sign message color and dimensions shall conform to the requirements of the MUTCD. Sign legends shall be screened with process inks compatible with the Reflective Sheeting.

B. All colors for signs, when thoroughly dry, shall match the Standard Interstate Colors (AASHTO Manual) when compared in natural daylight. Black paint for nonreflectorized message application shall be high quality opaque process paste made with synthetic resin as manufactured or recommended by the manufacturer of the reflective sheeting. Transparent blue, red, and green paint and thinner for the application on the silver reflective sheeting for signs and reflectorized backgrounds shall be as recommended by the manufacturer of the reflective sheeting.

C. Flat Sheet Aluminum For Signs. All traffic control signs shall be fabricated of a single piece of flat sheet 0.080 gauge aluminum meeting the requirements of ASTM B 209 without joints and without supporting frame, unless otherwise specified. The aluminum sign blanks shall be of Alloy 6061-T6 or as specified, vapor degreased and etched or treated with Alodine 1200, Iridite 14-2, Bonderite 721, or equal product in strict accordance with the recommendations of the manufacturer of the chemical used. All corner radii shall be cut and holes shall be punched as required by the MUTCD.

D. Extruded Aluminum Sign Blades. All street name signs shall be fabricated from extruded aluminum meeting the requirements of ASTM B 221, Alloy 6061-T6, 0.250 bulk, 0.091 web, vapor degreased and etched or treated with Alodine 1200, Iridite 14-2, Bonderite 721, or equal product, in strict accordance with the recommendations of the manufacturer of the chemical.

E. Hardware. All bolts, nuts, washers, and other hardware shall conform to the requirements of the following specifications:

1. Aluminum

a. Bolts.
Bolts shall meet the requirements of ASTM B 211, Alloy 2024-T4. Chromated sealed anodic coating at least 0.0002 inch thick shall be applied to all finished bolts

b. Nuts.
Nuts shall meet the requirements of ASTM B 211, Alloy 6262-T9 for 5/16 inch and larger, and Alloy 2024-T4 for ¼ inch and under, tamper proof type.

c. Washers.
Washers shall meet the requirements of ASTM B 209, Alloy Alclad 2024-T4.

d. Caps, Clamps, Clips, Brackets, and Other Hardware.
Caps, clamps, clips, brackets, and other hardware shall meet the requirements of the following specifications: ASTM B 308, Alloy 6061-T6 for structural shapes; ASTM B 221, Alloy 6063-T6 for extruded shapes; and ASTM B 26, Alloy SG-70A-F for cast shapes.

2. Steel.

a. Bolts, Nuts, and Washers.
Bolts, nuts, and washers shall be cadmium plated meeting the requirements of ASTM A 307.

b. Other Hardware.
Other hardware shall meet the requirements of ASTM A 36, galvanized in accordance with ASTM A 123, for structural shapes and plates and ASTM A 27, galvanized in accordance with ASTM 123, for cast shapes.

3. Stainless Steel.

a. Bolts and Washers.
Bolts and washers shall meet the requirements of ASTM A 193, Austenitic Steel.

b. Nuts.
Nuts shall meet the requirements of ASTM A 194, Grade 8F, except that the nuts shall be lock nuts with semi-finished hex nuts equivalent to American Standard Heavy Series.

F. Reflective Sheeting Materials. Sign face materials shall be of Reflective Sheeting Material (Glass Bead Retroreflective Element Material) conforming to the following requirements unless otherwise specified.

1. Description.

a. Reflective sheeting shall consist of a Retroreflective lens system having a smoother outer surface. When adhesive backing is used the sheeting shall have a precoated adhesive on the backside protected by an easily removable liner. Types I – IV refer to levels of performance in terms of reflective intensity. Type III Reflective Sheeting Material with Class 2 adhesive backing shall be used unless otherwise specified.

2. Color Requirements.

a. The colors specified shall be matched visually and shall by within the color tolerance limits shown on the appropriate Highway Color Tolerance Charts issued by the Federal Highway Administration utilizing the instruction thereon. Certification as to conformance with this requirement shall be provided by the Contractor.

