

SECTION 01100

MOBILIZATION

01100.01 GENERAL

A. Description

Mobilization shall include, but not necessarily be limited to, the performance of preparatory construction operations, including the movement of personnel and equipment to the project site; application, fee payment and acquisition for all necessary permits (i.e., sediment control plan for staging areas, temporary and permanent building permits, utility connections, etc.); and the establishment of the Contractor's offices, buildings, and other facilities necessary to begin work on a substantial phase of the Contract. The cost of required insurance and bonds shall be included in this item.

B. Submittals

For Capital Improvement Projects the Contractor shall furnish proof of carriage of insurance as specified in the "General Provisions."

01100.02 MATERIALS

Not applicable.

01100.03 EXECUTION

All work performed in providing the facilities and services shall be done in a safe and workmanlike manner.

01100.04 METHOD OF MEASUREMENT

RESERVED FOR FUTURE USE

01100.05 BASIS OF PAYMENT

RESERVED FOR FUTURE USE

SECTION 01200

DIGITAL CAMERA

For County Capital Improvement Program Projects

01200.01 GENERAL

A. Description

The Contractor will furnish a digital camera to be used by the County Representative(s) to monitor and record the project work progress and quality. The camera will be in new condition and in the original packaging with all accessories.

B. Related Work Included Elsewhere

None

C. Quality Insurance

None

D. Submittals

The Contractor will submit information on the digital camera proposed to be furnished to the County Representative for review prior to furnishing the digital camera. The County Representative will review the information and notify the Contractor in writing either accepting or rejecting the digital camera per this specification.

01200.02 MATERIALS

A. Materials Furnished by the County

The County will not furnish any materials.

B. Contractor's Options

Not applicable.

C. Detailed Material Requirements

The digital camera will be of such design and quality equivalent to, but not necessarily limited to, the features of the Bushnell™ Outdoor 3.2 MP Water Resistant Digital Camera 11-0013. The following specific requirements will be considered the minimum acceptable standards:

- Water-resistant
- Dust-resistant
- Shock-resistant
- Minimum Resolution of 3.2 Megapixel
- Sufficient Memory for 30 Picture Capacity (min) at Highest Resolution
- Powered by Size AA Batteries

- Rechargeable NIMH Batteries (2 Sets) With Charger
- USB Connection and Software
- JPEG Image File Format
- Photo Print Software
- Zoom Capability

01200.03 EXECUTION

The digital camera in the original packaging will be furnished to the County Representative prior to the Notice To Proceed (NTP) and will remain in the County Representative's possession until the final release of the Engineer's Office.

The digital camera, all items included in the original packaging and any separately purchased accessories will become the property of Charles County Government upon final release of the Engineer's Office.

01200.04 MEASUREMENT AND PAYMENT

The digital camera furnished under this specification will not be measured and paid for directly, but will be included in the lump sum bid as part of the Engineer's Office.

01200.05 BASIS OF PAYMENT

RESERVED FOR FUTURE USE

SECTION 01300

CONSTRUCTION STAKEOUT

01300.01 GENERAL

A. Description

This work shall consist of furnishing, placing, and maintaining construction layout stakes necessary for the proper prosecution of the work in accordance with the Contract Documents.

B. Related Work Included Elsewhere

Not applicable.

C. Quality Assurance

1. The County Engineer may check any control point established by the Contractor. However, the checking or failure to check Contractor-furnished controls by the County Engineer shall not relieve the Contractor from the Contractor's responsibility to construct the facility in accordance with the Contract Documents.
2. The Contractor shall use competent personnel and suitable equipment for all engineering work required to complete the work in accordance with lines, grades, elevations, and dimensions indicated on the Plans.

D. Submittals

The Contractor shall furnish the County Engineer upon request with copies of all cut sheets and other control documents as may be required for control of the work.

01300.02 MATERIALS

A. Materials Furnished by the Contractor

1. Plans

The Contractor will furnish the County Engineer upon request with Plans indicating property, right-of-way, and other control lines and points, and the relationship of the controls to the various components being installed or constructed. The Plans will also show the location and elevation for bench marks which are to be utilized in controlling the work.

2. Details Furnished

The Contractor will furnish the following prior to commencement of work to the

CONSTRUCTION STAKEOUT

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County Engineer upon request:

- a. For utility systems, the Contractor will provide stakeout, offsets, and control points which are shown on the Plans. The Contractor will also provide cut sheets to the County Engineer upon request.
- b. For roadways, and structures of 20 foot or less span which are measured along the center line of roadway, the Contractor will furnish staked center line. The maximum spacing of stations (stakes, nails, crosses, etc.) will not be in excess of 100 feet and the elevations on the top of each marked point will be furnished. The Contractor will establish appropriately spaced bench marks and the necessary references including all points of curvature and all points of tangency for the preservation and control of the center line. Upon completion of the grading, the Contractor will again provide the County Engineer upon request with a staked center line or working line, whichever is requested by the County Engineer. An elevation for the top of each marked point will also be furnished by the Contractor, as well as one set of prints of the cross sections. When warranted by circumstances, an additional set of cross sections will be furnished by the Contractor. The cross sections are to be used as guides only, it being understood that dimensions or elevations scaled there from will not be sufficiently precise for use in the construction of roadways and structures of 20 foot span or less.
- c. For structures over 20 foot span which are measured along center line of roadway, the Contractor will furnish the County Engineer upon request a staked center line or working line, whichever applies, with stations not over 100 feet apart and extending at least 100 feet beyond ends of the structure. When the facility is on a curve, the Contractor will furnish a staked center line or working line, whichever applies, consisting of stations not over 50 feet apart and including the Point of Curvature, Point of Intersection, and Point of Tangency, and at least one point on the tangents beyond each end of the curve. When the facility is on a spiral, suitable points will be given. At least two bench marks, one on each end of the facility, will be established by the Contractor.
- d. For buildings and miscellaneous structures, parks, dredging and other projects not listed above, the Contractor will establish general reference points and bench marks which are shown on the plans.

