OFFICE OF THE PURCHASING AGENT

TOWN OF ARLINGTON
730 Massachusetts Avenue
Arlington, MA 02476

Telephone (781) 316-3003
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DATE: July 25, 2019

TO ALL BIDDERS

BID NO. 19-35

SUBJECT: Pavement Markings & Line Striping Project

**ADDENDUM NO. 2**

TO WHOM IT MAY CONCERN:

With reference to the bid request relative to the above subject, please note the following:

ATTACHED REVISED QUANTITY SHEET

1) The item # and quantities did not change, but the word "pre-formed was added to the item #'s in quantity/price sheet; #'s 10, 12, 13, 20, 22, 23, 24 & 25.

2) Added the word to the Definition of Items.

The second attachment is an addition to the specifications for High Friction Surface Treatment. inadvertently left out of the original Bid Document.

**ADDENDUM MUST BE ACKNOWLEDGED WITH BID SUBMISSION.**

All other terms, conditions and specifications remain unchanged.

Very truly yours,

Town of Arlington

Domenic R. Lanzillotti
Purchasing Officer

TOWN OF ARLINGTON
Department of Public Works
51 Grove Street
Arlington, Massachusetts 02476
*Office(781) 316-3320 Fax (781) 316-3281*

Engineering Division

**Bid# 19-35**
**Pavement Markings and Line Striping Project**

## QUANTITY SHEET

| Item | Estimate | | Description | Proposal | |
|---|---|---|---|---|---|
| | Qty | Unit | | Unit Price | Amount |
| 1 | 3530 | LF | 4-inch reflectorized white line – thermoplastic (parking spaces) | $ /LF | $ |
| 2 | 13,200 | LF | 6-inch reflectorized white line – thermoplastic (lane & edge lines) | $ /LF | $ |
| 3 | 13,000 | LF | 6-inch reflectorized white line - thermoplastic (broken/dotted lines) | $ /LF | $ |
| 4 | 11,500 | LF | 6-inch reflectorized yellow line – thermoplastic (center lines & edge lines) | $ /LF | $ |
| 5 | 250 | LF | 6-inch reflectorized yellow line - thermoplastic (broken/dotted lines) | $ /LF | $ |
| 6 | 1270 | LF | 12-inch reflectorized white line – thermoplastic (Bus stop & stop lines) | $ /LF | $ |
| 7 | 9500 | LF | 24-inch reflectorized white line – thermoplastic (crosswalks) | $ /LF | $ |
| 8 | 230 | LF | 6-inch reflectorized white line – thermoplastic; (skip striping - 5’ segments by hand) | $ /LF | $ |
| 9 | 200 | LF | 8-inch reflectorized yellow line – thermoplastic; (gore lines) | $ /LF | $ |
| 10 | 34 | EA | Bike Lane Symbol – pre-formed thermoplastic (3’-4” x 6’ ) | $ /EA | $ |
| 11 | 26 | EA | Bike Lane Direction Arrow – thermoplastic (2’ x 6’ ) | $ /EA | $ |
| 12 | 13 | EA | Bike Sharrow – pre-formed thermoplastic ( 3’-4” x 9’-4”) | $ /EA | $ |
| 13 | 20 | EA | Bike Detection Symbol – pre-formed thermoplastic (14” x 43”) | $ /EA | $ |
| 14 | 12 | EA | Straight Arrows – thermoplastic (3’-4” x 9.5’) | $ /EA | $ |
| 15 | 7 | EA | Left Turn Arrow – thermoplastic (6’-4” x 8’ ) | $ /EA | $ |
| 16 | 9 | EA | Left/Thru Arrow – thermoplastic (7’-8”x 12’-9”) | $ /EA | $ |