(or)

b. Through instrumental color testing the diffuse day color of the reflective material shall conform to the requirements of Table I or II and shall be determined in accordance with ASTM E 97, “Standard Method of Test for 45 Degree, 0 Degree Directional Reflectance of

Opaque Specimens by Filter Photometry." (Geometric characteristics must be confined to illumination within 10 degrees of, and centered about, a direction of 45 degrees from the perpendicular to the test surface; viewing is within 15 degrees of , and centered about, the perpendicular to the test surface. Condition of illumination and observation must not be interchanged.) The standards to be used for reference shall be the MUNSELL PAPERS designated in Tables 02891-1 and 02891-2. The papers must be recently calibrated on a spectrophotometer. The test instrument shall be one of the following or approved equal:

(1) GARDNER Multipurpose Reflectometer or Model XL20 Color Difference Meter.

(2) GARDNER Model AC-2a Color Difference Meter or Model XL30 Color Difference Meters.

(3) MEECO Model V Colormaster.

(4) HUNTERLAB D25 Color Difference Meter.

TABLE 02891-1
Color Specification Limits and Reference Standards
Types I and II Sheeting

	Chromaticity Coordinates* (Corner Points)								Reflectance Limits			
	1		2		3		4		(% Y) Y		Ref Std***	
Color	x	y	x	y	x	y	x	y	Min	Max	(Munsell Papers)	
White**	.305	.290	.350	.342	.321	.361	.276	.308	35	--	6.3GY	6.77/0.8
Red	.602	.317	.664	.336	.644	.356	.575	.356	8	12	8.2R	3.78/14.0
Orange	.535	.375	.607	.393	.582	.417	.535	.399	18	30	2.5YR	5.5/14.0
Brown	.445	.353	.604	.396	.556	.443	.445	.386	4	9	5.0YR	3/6
Yellow	.482	.450	.532	.465	.505	.494	.475	.485	29	45	1.25Y	6/12
Green	.107	.439	.155	.460	.130	.369	.180	.391	3.5	9	0.65BG	2.84/8.45
Blue	.147	.075	.176	.091	.176	.151	.106	.113	1	4	5.8PB	1.32/6.8

* The four pairs of chromaticity coordinates determine the acceptable color in terms of the CIE 1931 standard colorimetric system measured with standard illumination source C.
**Silver white is an acceptable color designation.
***Available from Munsell Color Co., 2441 Calvert St., Baltimore, MD 21218

TABLE 02891-2
Color Specification Limits and Reference Standards
Types III and IV Sheeting

	Chromaticity Coordinates* (Corner Points)								Reflectance Limits			
	1		2		3		4		(% Y) Y		Ref Std***	
Color	x	y	x	y	x	y	x	y	Min	Max	(Munsell Papers)	
White**	.303	.287	.368	.353	.340	.380	.274	.316	27	--	5.0PB	7/1
Red	.613	.297	.708	.292	.636	.364	.558	.352	2.5	11	7.5R	3/12
Orange	.550	.360	.630	.370	.581	.418	.516	.394	14	30	2.5YR	5.5/14.0
Yellow	.498	.412	.557	.442	.479	.520	.538	.472	15	40	1.25Y	6/12
Green	.030	.380	.166	.346	.286	.428	.201	.776	3	8	10G	3/8
Blue	.144	.030	.244	.202	.190	.247	.066	.208	1	10	5.8PB	1.32/8.8

* The four pairs of chromaticity coordinates determine the acceptable color in terms of the CIE 1931 standard colorimetric system measured with standard illumination source C.
**Silver white is an acceptable color designation.
***Available from Munsell Color Co., 2441 Calvert St., Baltimore, MD 21218

3. Reflective Intensity. The reflective sheeting shall have minimum Specific Intensity per unit area (SIA) as shown in Tables 02891-3 through 02891-6 expressed as "candelas per footcandle per square foot" ($(Cd\ 1c^{-1})\ ft.^{-2}$). Measurement of SIA shall be conducted in accordance with the method detailed in Section 718, Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects (Federal Highway Specifications).

TABLE 02891-3
Minimum Specific Intensity Per Unit area (SIA)
(Candelas Per Footcandle Per Square Foot)
Type I Sheeting

Observation Angle(*)	Entrance Angle(*)	White	Red	Orange	Brown	Yellow	Green	Blue
0.2	-4	50	10	13.0	1.0	25	5	3.8
0.2	+30	12	3	4.0	0.3	7	2	1.0
0.5	-4	15	15	6.5	0.3	10	3	2.0
0.5	+30	6	1	2.5	0.2	3	1	0.8

TABLE 02891-4
Minimum Specific Intensity Per Unit area (SIA)
(Candelas Per Footcandle Per Square Foot)
Type II Sheeting