B. Contractor's Options

Not applicable.

C. Detailed Material Requirements

No applicable.

01300.03 EXECUTION

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A. Alignment Markers

The Contractor shall exercise care in the preservation of stakes, general reference points, and bench marks and shall reset them at the Contractor's own expense when any are damaged or destroyed.

B. Detailed Stake-out

1. For utility systems, the Contractor will furnish and set stakes or other suitable markers at each station along the centerline of the pipeline and will establish such offsets as may be appropriate to control the work and provide cut sheets. The Contractor will furnish "cut sheets" for the centerline to the County Engineer upon request. The Contractor shall protect and preserve the markers until such time as they are no longer required.
2. For roadways and structures of 20 foot or less span, the Contractor shall furnish, set, and preserve stakes at each station along each side of the project on the right-of-way or easement line, whichever is furthest from the center line of construction. Where one lane of an ultimate dual highway is to be constructed, the stakes on the side of future improvement shall be set 10 feet beyond the construction limits. On each of these stakes shall be marked its offset distance from the center line and its top elevation or the cut or fill to the profile grade line. Additional stakes as needed for horizontal and vertical controls necessary for the correct layout of the work shall be set by the Contractor.
3. For structures over 20 foot span, the Contractor shall proceed with the Contractor's layout work. All lines established on the ground shall be preserved and/or well referenced, marked, and kept available at all times.

The Contractor shall establish the field elevations for all bridge seats and assume responsibility for finishing same to proper grade. If any steel beams or girders are incorporated in the project, it will be the Contractor's responsibility to run elevations over the tops of such beams or girders after they are in place, before any forms are attached to them, to determine the deflection of each member. This information shall then be applied to the deflection diagram to determine the corrected elevation of bottom slab forms and screed supports. After the Contractor has assembled this information, it may be checked by the County Engineer before final adjustments are made and the placing of any concrete in said forms.

4. For buildings and other miscellaneous structures, the Contractor shall provide such additional controls as necessary to construct or install the building or structure in accordance with the Contract Documents.

C. Additional Requirements

1. The Contractor shall be required to furnish to utility companies or agencies working within the limits of the project, promptly upon request, reference to control points and alignment and grade data, so that they may properly locate and coordinate their work and improvements in relation to this project.

CONSTRUCTION STAKEOUT

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2. The Contractor shall be required to define only right-of-way and easement lines of the project for adjacent property owners.
3. The Contractor shall be required to furnish for subgrade, subbase, and base courses string line and grade stakes both longitudinally and transversely with fixed controls not to exceed 25 foot longitudinal spacing. Transverse spacing shall be set for subgrade and the top course of any subbase or base course with fixed controls at 25 foot intervals.

The Contractor shall place along each form line for cement concrete pavement, line and grade with fixed controls not to exceed 25 foot intervals.

01300.04 METHOD OF MEASUREMENT

RESERVED FOR FUTURE USE

01300.05 BASIS OF PAYMENT

RESERVED FOR FUTURE USE

SECTION 01410

MAINTENANCE OF TRAFFIC

01410.01 GENERAL

A. Description

1. This work pertains to the maintenance of traffic, both vehicular and pedestrian, on any facility affected by the work of the Contract.
2. All work shall be in accordance with the latest issue of the Manual on Uniform Traffic Control Devices, the Contract Documents, the Maryland State Highway Administration Book of Standards, and as directed by the Engineer. Where no reference to maintenance of traffic or a traffic control plan is included in the Contract Documents, maintenance of traffic shall be in accordance with SECTION GP-7.10. Maintenance of traffic shall include furnishing traffic managers and flaggers; relocating, maintaining, and removing existing traffic signs and other traffic control devices; and implementation of a Traffic Control Plan (TCP).
3. Traffic control is required in accordance with Section GP-7.10 for all Contracts whether or not specifically included in the Proposal as bid items. No separate payment will be made for any traffic control items unless specific items are included in the Proposal as bid items.

B. Related Sections

1. Traffic control plan; Section 01411.
2. Traffic manager; Section 01412.
3. Temporary raised pavement markers; Section 01420.
4. Temporary concrete barrier; Section 01421.
5. Traffic barrier with beam; Section 01422.
6. Tubular markers; Section 01423.
7. Arrow board; Section 01424.
8. Traffic control signs through construction areas; Section 01430.
9. Temporary impact attenuators, hydrocells; Section 01440.
10. Temporary impact attenuators, sand containers; Section 01441.

11. Temporary painted stripe markings; Section 01450.
12. Temporary pavement tape marking; Section 01451.
13. Watch person service; Section 01460.
14. Temporary graded aggregate, bituminous concrete, and calcium chloride; Section 01470.

C. Quality Assurance

The County Engineer will inspect all materials furnished by the Contractor for maintenance of traffic to ensure compliance with the Contract Documents. However, the inspection, or the lack thereof, by the County Engineer shall in no way relieve the Contractor of the Contractor's responsibility to provide for the maintenance of traffic in accordance with the Contract Documents.

D. Submittals

The Contractor shall submit a Traffic Control Plan (TCP) as outlined in Section 01411 for all work within any obstruction of and/or crossing of any public right-of-way or any private drive, access road, parking lot, or sidewalk.

01410.02 MATERIALS**A. Materials Furnished by the County**

The County will not furnish any materials for the maintenance of traffic.

B. Contractor's Options

Not applicable.

C. Detailed Material Requirements

All materials, whether temporary or permanent, shall meet the requirements of the Manual on Uniform Traffic Control Devices and the Contract Documents.

01410.03 EXECUTION

The Contractor shall provide for the safe and expeditious movement of all traffic through the project in accordance with the TCP, the Contract Documents, and as directed by the County Engineer.

Equipment which is in use and requires temporary storage within the limits of the project and materials stored or stockpiled on the project shall be placed in a location which shall not be hazardous to the traveling public and as approved by the County Engineer.

All vehicles and all construction equipment entering or leaving the Project site and/or work area must follow the traffic flow pattern as established by the Traffic Control Plan.