| | | | | | | |
|---|---|---|---|---|---|---|
| 17 | 4 | EA | Right Turn Arrow – thermoplastic (6’-4” x 8’ ) | $ | /EA | $ |
| 18 | 5 | EA | Right/Thru Arrow – thermoplastic (7’-8”x 12’-9”) | $ | /EA | $ |
| 19 | 2 | EA | Merge Arrow(lane drop)– thermoplastic (5.67’ x 18’) | $ | /EA | $ |
| 20 | 4 | EA | Handicapped Parking Space – pre-formed thermoplastic (4’ x 4’) | $ | /EA | $ |
| 21 | 19 | EA | Letters “ONLY” – pre-formed thermoplastic (5’-9” x 8’) | $ | /EA | $ |
| 22 | 27 | EA | Letters “BUS” – pre-formed thermoplastic (4’ x 6’) | $ | /EA | $ |
| 23 | 3 | EA | Letters :”6-9AM” – pre-formed thermoplastic (6’ x 8’-10”) | $ | /EA | $ |
| 24 | 3 | EA | Letters :”ONLY” – pre-formed thermoplastic (6’ x 7’-5.5”) | $ | /EA | $ |
| 25 | 3 | EA | Letters :”BUS” – pre-formed thermoplastic (6’ x 5’-2.5”) | $ | /EA | $ |
| 26 | 462 | SF | High Friction Surface Treatment – (Green) | $ | /SF | $ |
| 27 | 9,700 | SF | High Friction Surface Treatment (Terra cotta) | $ | /SF | $ |
| 28 | 10 | hr | Layout and pre-marking services | $ | /hr | $ |
| | | | **Total (in figures & written)** | **$** | | |

## DEFINITIONS OF ITEMS

**ITEM #**

1. **4-INCH REFLECTORIZED WHITE LINES – (THERMOPLASTIC MARKINGS):**
   This work shall consist of the application of 4-inch white reflectorized thermoplastic markings on existing roads for **parking spaces** and shall include suitable traffic control and/or devices to prevent vehicles from traveling on the newly painted sections and to provide a safer environment for workers. Payment shall be made by the Lineal Foot.

2. **6-INCH REFLECTORIZED WHITE LINES – (THERMOPLASTIC MARKINGS):** This work shall consist of the application of 6-inch white reflectorized thermoplastic markings on existing roads for **lane lines and edge lines** and shall include suitable traffic control and/or devices to prevent vehicles from traveling on the newly painted sections and to provide a safer environment for workers. Payment shall be made by the Lineal Foot.

3. **6-INCH REFLECTORIZED WHITE LINES – (THERMOPLASTIC MARKINGS):** This work shall consist of the application of 6-inch white reflectorized thermoplastic markings on existing roads for **broken lines and dotted lines** and shall include suitable traffic control and/or devices to prevent vehicles from traveling on the newly painted sections and to provide a safer environment for workers. Payment shall be made by the Lineal Foot.

4. **6-INCH REFLECTORIZED YELLOW LINES – (THERMOPLASTIC MARKINGS):** This work shall consist of the application of 6-inch white reflectorized thermoplastic markings on existing roads for **center lines and edge lines** and shall include suitable traffic control and/or devices to prevent vehicles from traveling on the newly painted sections and to provide a safer environment for workers. Payment shall be made by the Lineal Foot.

5. **6-INCH REFLECTORIZED YELLOW LINES – (THERMOPLASTIC MARKINGS):** This work shall consist of the application of 6-inch yellow reflectorized thermoplastic markings on existing roads for **broken lines and dotted lines** and shall include suitable traffic control and/or devices to prevent vehicles from traveling on the newly painted sections and to provide a safer environment for workers. Payment shall be made by the Lineal Foot.

6. **12-INCH REFLECTORIZED WHITE LINES – (THERMOPLASTIC MARKINGS):** This work shall consist of the application of 12-inch white thermoplastic markings on existing roads for **bus stops and stop lines** and shall include suitable traffic control and/or devices to prevent vehicles from traveling on the newly painted sections and to provide a safer environment for workers. Payment shall be made by the Lineal Foot.

7. **24-INCH REFLECTORIZED WHITE LINES – (THERMOPLASTIC MARKINGS):** This work shall consist of the application of 24-inch white reflectorized thermoplastic markings on existing roads for **crosswalks** and shall include suitable traffic control and/or devices to prevent vehicles from traveling on the newly painted sections and to provide a safer environment for workers. Payment shall be made by the Lineal Foot.

8. **6-INCH REFLECTORIZED WHITE LINES – (THERMOPLASTIC MARKINGS):** This work shall consist of the application of 6-inch white reflectorized thermoplastic markings for **skip striping** coordinated with application of red high friction surface treatment for Bus Lane layout and shall include suitable traffic control and/or devices to prevent vehicles from traveling on the newly painted sections and to provide a safer environment for workers. Payment shall be made by the Lineal Foot.