Observation Angle(*)	Entrance Angle(*)	White	Red	Orange	Brown	Yellow	Green	Blue
0.2	-4	70	14.5	25.0	1.0	50	9.0	4.0
0.2	+30	30	6.0	7.0	0.3	22	3.5	1.75
0.5	-4	30	7.5	13.5	0.3	25	4.5	2.0
0.5	+30	15	3.0	4.0	0.2	13	2.2	0.8

TABLE 02891-5
Minimum Specific Intensity Per Unit area (SIA)
(Candelas Per Footcandle Per Square Foot)
Type III Sheeting
A – Glass Bead Retroreflective Element Material

Observation Angle(*)	Entrance Angle(*)	White	Red	Orange	Yellow	Green	Blue
0.2	-4	250	45	100	170	45	20.0
0.2	+30	150	25	60	100	25	11.0
0.5	-4	95	15	30	82	15	7.5
0.5	+30	65	10	25	45	10	5.0

B – Prismatic Retroreflective Element Material

Observation Angle(*)	Entrance Angle(*)	White	Red	Orange	Yellow	Green	Blue
0.2	-4	250	45.0	100	170	45.0	20.0
0.2	+30	95	13.3	26	64	11.4	7.6
0.5	-4	200	28.0	56	136	24.0	18.0
0.5	+30	65	10	25	45	10	5.0

TABLE 02891-6
Minimum Specific Intensity Per Unit area (SIA)
(Candelas Per Footcandle Per Square Foot)
Type IV Sheeting

Observation Angle(*)	Entrance Angle(*)	White	Red	Orange	Yellow	Green	Blue
0.2	-4	250	35.0	70	170	30.0	20.0
0.2	+30	95	13.3	26	64	11.4	7.6
0.5	-4	200	28.0	56	136	24.0	18.0
0.5	+30	60	8.4	17	40	7.2	4.8

*Test samples are to be mounted in accordance with manufacturer's recommendation.

4. Specular Gloss. The reflective sheeting shall have an 85 degree specular gloss of not less than 40 for Types I and II, and not less than 50 for III and IV, when tested in accordance with ASTM D 523.

5. Color Processing. The sheeting shall permit cutting and color processing with compatible transparent and opaque process inks in accordance with the Manufacturer's recommendation at temperatures of 60^0 F to 100^0 F and relative humidity at 20 to 80 percent. The sheeting shall be heat resistant and permit force curing without staining of applied or unapplied sheeting at temperatures as recommended by the manufacturer. Color processing for Type III material shall be restricted to sheeting with heat activated adhesive backing unless otherwise recommended by the manufacturer.

6. Shrinkage. A 9 inch by 9 inch reflective sheeting specimen with liner shall be conditioned a minimum of 1 hour at 72^0 F and 50 percent relative humidity. The liner shall be removed and the specimen placed on a flat surface with the adhesive side up. Ten minutes after liner is removed and again after 24 hours, the specimen shall be measured to determine the amount of dimensional change. The reflective sheeting shall not shrink in any dimension more than 1/32 inch in 10 minutes nor more than 1/8 inch in 24 hours.

7. Flexibility.

a. Types I and II Sheeting Material applied according to the manufacturer's recommendations to a clean, etched 0.020 inch by 2 inch by 8 inch aluminum panel of alloy 6061-T6 conditioned a minimum of 48 hours and tested at 72^0F and 50 percent relative humidity shall be sufficiently flexible to show no cracking when bent around a ¾ inch mandrel.

b. Types III and IV sheeting material, with the liner removed and conditioned for 24 hours at 72^0F and 50 percent relative humidity, shall be sufficiently flexible to show no cracking when

slowly bent, in one second's time, around a 1/8 inch mandrel with adhesive contacting the mandrel. NOTE: For ease of testing, spread talcum powder on adhesive to prevent sticking to the mandrel.

c. Non-adhesive sheetings shall show no signs of cracking or crazing when flexed repeatedly over a 1/16 inch mandrel to 180^0 at 72^0F.