All construction operations shall be performed in the normal direction of traffic flow unless written permission is obtained from the County Engineer prior to the commencement of such work. Work performed and equipment moving against the normal traffic flow pattern is strictly prohibited unless a written exception is granted by the County Engineer.

01410.04 METHOD OF MEASUREMENT

RESERVED FOR FUTURE USE

01410.05 BASIS OF PAYMENT**A. General**

RESERVED FOR FUTURE USE

B. Maintenance of Traffic

RESERVED FOR FUTURE USE

C. Temporary Roads

RESERVED FOR FUTURE USE

D. Temporary Bridges

RESERVED FOR FUTURE USE

SECTION 01411

TRAFFIC CONTROL PLAN FOR MAINTENANCE OF TRAFFIC

01411.01 GENERAL

A. Description

1. Each Contract for construction within or crossing a public right-of-way shall contain a Traffic Control Plan (TCP) which will assure the safety of motorists, pedestrians, and construction workers during the construction of the Project. The TCP covers such items as signing; pavement markings; methods and devices for delineation and channelization; the placement and design of barriers, barricades and impact attenuators; and other items as required.
2. On Developer projects, the TCP shall be developed by the Developer, subject to the County's approval.

B. Related Work Included Elsewhere

Traffic manager; Section 01412.

C. Quality Assurance

The TCP is subject to amendment during the life of the Contract due to changing field conditions. Implementation of the Contract TCP does not relieve the Contractor of any of the provisions set forth in the Contract Documents.

D. Submittals

RESERVED FOR FUTURE USE

01411.02 MATERIALS

Not applicable.

01411.03 CONSTRUCTION REQUIREMENTS

Not applicable.

01411.04 METHOD OF MEASUREMENT

Not applicable.

A. General

RESERVED FOR FUTURE USE

B. Changes to County's TCP

RESERVED FOR FUTURE USE

SECTION 01412

TRAFFIC MANAGER FOR MAINTENANCE OF TRAFFIC

01412.01 GENERAL

A. Description

1. The Contractor shall assign to the project an employee to serve in the capacity of traffic manager. This employee shall be thoroughly experienced in all aspects of traffic control.
2. The traffic manager shall have the primary responsibility and sufficient authority for the implementation of the approved Traffic Control Plan, the monitoring and maintenance of signs, pavement markings, channelizing devices, arrow boards, detour signals, turnouts, the furnishing of watch persons, and flaggers, and other safety aspects of the Contract.
3. The traffic manager shall closely coordinate the traffic manager's operations with the County Engineer. The traffic manager shall oversee and supervise all aspects of maintenance of traffic on the Project including those involving subcontractors.

B. Related Work Included Elsewhere

Traffic Control plan; Section 01411.

C. Quality Assurance

The traffic manager shall make on-site inspections of those operations that affect traffic (vehicular and pedestrian) on a regular basis and be available for consultation at all times. The monitoring of all aspects of maintenance of traffic on the Project by the traffic manager shall include surveillance of the construction area during nonworking hours, night time, and holidays as required on a regular basis.

D. Submittals

The Contractor shall submit the traffic manager's name and phone number(s) which are answered 24 hours per day to the County Engineer for approval at least 10 working days prior to commencing any work on the Project. Any change in the appointment of this individual during the term of the Contract shall require a written submission and approval by the County Engineer.

01412.02 MATERIALS

Not applicable.

01412.03 CONSTRUCTION REQUIREMENTS

Not Applicable.

01412.04 METHOD OF MEASUREMENT

RESERVED FOR FUTURE USE

01412.05 BASIS OF PAYMENT

RESERVED FOR FUTURE USE

SECTION 01420

TEMPORARY RAISED PAVEMENT MARKERS FOR MAINTENANCE OF TRAFFIC

01420.01 GENERAL

A. Description

This work shall consist of furnishing and installing, complete in place, temporary raised pavement markers as indicated on the approved Traffic Control Plan or as directed by the County Engineer.

B. Related Work Included Elsewhere

Traffic control plan; Section 01411.

C. Quality Assurance

The County Engineer will inspect all materials before and/or after installation to ensure compliance with the Contract Documents.

D. SUBMITTALS

Shop drawings shall be submitted as specified in the "General Provisions" for all raised pavement markers furnished giving general product information and installation instructions.

01420.02 MATERIALS

A. Materials Furnished by the County

The County will not furnish any materials for raised pavement marker installation.

B. Contractor's Options

Temporary raised pavement markers shall be the Stimsonite 88 Catadots, Safety Guide Markers, Ray-0-Lite Markers, or County approved equal.

01420.03 EXECUTION

All materials, equipment, and services necessary for the complete installation of the temporary raised pavement markers, as indicated on the approved Traffic Control Plan, shall be as prescribed by the manufacturer furnishing the material.

**TEMPORARY RAISED PAVEMENT MARKERS
FOR MAINTENANCE OF TRAFFIC**

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01420.04 METHOD OF MEASUREMENT

A. Installation

RESERVED FOR FUTURE USE

B. Removal

RESERVED FOR FUTURE USE

01420.05 BASIS OF PAYMENT

A. Installation

RESERVED FOR FUTURE USE

B. Removal

RESERVED FOR FUTURE USE

SECTION 01421

TEMPORARY PRECAST CONCRETE BARRIER FOR MAINTENANCE OF TRAFFIC

01421.01 GENERAL

A. Description

This work shall consist of furnishing, placing, resetting, and removal of precast concrete barriers for temporary use during construction along highways, streets, and at locations indicated on the Plans or as directed by the County Engineer. The barrier shall meet the requirements of the precast concrete barrier details as shown on the Plans or Standard Details and in accordance with the Contract Documents.

B. Related Work Included Elsewhere

1. Traffic control plan; Section 01411.
2. Traffic barriers; Section 02721.
3. Portland cement concrete; Section 03310.

C. Quality Assurance

The County Engineer will inspect all materials before and/or after installation to ensure compliance with the Contract Documents.