9. **8-INCH REFLECTORIZED YELLOW LINES – (THERMOPLASTIC MARKINGS):** This work shall consist of the application of 8-inch yellow reflectorized thermoplastic markings on existing roads for **gore lines** and shall include suitable traffic control and/or devices to prevent vehicles from traveling on the newly painted sections and to provide a safer environment for workers. Payment shall be made by the Lineal Foot.

10. **TRAFFIC SYMBOLS - WHITE (PRE-FORMED THERMOPLASTIC MARKINGS):** This work shall consist of the application of white reflectorized thermoplastic markings on existing roads for **bike lane symbols** and shall include suitable traffic control and/or devices to prevent vehicles from traveling on the newly painted sections and to provide a safer environment for workers. Symbols must be compliant with MUTCD size requirements and layout requirements.

11. **TRAFFIC SYMBOLS - WHITE (THERMOPLASTIC MARKINGS):** This work shall consist of the application of white reflectorized thermoplastic markings on existing roads for **bike lane direction arrow** and shall include suitable traffic control and/or devices to prevent vehicles from traveling on the newly painted sections and to provide a safer environment for workers. Symbols must be compliant with MUTCD size requirements and layout requirements.

12. **TRAFFIC SYMBOLS - WHITE (PRE-FORMED THERMOPLASTIC MARKINGS):** This work shall consist of the application of white reflectorized thermoplastic markings on existing roads for **bike sharrow symbols** and shall include suitable traffic control and/or devices to prevent vehicles from traveling on the newly painted sections and to provide a safer environment for workers. Symbols must be compliant with MUTCD size requirements and layout requirements.

13. **TRAFFIC SYMBOLS - WHITE (PRE-FORMED THERMOPLASTIC MARKINGS):** This work shall consist of the application of white reflectorized thermoplastic markings on existing roads for **bike detection symbols** and shall include suitable traffic control and/or devices to prevent vehicles from traveling on the newly painted sections and to provide a safer environment for workers. Symbols must be compliant with MUTCD size requirements and layout requirements.

14. **TRAFFIC SYMBOLS - WHITE (THERMOPLASTIC MARKINGS):** This work shall consist of the application of white reflectorized thermoplastic markings on existing roads for **Straight Arrow symbols** and shall include suitable traffic control and/or devices to prevent vehicles from traveling on the newly painted sections and to provide a safer environment for workers. Symbols must be compliant with MUTCD size requirements and layout requirements.

15. **TRAFFIC SYMBOLS - WHITE (THERMOPLASTIC MARKINGS):** This work shall consist of the application of white reflectorized thermoplastic markings on existing roads for **Left Turn Arrow symbols** and shall include suitable traffic control and/or devices to prevent vehicles from traveling on the newly painted sections and to provide a safer environment for workers. Symbols must be compliant with MUTCD size requirements and layout requirements.

16. **TRAFFIC SYMBOLS - WHITE (THERMOPLASTIC MARKINGS):** This work shall consist of the application of white reflectorized thermoplastic markings on existing roads for **Left/Thru Arrow symbols** and shall include suitable traffic control and/or devices to prevent vehicles from traveling on the newly painted sections and to provide a safer environment for workers. Symbols must be compliant with MUTCD size requirements and layout requirements.
17. **TRAFFIC SYMBOLS - WHITE (THERMOPLASTIC MARKINGS):** This work shall consist of the application of white reflectorized thermoplastic markings on existing roads for **Right Turn Arrow symbols** and shall include suitable traffic control and/or devices to prevent vehicles from

traveling on the newly painted sections and to provide a safer environment for workers. Symbols must be compliant with MUTCD size requirements and layout requirements.

18. **TRAFFIC SYMBOLS - WHITE (THERMOPLASTIC MARKINGS):** This work shall consist of the application of white reflectorized thermoplastic markings on existing roads for **Right/Thru Arrow symbols** and shall include suitable traffic control and/or devices to prevent vehicles from traveling on the newly painted sections and to provide a safer environment for workers. Symbols must be compliant with MUTCD size requirements and layout requirements.

19. **TRAFFIC SYMBOLS - WHITE (THERMOPLASTIC MARKINGS):** This work shall consist of the application of white reflectorized thermoplastic markings on existing roads for **Merge Arrow/Lane Drop symbols** and shall include suitable traffic control and/or devices to prevent vehicles from traveling on the newly painted sections and to provide a safer environment for workers. Symbols must be compliant with MUTCD size requirements and layout requirements.