8. Adhesive.

a. The reflective sheeting shall include a precoated pressure sensitive adhesive backing (Class 1) or a tack free heat activated adhesive backing (Class 2) either of which may be applied without necessity of additional adhesive coats on either the reflective sheeting or application surface. The Class 1 adhesive shall be a pressure sensitive adhesive of the aggressive tack type requiring no heat solvent or other preparation for adhesion to smooth clean surfaces. The Class 2 adhesive backing shall be a tack free adhesive activated by applying heat in excess of 175^0F to the material as in the heat vacuum process of sign fabrication.

b. The protective liner attached to the adhesive shall be removed by peeling without soaking in water or other solvents without breaking, tearing, or removing any adhesive from the backing. The protective liner shall be easily removed following accelerated storage for 4 hours at 160^0F under a weight of 2.5 pounds per square inch.

c. The adhesive backing of the reflective sheeting shall produce a bond to support a 1 ¾ pound weight for 5 minutes, without the bond peeling for a distance of more than 2.0 inches when applied to a smooth aluminum surface and tested as specified in Section 718, Federal Highway Specifications.

9. Impact Resistance. Types I, II, III, and IV reflective sheeting material, applied according to the manufacturer's recommendations to a cleaned, etched aluminum panel of alloy 6061-T6, 0.04inches by 3.0 inches by 5.0 inches and conditioned for 24 hours at 72^0F and 50 percent relative humidity shall show no cracking when the face of the panel is subjected to an impact of a 2.0 pound weight with a 5/8 inch rounded tip dropped from a 10 inch pound setting on a Gardner Variable Impact Tester, IG-1120.

10. Accelerated Weathering. When applied in accordance with recommended procedures, the reflective material shall be weather resistant and, following cleaning in accordance with manufacturer's recommendations, shall show no appreciable discoloration, cracking, blistering or dimensional change. Following exposure, the panels shall be washed with a 5% HCL solution for 45 seconds, rinsed thoroughly with clean water, blotted with a soft clean cloth, brought to equilibrium at standard conditions and tested. It shall have not less than the percent of the minimum SIA specified in Table 02891-7 when subjected to an accelerated weathering test of the specified duration in accordance with ASTM G 23, Type E or EH Weatherometer with the humidifier off.

TABLE 02891-7
MINIMUM SIA AFTER WEATHEROMETER TEST

Type of Material	Hours Tested	Minimum Specific Intensity Per Unit Area
I	1,000	50% of Table 02891-3
II	1,000	50% of Table 02891-4
III	2,200*	80% of Table 02891-5
IV	250	50% of Table 02891-6

* For orange material having glass bead retroreflective elements, the hours tested shall be 500.

11. Intended Use. The reflective sheeting specified herein is intended for use on surfaces of highway signs and other traffic control devices to assure their optimum visibility by day and at night when exposed to a light source and whether dry or totally wet by rain.

2.03 SIGN SUPPORTS.

Sign supports for traffic control signs shall be furnished and installed as specified herin, unless otherwise specified.

A. Steel Stanchions. Steel stanchions of one continuous length meeting the requirements of ASTM A 499, U.S. Highway Type, shall be used for all ground mounted traffic control signs. Stanchions shall have a weight of 3.00 pounds per foot and shall have drilled a minimum of 58 3/8 inch holes on one inch centers. The stanchions shall be painted green.

B. Steel Tubes. Steel tubes of one continuous length meeting the requirements of ASTM A 53, galvanized in accordance with ASTM A 123, shall be used for all ground mounted street name signs. Steel tubes shall have a 2-3/8 inch outside diameter, minimum 12 gauge.

C. Steel Strain Poles. Steel strain poles furnished and installed for span mounted overhead signs shall meet the requirements of Specification Section 02890 Paragraph 2.02.F. Clamps shall be sized to fit each pole at a point eighteen inches from the top of the pole and 21.5 feet above the roadway crown. The poles shall be installed according to the requirements of Specification Section 02890 Paragraph 3.02.F.

D. Wood Strain Poles. Wood strain poles furnished and installed for span mounted overhead signs shall meet the requirements of Specification Section 02890 Paragraph 2.05.D. Guy assemblies shall meet the requirements of Specification Section 02890 Paragraph 2.02.L and 3.02.L.

E. Span Wire Assembly. The span wire assembly furnished and installed for span mounted overhead signs shall include span wire, tether line, and all appurtenances required to complete sign installation. The materials used shall meet or exceed ASTM standards. All 3/8" diameter dead ends, pole clamps, and overhead sign mounting devices shall be galvanized in accordance with ASTM A 123. All 5/16" diameter dead ends shall be copper clad steel. All structural steel shall have a minimum yield stress of 36,000 psi.

1. Span Wire and Tether Line. All wire rope used for span wire and tether line at locations other than signalized intersections shall be utility grade 3/8 inch diameter steel having a minimum breaking strength of 11,500 pounds. Each individual wire within the wire rope shall be protected by a uniform coating (galvanized) of pure zinc in accordance with ASTM A 123.