D. Submittals

Shop drawings shall be submitted as specified in the "General Provisions" for all concrete barriers furnished. The shop drawings shall provide the information specified in Sections 02721.01, 03200.01 and 03310.01.

01421.02 MATERIALS

A. Materials Furnished by the County

The County will not furnish any materials for concrete barrier installation.

B. Contractor's Options

RESERVED FOR FUTURE USE

C. Detailed Material Requirements

1. Welded wire fabric shall be as specified in Section 03200.02.

**TEMPORARY PRECAST CONCRETE BARRIER
FOR MAINTENANCE OF TRAFFIC**

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2. Portland cement concrete for barriers shall be Mix No. 6 as specified in Section 03310.02.
3. Each unit of precast concrete barriers, as a minimum requirement, shall be completely covered with white acrylic water-base paint in accordance with the manufacturer's recommendations.
4. Warning lights and/or reflectors shall be furnished in accordance with MUTCD and shall be approved by the County Engineer before installation.

01421.03 EXECUTION

A. General

Temporary concrete barriers shall be furnished and placed at locations indicated on the Plans or as directed by the County Engineer. Care shall be taken by the Contractor to assure that the precast sections are not damaged during the placing operations. Particular care shall be exercised to assure that the connecting plate is not struck during installation operations. The Contractor shall be responsible to maintain the precast barrier in a safe and effective condition. Damaged units shall be replaced by the Contractor.

B. Painting

The exposed face and top of the temporary precast concrete barrier shall be painted in accordance with Section 01421.02, Article C, Paragraph 3. The Contractor shall repaint the barriers when peeling, flaking, aging, and/or deterioration of the reflective delineation of the units are evident.

C. Warning Lights and/or Reflectors

Warning lights and/or reflectors shall be installed on the temporary barrier with a spacing in feet not to exceed the speed limit in miles per hour.

D. Resetting Barriers

Resetting temporary concrete barriers shall consist of removing, relocating, and resetting the temporary concrete barrier at a new location as directed by the County Engineer.

01421.04 METHOD OF MEASUREMENT

A. Temporary Concrete Barrier

RESERVED FOR FUTURE USE

B. Reset Temporary Concrete Barrier

RESERVED FOR FUTURE USE

01421.05 BASIS OF PAYMENT

A. Temporary Concrete Barrier

**TEMPORARY PRECAST CONCRETE BARRIER
FOR MAINTENANCE OF TRAFFIC**

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RESERVED FOR FUTURE USE

B. Reset Temporary Concrete Barriers

RESERVED FOR FUTURE USE

C. Warning Lights and/or Reflectors

RESERVED FOR FUTURE USE

D. Ownership of Removed Materials

RESERVED FOR FUTURE USE

SECTION 01422

W BEAM TRAFFIC BARRIER FOR MAINTENANCE OF TRAFFIC

01422.01 GENERAL

A. Description

This work shall consist of furnishing, erecting, resetting, maintaining, and the removal of W beam traffic barrier for maintenance of traffic at locations indicated on the Traffic Control Plan (TCP) or as directed by the Engineer for protective measures while maintaining traffic during construction. The work shall include all required posts, cable, fixtures, and fastenings, beams, anchorages, and attachments, as well as the aligning, painting, and all work and incidentals necessary to satisfactorily complete the installation ready for traffic.

B. Related Work Included Elsewhere

1. Traffic control plan; Section 01411.
2. Traffic barriers; Section 02721.

C. Quality Assurance

The Engineer will inspect all materials before and/or after installation to ensure compliance with the Contract Documents.

D. Submittals

Shop drawings shall be submitted as specified in the "General Provisions" for all W beam, posts, and other hardware necessary and incidental to the installation of W beam traffic barriers.

01422.02 MATERIALS

A. Materials Furnished by the County

The County will not furnish any materials for W beam traffic barrier installation.

B. Contractor's Options

Not applicable.

C. Detailed Material Requirements

1. Steel posts, barrier W beam, and hardware for the traffic barrier shall be as specified in Section 02721.02.

2. Warning lights and/or reflectors shall be furnished in accordance with MUTCD and shall be approved by the County Engineer before installation.

01422.03 EXECUTION

A. W Beam Traffic Barrier for Maintenance of Traffic

The construction methods shall be in accordance with the applicable portion of Section 02721.03.

B. W Beam Traffic Barrier for Maintenance of Traffic Replacement

If damage occurs along any portion of the installed traffic barrier, the damaged section shall be immediately replaced. The work shall be accomplished in such a manner as to reflect the original horizontal and vertical alignments of the traffic barrier before damage.

C. Warning Lights and Reflectors

Warning lights and/or reflectors shall be installed on the temporary barrier with a spacing in feet not to exceed the speed limit in miles per hour.

D. Reset W Beam Traffic Barrier for Maintenance of Traffic

When construction work is sufficiently completed through a traffic control sector and the traffic barrier is no longer required, the traffic barrier and all components shall be removed and may be reset along a new construction area as required by the TCP or as directed by the County Engineer. The previous traffic control sector shall be restored to its original condition which may require grading, backfilling, compacting, seeding, sodding, mulching, paving, or shoulder restoration.

01422.04 METHOD OF MEASUREMENT

A. W Beam Traffic Barrier for Maintenance of Traffic

RESERVED FOR FUTURE USE

B. W Beam Traffic Barrier for Maintenance of Traffic - Replacement

RESERVED FOR FUTURE USE

C. Reset W Beam Traffic Barrier for Maintenance of Traffic.

RESERVED FOR FUTURE USE

01422.05 BASIS OF PAYMENT

A. W Beam Traffic Barrier for Maintenance of Traffic

RESERVED FOR FUTURE USE

B. W Beam Traffic Barrier for Maintenance of Traffic - Replacement

RESERVED FOR FUTURE USE

C. Reset W Beam Traffic Barriers for Maintenance of Traffic.

RESERVED FOR FUTURE USE

D. Warning Lights and/or Reflectors

RESERVED FOR FUTURE USE

E. Ownership of Removed Materials

RESERVED FOR FUTURE USE

SECTION 01423

TUBULAR MARKERS FOR MAINTENANCE OF TRAFFIC

01423.01 GENERAL

A. Description

This work shall consist of furnishing and installing, complete in place, tubular markers for maintenance of traffic. Tubular markers shall be used to provide reflective delineation for channelizing traffic through the construction areas or detours as indicated on the approved Traffic Control Plan (TCP) or as directed by the County Engineer.