20. **TRAFFIC SYMBOLS - WHITE (PRE-FORMED THERMOPLASTIC MARKINGS):** This work shall consist of the application of white reflectorized thermoplastic markings on existing roads for **Handicapped Parking Space symbols** and shall include suitable traffic control and/or devices to prevent vehicles from traveling on the newly painted sections and to provide a safer environment for workers. Symbols must be compliant with MUTCD size requirements and layout requirements.

21. **TRAFFIC LETTERING - WHITE (THERMOPLASTIC MARKINGS):** This work shall consist of the application of white reflectorized thermoplastic markings on existing roads for **Text "ONLY"(5'-9" x 8')** and shall include suitable traffic control and/or devices to prevent vehicles from traveling on the newly painted sections and to provide a safer environment for workers. Symbols must be compliant with MUTCD size requirements and layout requirements.

22. **TRAFFIC LETTERING - WHITE (PRE-FORMED THERMOPLASTIC MARKINGS):** This work shall consist of the application of white reflectorized thermoplastic markings on existing roads for **Text "BUS" (4' x 6')** and shall include suitable traffic control and/or devices to prevent vehicles from traveling on the newly painted sections and to provide a safer environment for workers. Symbols must be compliant with MUTCD size requirements and layout requirements.

23. **TRAFFIC LETTERING - WHITE (PRE-FORMED THERMOPLASTIC MARKINGS):** This work shall consist of the application of white reflectorized thermoplastic markings on existing roads for **Text "6-9AM"** and shall include suitable traffic control and/or devices to prevent vehicles from traveling on the newly painted sections and to provide a safer environment for workers. Symbols must be compliant with MUTCD size requirements and layout requirements.

24. **TRAFFIC LETTERING - WHITE (PRE-FORMED THERMOPLASTIC MARKINGS):** This work shall consist of the application of white reflectorized thermoplastic markings on existing roads for **Text "ONLY" (6' x 7'-5.5")** and shall include suitable traffic control and/or devices to prevent vehicles from traveling on the newly painted sections and to provide a safer environment for workers. Symbols must be compliant with MUTCD size requirements and layout requirements.

25. **TRAFFIC LETTERING - WHITE (PRE-FORMED THERMOPLASTIC MARKINGS):** This work shall consist of the application of white reflectorized thermoplastic markings on existing roads for **Text "BUS" (6' x 5'-2.5")** and shall include suitable traffic control and/or devices to prevent vehicles from traveling on the newly painted sections and to provide a safer environment for workers. Symbols must be compliant with MUTCD size requirements and layout requirements.

26. **HIGH FRICTION SURFACE TREATMENT – (GREEN) :** This work shall consist of the application of Green High Friction Surface Treatment for bicycle facilities on existing roads. Payment shall be made by the Square Foot.

27. **HIGH FRICTION SURFACE TREATMENT – (TERRA COTTA RED) :** This work shall consist of the application of Terra Cotta Red High Friction Surface Treatment in coordination with 6" white thermoplastic skip striping for Bus Lane facilities on existing roads. Payment shall be made by the Square Foot.

28. **LAYOUT AND PRE-MARKING SERVICES:** This work shall consist of providing layout and pre-marking of line striping as needed in coordination with the Arlington Engineering Division and/or Department of Public Works for application of new High Friction Surface Treatment. Payment shall be made by the Hour.

**ITEM 458.8 HIGH FRICTION SURFACE TREATMENT SQUARE FOOT**

The work under this Item shall include the application of a high friction surface treatment, at the locations shown on the plans. The surface treatment shall be green in color for bike lane segments and terra cotta red in color or bus lane areas. Samples of color shades shall be submitted to the Engineer for selection of the actual color to be used prior to application.

Material must be specifically designed for application onto asphalt or non-bituminous concrete surfaces such as cement concrete. Material must have a balance of properties that will ensure adhesion and movement on a flexible pavement, while providing excellent durability and color stability. Key properties include wear and crack resistance, color retention, adhesion, minimal water absorption and increased friction properties.

The material shall be a durable, colorized, slip resistant and skid resistant coating suitable for delineating areas for preferential use, such as bicycle lanes, bus lanes and other vehicular or pedestrian traffic uses.

A Certificate of Analysis from an independent recognized testing laboratory confirming performance as outlined above shall be made available upon request.

The Contractor shall install the high friction surface treatment in accordance with all manufacturers' installation and materials specifications. Copies of the manufacturer's installation procedures and materials specifications shall be provided to the Engineer for approval before placement of the surface treatment is allowed.