2. Spiral Dead Ends. Spiral Dead Ends shall be of the same material, size and strength as the connecting span wire and/or tether line and of a design similar to that shown in the Design Standards.

3. Strain Insulator. Strain insulator shall be fiberglass, shall be capable of transmitting a minimum force of 15,000 pounds, and shall be of a design similar to that shown in the Design Standards.

4. Overhead Sign Mounting Devices.

a. Span Wire Clamp Assembly. Span wire clamp assembly shall consist of two 3/8 inch U-bolts with nuts and washers, one 5/8 inch pin with cotter pin and one clamp (two-piece) assembly for 3/8 inch wire rope as shown in the Design Standards.

b. Balance Adjuster. Balance adjusters shall be malleable iron.

c. Galvanized Conduit, Galvanized Steel Tubing, Galvanized Bars, and Angles. Galvanized bars and angels shall be the size and types shown in the Design Standards.

d. Overhead Sign Mounting Bracket. Overhead sign mounting brackets shall be of the type and shape shown on the Plans or Design Standards.

e. Signs. Signs shall be of the type and size shown on the Plans and called for in these Specifications.

f. Clamp for Existing Concrete Poles. Clamp shall be galvanized steel as shown in the Design Standards.

g. Clamp for Steel Poles. Clamp shall be galvanized steel as shown in the Design Standards.

h. Fastening Device for Span & Tether Line. Fastening device for span on tether line shall be as shown on the Plans or Design Standards.

2.04 CONSTRUCTION EQUIPMENT.

All equipment required for the satisfactory performance of the Work shall be on hand and approved by the Owner before construction will be permitted to begin.

PART 3 - CONSTRUCTION REQUIREMENTS

3.01 GENERAL REQUIREMENTS.

A. Before beginning any excavation or driving any sign posts, the Contractor shall determine the location of any underground electrical lines, drainage, or other utility lines in the vicinity and shall conduct his work in such manner as to avoid damage to same.

B. All signs are numbered or otherwise identified and shall be located as indicated on the Plans. Any changes in locations shall be approved by the Owner prior to erection.

C. The Owner will identify in the field the location of all sign supports and each sign to be mounted. The Contractor shall install the signs at the approved locations and complete the work.

3.02 SIGNS.

A. Traffic signs shall be furnished, fabricated, and erected on their supports as specified herein. The reflective sheeting shall be applied to the properly prepared aluminum with the equipment and in a manner prescribed by the sheeting manufacturer.

B. All completed signs shall be free from defects in materials and workmanship and effectively present the specified message under conditions of both day and night viewing. Reflectorized sign surfaces shall exhibit uniform color and brightness over the entire background surface and shall not appear mottled, streaked, or stained when viewed either in ordinary daylight or the incident beam of an automobile headlamp.

C. The reflectorized legend optical performance shall be such that incident light from motor vehicle headlamps will be uniformly reflected back to the eyes of the operator at entrance angles up to 30 degrees without gaps or irregularities.

D. Signs shall be positioned on and fastened to the support as shown on the Plans, or as directed by the Owner. All signs, once erected, shall be clean and free of any substance which would hide or otherwise obscure any portion of the sign face.

3.03 SIGN SUPPORTS.

A. Stanchion and Tube Supports For Ground Mounted Signs.

1. Stanchion and tube supports to be furnished and erected shall consist of one or more posts of the type specified, set directly in the ground, embedded in concrete, or bolted to a foundation, ash shown on the Plans. All stanchions and tubes set directly in the ground shall be held in proper position, and backfilling shall be placed in 6 inch layer, each layer being thoroughly tamped. All stanchions and tubes shall be set, driven or embedded so that the sign face will be plumb, oriented and aligned as shown on the Plans and Design Standards. In driving stanchions or tubes, a method shall be used which will not damage or deface the top of the stanchions or tubes.

2. The excavation for sign stanchions or tubes that are to be embedded in or bolted to a concrete foundation shall be made as nearly to neat lines as possible and all parts of the sign post encasement shall generally be poured against the soil but forming below ground level shall be used in sandy soils or when directed by the Owner. Forming will be required for all concrete work above the finished ground level and the top 12 inches of all concrete work. Necessary braces shall be provided to keep anchor bolts and encased posts in proper position. Concrete for foundations and encasement shall be Class A, meeting the requirements of Specification Section 03050. Concrete placement shall be performed in accordance with the provisions of Specification Section 03310, Concrete Structures. The Contractor shall remove and dispose of all surplus excavated material.