B. Related Work Included Elsewhere

Traffic control plan; Section 01411.

C. Quality Assurance

1. The County Engineer will inspect all materials before and/or after installation to ensure compliance with the Contract Documents.
2. Tubular markers shall meet the following minimum test requirements

- a. Impact Resistance

To measure each delineator's reaction to vehicle impact, the delineator shall be attached to a road surface and struck by a vehicle at various speeds. Results after each impact shall be recorded. The first two impacts shall be at 20 mph; the next two impacts at 40 mph; then two final impacts shall be conducted at 60 mph. The tubular markers shall not damage vehicles nor change the traffic pattern upon impact, and the delineators shall be self-righting after impact testing.

- b. Temperature

The delineators shall withstand high and low temperatures and still be self-supporting. They shall remain upright after four hours of exposure at 140 Degrees Fahrenheit. Likewise, after four hours of exposure to temperatures of -8 Degrees Fahrenheit a tubular marker shall be capable of being bent over 180 degrees with no distress.

D. Submittals

A certificate of compliance shall be submitted as specified in the "General Provisions" for tubular markers stating that they meet the requirements and have demonstrated

compliance with the test specified herein.

01423.02 MATERIALS

A. Materials Furnished by the County

The County will not furnish any materials for tubular marker installation.

B. Contractor's Options

Not applicable.

C. Detailed Material Requirements

1. Tubular markers shall consist of a snap back delineator post and base that can be secured to any pavement with epoxy. The post with base shall be a minimum height of 36 inches and have a minimum outside diameter of 2.3 inches. The posts shall be made of materials to withstand impact without damage to themselves or to vehicles and shall return to the original upright position after impact.
2. No paint shall be used on either the post or base so they remain maintenance free. Reflectorization of tubular markers shall be a minimum of two 3-inch bands placed a maximum of 2 inches from the top with a maximum of 6 inches between the bands. The posts shall have a detachable base, no more than 2 inches in height, which may be mated to a new tubular marker when the original marker fails because of repeated vehicle impact. Reflectorized materials shall have a smooth, sealed outer surface which shall display the same approximate color day and night. Color shall be in accordance with the Manual on Uniform Traffic Control Devices or as noted on the TCP.

01423.03 EXECUTION

All materials, equipment, and services necessary for the complete installation of the tubular markers, as indicated on the approved TCP, shall be as prescribed by the manufacturer furnishing the material. Tubular markers shall be installed on paved surfaces only, as recommended by the manufacture and as approved by the County Engineer.

01423.04 METHOD OF MEASUREMENT

A. Tubular Marker Installation

RESERVED FOR FUTURE USE

B. Tubular Marker Replacement

RESERVED FOR FUTURE USE

01423.05 BASIS OF PAYMENT

A. Tubular Marker Installation

RESERVED FOR FUTURE USE

B. Tubular Marker Replacement

RESERVED FOR FUTURE USE

C. Ownership of Removed Materials

RESERVED FOR FUTURE USE

SECTION 01424

ARROW PANEL FOR MAINTENANCE OF TRAFFIC

01424.01 GENERAL

A. Description

At those locations where a traffic lane is to be closed for purpose of construction, an arrow panel meeting the specifications noted below shall be used. The arrow panel shall supplement, but not replace, standard signing as required by the Manual on Uniform Traffic Control Devices, the Traffic Control Plan (TCP), and/or the Contract Documents.

B. Related Work Included Elsewhere

Traffic Control Plan; Section 01411.

C. Quality Assurance

The Contractor will be required to furnish the arrow panel(s) on site 24 hours in advance of actual use to insure the unit(s) are functioning properly.

D. Submittals

None.

01424.02 MATERIALS

A. Materials Furnished by the County

The County will not furnish any materials for arrow panel for maintenance of traffic.

B. Contractor's Options

Self-contained trailer unit(s) shall be used unless otherwise specified.

C. Detailed Material Requirements

1. The arrow panel(s) shall be self-contained, vehicle mounted or portable.
2. All arrow panels shall have both manual and automatic dimmer switches capable of reducing the light intensity by 50%. Photo cells for the automatic dimmers shall be periodically cleaned to prevent malfunctioning of the brightness control. The use of this dimmer switch shall be mandatory during the night operations of the arrow panel unit(s). Manual and automatic dimmer devices shall be designed to include a fail system which shall ensure that maximum brightness is displayed during

sunlight and 50 percent brightness is displayed during darkness regardless of which dimmer device is operational.

Arrow panels shall also meet the following requirements:

- a. Self-Contained Trailer Unit
 - 1) The arrow panel shall be 48 inches high by 96 inches wide (nominal).
 - 2) The arrow panel shall contain a minimum of 15 sealed beam lamps No. 4412 A-Par 46 or equal as approved by the County Engineer, amber in color, in accordance with the Institute of Traffic Engineers (ITE) specifications and mounted on a flat black background.
 - 3) The arrow panel shall flash at a rate of 25 to 36 flashes per minute with a dwell time of 50% of the cycle.
 - 4) The arrow panel shall be arranged with a double pointed arrow configuration capable of displaying a left arrow, right arrow, double arrow, and a caution mode; sequential chevron display is also acceptable if all operational modes can be displayed.
- b. Vehicle Mounted Arrow Panel
 - 1) The arrow panel shall be 36 inches high by 64 inches wide (nominal).
 - 2) The arrow panel shall contain a minimum of 13 sealed beam lamps No. 4412 A-Par 46 or County approved equal, amber in color, in accordance with the ITE specifications and mounted on a flat black background.
 - 3) The arrow panel shall flash at a rate of 25 to 35 flashes per minute with a dwell time of 50% of the cycle.
 - 4) The arrow panel shall be arranged with double pointed arrow configuration capable of displaying a left arrow, right arrow, double arrow, and a caution mode; sequential chevron display is also acceptable if all operational modes can be displayed.
- c. Portable Arrow Panels
 - 1) The arrow panels shall be 24 inches high by 48 inches wide (minimum).
 - 2) The arrow panel shall contain a minimum of thirteen 4-inch diameter lenses, amber in color, illuminated by No. 1295 GE lamps or County approved equal, or sealed beam lamps No. 4415A, in accordance with the ITE specifications and mounted on a flat black background.
 - 3) The arrow panel shall flash at a rate of 50 flashes per minute with a dwell time of 50% of the cycle.
 - 4) The arrow panel shall be arranged with a double pointed arrow configuration capable of displaying a left arrow, right arrow, double arrow, and a caution

mode; sequential chevron display is also acceptable if all operational modes can be displayed.

01424.03 EXECUTION

A. General

1. Arrow panel(s) for maintenance of traffic shall be used when necessary to temporarily occupy any part of the traveled width of roadway which will restrict traffic, either on the project site or on any other existing roadway. Arrow panels shall not be placed without the approval of the County Engineer. Where the County's TCP indicates that arrow panel(s) will be used, any alternate plans to the TCP must also include panel board(s).
2. For a lane closure on a two-lane, two-way highway, or for a shoulder closure arrow panel(s) shall be used only in the caution mode unless indicated otherwise by the TCP or the County Engineer. The "caution" mode on an arrow panel shall show only one light in each corner of the arrow panel.
3. Arrow panels shall conform to the applicable requirements of section 6E-7 of the MUTCD. Arrow panels shall only be used to supplement other required traffic control devices. Arrow panels shall be used in the arrow mode only when closing a through travel lane on a multilane roadway. Only one arrow panel in the "arrow" mode shall be used for each stationary lane closure. Moving work operations may utilize one or more arrow panels for a single lane closure. Care shall be taken in the placement of arrow panels to avoid driver confusion in the vicinity of ramps, median crossovers, and side road intersections.
4. Arrow panels shall be aimed at approaching traffic to insure that the minimum legibility distance as specified in section 6E-9 of the MUTCD is met. Arrow panels shall be erected so that the arrow is level in relation to the roadway.
5. For stationary lane closures, the arrow panel shall be placed on the shoulder at the beginning of the taper (nearest to oncoming traffic). Where there are narrow or no existing shoulders in the closed lane the arrow panel shall be placed behind the channelizing devices as near to the beginning of the taper as possible.
6. For moving maintenance type activities along multilane highways where a lane is closed, the arrow panel shall be placed at the rear of the activity in the closed lane on a vehicle separate from the maintenance vehicle itself. For paint striping-type activities, additional vehicles with arrow panels in the arrow panel mode may be required to supplement this work operation. Arrow panels shall always remain upstream of the maintenance vehicle where adequate recognition distance is available. The vehicle carrying the arrow panel shall also be equipped with signing and lighting as required by the standard TCP.

B. Maintenance

The Contractor is responsible for maintenance of the units, including cleaning, so as to provide maximum protection for and visibility to the traveling public.

C. Request for Lane Usage

The Contractor shall make a request to the County Engineer for such lane usage 24 hours in advance of the time a traffic lane is desired to be made available to the Contractor for the prosecution of the work. Prior to opening the closed lane to traffic, the Contractor shall clear the lane of all material, equipment, and debris and shall leave it in a condition satisfactory to the County Engineer for the resumption of its use by the public.

01424.04 METHOD OF MEASUREMENT

RESERVED FOR FUTURE USE

01424.05 BASIS OF PAYMENT

A. Arrow Panels

RESERVED FOR FUTURE USE

B. Ownership of Removed Materials

RESERVED FOR FUTURE USE

SECTION 01425

DRUMS FOR WARNING AND CHANNELIZATION

01425.01 GENERAL

A. Description

This work shall consist of furnishing and installing, complete in place reflectorized drums for traffic warning and channelization of traffic during construction. The drums shall be used to provide reflective delineation for channelizing traffic through the construction areas or detours as indicated on the approved Traffic Control Plan (TCP) or as directed by the County Engineer.

B. Related Work Included Elsewhere

Traffic control plan; Section 01411.

C. Quality Assurance

1. The County Engineer will inspect all materials before and/or after installation to ensure compliance with the Contract Documents.
2. Certification of color conformance for reflectorized sheeting shall be made.

01425.02 MATERIALS

A. Materials Furnished by the County

The County will not furnish any materials for drums for warning and channelization installations.

B. Contractor's Options

Not applicable.

C. Detailed Material Requirements

1. Drums
 - a. Drums shall be manufactured of materials which will withstand impact without damage to themselves or to vehicles.
 - b. Drums shall be 36 inches in height and 18 inches in diameter.
 - c. Drums shall be reflectorized by horizontal, circumferential strips alternating orange and white in color. There shall be a minimum of two orange and two

white strips per drum with the top strip orange. Strips shall be a minimum of 6 inches in width.

- d. All drums shall be new or like new condition.
 - e. Portions of drums not covered by reflective strips shall be painted or otherwise colored orange.
2. Reflectorized Strips
- a. Reflective sheeting used for the strips shall be the encapsulated lens type meeting the latest requirements of Federal Highway Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects.
 - b. Color shall be matched visually and be within the color tolerance limits shown on the appropriate Highway Color Tolerance Charts issued by the Federal Highway Administration utilizing the instruction thereon.
 - c. Minimum reflective intensity values for encapsulated lens sheeting shall be as follows:

| Observation Angle in degrees | Entrance Angle in degrees | Color | |
|------------------------------|---------------------------|--------------|--------|
| | | Silver-White | Orange |
| 0.2 | - 4 | 250 | 100 |
| 0.2 | 30 | 150 | 60 |
| 0.5 | - 4 | 95 | 30 |
| 0.5 | 30 | 65 | 25 |

- d. Reflectorized sheeting shall be applied to the drums in strict accordance with the sheeting manufacturer's recommendations.