The high friction surface treatment must be composed of a two component, epoxy-modified, acrylic, waterborne coating specifically designed for application onto asphalt or non-bituminous concrete surfaces such as cement concrete, and is specially formulated to provide a safe, durable, long lasting color and texture to the pavement surface.

Table 1: Typical Properties of Coating

| Table 1: Typical Properties of Coating | | |
|---|---|---|
| **Characteristic** | **Test Specification** | **Coating** |
| Solids by volume | ASTM D 2697 | 55% |
| Solids by weight | ATSM D 2369 | 68.90% |
| Density | ASTM D 1475 | 13.34 lbs/gal (1.599 kg/gal) |

Material must be environmentally safe and meet EPA requirements for Volatile Organic Compounds (VOC).

The material shall be applied to the pavement surface using the method outlined in the product application instructions.

The pavement surface shall be dry and free from all foreign matter. Material shall be applied with a minimum of 3 spray passes.

**ITEM 458.8** (Continued)

| Thickness (Approx.) | | | | |
|---|---|---|---|---|
| Spray Passes | Wet | | Dry | |
| | mm | mil | mm | mil |
| 3 | 0.65 | 25.7 | 0.36 | 14.1 |
| 4 | 0.87 | 34.3 | 0.48 | 18.9 |

Each coating application shall be spray applied and broomed to work the material into the surface. Subsequent layers shall be sprayed and rolled, using a 1 in. to 1.5 in. nap roller or sprayed and broomed.

Each additional layer of coating material shall be the same color as the first and shall be allowed to dry completely before applying the next layer.

One container of coating will yield one layer covering approximately 700 square feet. See table below.

| Spray Passes | Approx. Coverage Per Unit | Approx. Coverage Per Layer | Recommendation |
|---|---|---|---|
| 3 | 225 ft² (20.9 m²) | 675 ft² (62.7 m²) | Coating not subjected to vehicular traffic |
| 4 | 175 ft² (16.3 m²) | 700 ft² (65.1 m²) | Coating subjected to vehicular traffic |

Coating must be 100% dry before opening to traffic. Air temperature, relative humidity and time will affect dry time. Substrate temperature and ambient wind conditions can also affect dry times. Reference the table below for typical dry times.

| Coating Dry Times (Typical) | | |
|---|---|---|
| Air Temperature | Relative Humidity | Time To Dry (Approx.) |
| 60° F (15°C) | 80% | 8 hours |
| 81° F (27°C) | 57% | 4 hours |
| 120° F (49°C) | 5% | 2 hours |

ITEM 458.8 (Continued)

Performance Properties of Coating

| Characteristic | Test Specification | Coating | |
|---|---|---|---|
| Dry Time (To Record) | ASTM D 5895 | 35 min | |
| | 23° C; 37% RH | | |
| Taber Wear Abrasion | ASTM D 4060 | 0.98 g/1000 cycles | |
| Dry H-10 Wheel | 1 day cure | | |
| Taber Wear Abrasion | ASTM D 4060 | 3.4 g/1000 cycles | |
| Wet H-10 Wheel | 7 day cure | | |
| Accelerated Weathering Environment | ASTM G 15 | ΔE=0.49 (brick color) | |
| | 2,000 hrs (CIE Units) | | |
| Hydrophobicity Water Absorption | ASTM D 570 | 8.3% (9 days immersion) | |
| Shore Hardness | ASTM D 2240 | 63 Type D | |
| Mandrel Bend | ASTM D 522-93A | ¼ in @ 21° C | |
| Permeance | ASTM D 1653 | 3.45 g/m²/hr (52 mils) | |
| VOC | EPA-24 | 18.7 g/l | |
| | ASTM D 3960-05 | | |
| Adhesion To Asphalt | ASTM D 4541 | Substrate Failure | |
| Friction Wet | ASTM E 303 | WP* coated | 64 |
| | British Pendulum Tester | WP* uncoated | 57 |
| | | AC** coated | 73 |
| | | AC** uncoated | 60 |

*WP - test conducted on asphalt pavement in wheel path.
**AC - test conducted on asphalt pavement adjacent to curb.

Method of Measurement and Basis of Payment

The work under this item will be paid for at the contract unit price per square foot based on the measurement of the area of High Friction Surface complete in place, as determined by the Engineer.

The contract price shall include all material, labor and equipment required or incidental to the satisfactory completion if work.