3. All cracked, chipped, or scratched galvanized steel members shall be repaired with a "touch-up". Zinc powder, wire, or stick shall be used to repair the damaged areas. The zinc shall become completely liquid at a temperature no greater than 475^0F . The area to be regalvanized shall be thoroughly cleaned, including removal of slag on welds, the surface heated, and zinc applied in accordance with the recommendations of the manufacturer of the material being used.

B. Supports For Span Mounted Overhead Signs.

Construction requirements for supports for span mounted overhead signs shall include all excavation and backfill; disposal of surplus or unsuitable material; forming, placement of reinforcement, conduit, concrete, and anchor bolts; finishing; and curing. This construction shall meet the requirements of Specification Section 02890 Paragraph 3.02.F. Signs shall be placed on the span according to the Plans.

PART 4 - MEASUREMENT

Accepted installed items related to traffic control sign installation shall be measured as described herein. Construction work required for the installation of a traffic control sign shall be measured according to the respective paragraph of these Specifications.

Supports for span mounted signs will not be measured as a unit but will be measured according to their components. Steel and wood strain poles will be measured as specified in Specification Section 02890 Paragraph 4.06.

The span wire assembly will be measured as specified in Specification Section 02890 Paragraph 4.12.

All other work shall be considered incidental to the installation of the traffic control signs and shall not be measured separately from the items described herein.

4.01 FLAT SHEET ALUMINUM SIGNS.

Accepted field installed flat sheet aluminum signs shall be measured in square feet to the nearest tenth of one square foot for each gauge aluminum sign black used.

4.02 EXTRUDED ALUMINUM SIGNS

Accepted field installed extruded aluminum signs shall be measured in square feet to the nearest tenth of one

square foot for each gauge aluminum sign blade used.

4.03 STEEL STANCHIONS
Accepted field installed steel stanchions of each unit weight and length shall be measured as one complete installed unit, per each.

4.04 STEEL TUBES
Accepted field installed steel tubes of each unit weight and length shall be measured as one complete installed unit, per each.

PART 5 - PAYMENT
Payment for accepted work, measured as above, shall be made at the appropriate contract unit price which shall be payment in full for all work required to complete the installation. Payment shall be made for quantities as shown on the Plans unless a field measurement is requested by the Contractor, in which case payment shall be for approved field measured quantities. Payment shall be made under the pay items listed at the end of this section.

5.01 FLAT SHEET ALUMINUM SIGNS.
Payment for the area of accepted and installed flat sheet aluminum signs for each gauge will be made at the contract unit price. Payment shall include the aluminum sign black with reflective sheeting applied and bands and brackets required for a complete installation according to the Plans.

5.02 EXTRUDED ALUMINUM SIGNS.
Payment for the area of accepted and installed extruded aluminum signs for each gauge will be made at the contract unit price. Payment shall include the aluminum sign blades with reflective sheeting applied and all bolts, nuts, washers, clamps, and brackets required for a complete installation according to the Plans.

5.03 STEEL STANCHIONS.
Payment for each accepted and installed steel stanchion of cross section weight and length installed according to the Plans as a complete unit will be made at the contract unit price. This payment shall be compensation for any excavation, backfilling, drilling, removal, and replacement of concrete and other items required for the complete installation of the stanchions.

5.04 STEEL TUBES.
Payment for each accepted and installed steel tube of each cross section and length installed according to the Plans as a completed unit will be made at the contract unit price. This payment shall be compensation for any excavation, backfilling, drilling, removal, and replacement of concrete, and other items required for the complete installation of the stanchions.

5.05 PAYMENT WILL BE MADE UNDER:

Item No.	Pay Item	Pay Unit
02891-01	FLAT SHEET ALUMINUM SIGNS	Sq. Ft.
02891-01.01	Flat Sheet Aluminum Sign, 0.080”	Sq. Ft.
02891-02	EXTRUDED ALUMINUM SIGNS	Sq. Ft.
02891-02.01	Extruded Aluminum Sign, 0.080”	Sq. Ft.
02891-03	STEEL STANCHIONS	Each
02891-03.___.___	Steel Stanchions, Length (feet) Unit weight (tenth of lb/ft,)	Each
02891-04	STEEL TUBES	Each
02891-04.01.___	Steel Tubes, 2-3/8” O.D., 12 gauge,	Each

Length (feet)

END OF SECTION 02891