01425.03 EXECUTION

A. Installation

Drums shall be set and/or reset as indicated on the approved TCP or as directed by the County Engineer.

B. Maintenance

- 1. Drums that become faded or otherwise difficult to see fully shall be replaced. Drums that are not new will be permitted to be used provided their reflective intensity meets at least 60 percent of the values indicated in Section 01425.02, Article C, Item 2.c. over at least 90 percent of the reflectorized surface area.
- 2. Drums shall be checked daily by the Contractor and drums damaged by traffic shall be replaced by the Contractor at the Contractor's expense.

C. Removal

After the drums have served the intended purpose, the Contractor shall completely remove the drums from the Project site and perform any necessary surface restoration required to return the site to a condition satisfactory to the County Engineer.

01425.04 METHOD OF MEASUREMENT

RESERVED FOR FUTURE USE

01425.05 BASIS OF PAYMENT

A. Installation

RESERVED FOR FUTURE USE

B. Replacement of Damaged Drums

RESERVED FOR FUTURE USE

C. Ownership of Removed Materials

RESERVED FOR FUTURE USE

SECTION 01430

TRAFFIC CONTROL SIGNS THROUGH CONSTRUCTION AREAS FOR MAINTENANCE OF TRAFFIC

01430.01 GENERAL

A. Description

1. This work shall consist of furnishing and placing signs to control traffic, vehicular and pedestrian, through all construction areas on County and/or State Highways in accordance with the Traffic Control Plan (TCP), as directed by the County Engineer, and/or as specified in the Contract Documents.
2. All traffic control signs used on construction, maintenance, and public utility operations under the jurisdiction of the County and/or State Highway Administration shall be in accordance with this section and the latest edition of the Manual on Uniform Traffic Control Devices.
3. Traffic control signs shall be installed at the beginning of construction operations and shall be properly maintained and/or operated during the time such conditions exist. They shall remain in place only as long as they are needed and shall be immediately removed thereafter. Where operations are performed in stages, only those devices that apply to existing traffic patterns shall be displayed. All other devices shall be removed, covered with opaque material, or turned so as not to be readable by oncoming traffic. Sign supports shall be constructed and erected in a workmanlike manner.
4. Signs for the purpose of controlling traffic shall not be obscured by weeds, trees, shrubbery, construction equipment, materials or spoil, personal vehicles, etc.
5. All traffic control signs (rigid or flexible) used at night shall be reflectorized to show the same shape and color as in daylight conditions. The sign background shall be the color/colors specified in the Manual on Uniform Traffic Control Devices.

B. Related Work Included Elsewhere

Traffic control plan; Section 01411.

C. Quality Assurance

The County Engineer will inspect all materials before and/or after installation to ensure compliance with the Contract Documents.

D. Submittals

Certificates of compliance shall be submitted as specified in the "General Provisions" for

sign materials stating that the materials meet the applicable requirements and/or standards specified herein.

01430.02 MATERIALS

A. Materials Furnished by the County

The County will not furnish any traffic control signs for the maintenance of traffic.

B. Contractor's Options

Not applicable.

C. Detailed Material Requirements

1. Reflective sheeting shall have either a wood or aluminum backing.
 - a. All wood sign panel backing shall be of 5/8 inch high density overlay exterior plywood. All aluminum sign panel backing shall have a minimum thickness of 0.10 inch. The chromate protective coating for flat sheet blanks shall meet the requirements of ASTM B 449, Class II, and shall be at least standard aluminum designation 3003 alloy.
 - b. Blanks shall be free of buckles, warps, dents, burrs, oil, and foreign contaminants prior to application of reflective sheeting.
2. Reflective Sheeting
 - a. The reflective sheeting shall be the encapsulated lens type meeting the latest requirements of Federal Highway Administration, Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects.
 - b. The color specified shall be matched visually and be within the color tolerance limits shown on the appropriate Highway Color Tolerance Charts issued by the Federal Highway Administration and utilizing the instructions thereon. Certification as to conformance with this requirement will be accepted by the County Engineer.
 - c. Minimum reflective intensity values for encapsulated lens sheeting:

| Observation Angle in degrees | Entrance Angle in degrees | Silver-White | Yellow | Red | Orange | Green | Blue |
|------------------------------|---------------------------|--------------|--------|-----|--------|-------|------|
| 0.2 | - 4 | 250 | 170 | 45 | 100 | 45 | 20.0 |
| 0.2 | +30 | 150 | 100 | 25 | 60 | 25 | 11.0 |
| 0.5 | - 4 | 95 | 62 | 15 | 30 | 15 | 7.5 |
| 0.5 | +30 | 65 | 45 | 10 | 25 | 10 | 5.0 |

3. Sign posts shall be 4 inch x 4 inch lumber.

01430.03 EXECUTION

A. General

All traffic control signs used on construction or maintenance work in both rural and urban areas shall be in accordance with the applicable sections of the Manual on Uniform Traffic Control Devices. Since it is not practical for the Manual on Uniform Traffic Control Devices to prescribe detailed standards of application for all the situations that may conceivably arise, the standards presented are for the most common situations. It is emphasized that they are for normal situations and that additional protection must be provided when special complexities and hazards prevail. Less protection may be warranted under special conditions as well. The variety of conditions encountered makes the establishment of inflexible arrangements totally impractical. Nothing in this specification shall be interpreted as precluding the application of engineering judgment. In all questions of interpretations, the judgment of the County Engineer will be final.

B. Ground Mounted Signs

The placement of the signs shall be in accordance with the detailed dimensions shown in Manual on Uniform Traffic Control Devices or as shown on the approved TCP.

Sign posts length shall be sufficient so that the buried portion will adequately and firmly support the sign.

The Contractor is responsible for mounting and maintaining signs in their proper location. This includes any necessary cleaning so that the signs are legible at all times.

C. Sign Replacement

Signs that become faded or illegible shall be replaced. Signs that are not new may be used, provided their reflective intensity at a divergence angle of 0.2 degrees and incidence angle of minus 4 degrees meets at least 60% of the values of Table 01430.02.

Signs damaged by traffic shall be replaced.

The acceptability of the signs shall be measured by means of a calibrated, one foot square test standard that meets 60% of the reflective requirements at a divergence angle of 0.2 degrees and incidence angle of minus 4 degrees from Section 01430.02, Paragraph C.2.c.

The calibrated sheeting shall be attached by temporary means to the sign in question and viewed at night from the portion of roadway that is being maintained through the construction area. The intent is to view the sign as the motorist sees it. If the sign has less intensity than the standard, it shall be rejected by the County Engineer and replaced at the Contractor's expense.

01430.04 METHOD OF MEASUREMENT

RESERVED FOR FUTURE USE

**TRAFFIC CONTROL SIGNS THROUGH CONSTRUCTION
AREAS FOR MAINTENANCE OF TRAFFIC**

01430-4

01430.05 BASIS OF PAYMENT

A. Traffic Control Signs

RESERVED FOR FUTURE USE

B. Ownership of Removed Materials

RESERVED FOR FUTURE USE

SECTION 01440

TEMPORARY CRASH CUSHIONS (G-R-E-A-TC2) FOR MAINTENANCE OF TRAFFIC

01440.01 GENERAL

A. Description

This work shall consist of furnishing and installing, complete in place, temporary crash cushion (G-R-E-A-TC2) within construction zones in accordance with the manufacturer's recommendation. The crash cushions can be arranged in a variety of patterns to protect errant motorists from collision with unmovable hazards during construction. They shall be located as shown on the Traffic Control Plan (TCP) and/or as directed by the County Engineer.

B. Related Work Included Elsewhere

Traffic control plan; Section 01411.

C. Quality Assurance

1. The County Engineer will inspect all materials before and/or after installation to ensure compliance with the Contract Documents.
2. The Contractor shall perform periodic checks at least once a week to determine that no unreported or undetected damages have occurred as well as to determine that the unit(s) are performing as required.

D. Submittals

Shop drawings shall be submitted as specified in the "General Provisions" for (G-R-E-A-TC2) crash cushions. The shop drawings shall include general product description and impact attenuation capability.

01440.02 MATERIALS

A. Materials Furnished by the County

The County will not furnish any materials for temporary, hydrocell-type impact attenuators.

B. Contractor's Options

Not applicable.

C. Detailed Material Requirements

Each G-R-E-A-T-C2 crash cushion shall consist of a number of predetermined individual cartridges, miscellaneous metalwork, diaphragms, fender panels, a backup system, base pad, anchor device, and a hose wrap as manufactured by Energy Absorption Inc., Rich Hydrocushion Inc. or County approved equal.

01440.03 EXECUTION

A. Installation

The G-R-E-A-T-C2 crash cushion system shall be installed and securely anchored on a base pad that has been prepared to meet the manufacturer's recommendations at the locations shown on the TCP and/or as directed by the County Engineer.

B. Repairs of Damaged Crash Cushions

During the intended life of the G-R-E-A-T-C2 crash cushions, the Contractor shall provide the necessary maintenance in order that each crash cushion system remain in its original condition and position. Should the crash cushion system become damaged the Contractor shall immediately repair the system using the manufacturer's spare parts package(s). The Contractor shall perform any necessary re-grading and/or re-anchorage of the system and shall remove any debris or remnant of the damaged crash cushion system from the Project site.

C. Removal

After the crash cushion system has served its intended purpose, the Contractor shall completely remove the installation from the Project site and perform any necessary surface restoration such as grading, filling, cleanup, sodding, seeding, and mulching of the area to the satisfaction of the County Engineer.

01440.04 METHOD OF MEASUREMENT

A. Temporary Crash Cushion (G-R-E-A-TC2) Installation

RESERVED FOR FUTURE USE

B. Repairing Damaged Crash Cushions

RESERVED FOR FUTURE USE

01440.05 BASIS OF PAYMENT

A. Temporary Crash Cushion (G-R-E-A-TC2) Installation

RESERVED FOR FUTURE USE

B. Repairing Damaged Crash Cushions

RESERVED FOR FUTURE USE

**TEMPORARY CRASH CUSHIONS (G-R-E-A-TC2)
FOR MAINTENANCE OF TRAFFIC**

01440-3

C. Ownership of Removed Materials

RESERVED FOR FUTURE USE

SECTION 01441

TEMPORARY SAND CONTAINER CRASH CUSHIONS FOR MAINTENANCE OF TRAFFIC

01441.01 GENERAL

A. Description

This work shall consist of furnishing and installing, complete in place, temporary sand container crash cushion(s) for maintenance of traffic. The temporary crash cushion shall be arranged as shown on the Traffic Control Plan (TCP) and/or as directed by the County Engineer and shall consist of a configuration of standard yellow plastic containers filled with varying weights of sand. They are used during the construction period to provide for safe vehicular and/or pedestrian traffic by shielding rigid objects or hazardous conditions which cannot be removed, relocated, or made breakaway.

B. Related Work Included Elsewhere

Traffic control plan; Section 01411.

C. Quality Assurance

1. The County Engineer will inspect materials before and/or after installation to ensure compliance with the Contract Documents.
2. The Contractor shall perform periodic checks at least once a week to determine that no unreported or undetected damages have occurred as well as to determine that the unit(s) are performing as required. The condition of the crash cushions shall be made at least once a week.

D. Submittals

Shop drawings shall be submitted as specified in the "General Provisions" for sand containers. The shop drawings shall include general product description, crash cushion capability, and manufacturer's design manual.

01441.02 MATERIALS

A. Materials Furnished by the County

The County will not furnish any materials for temporary sand container type impact attenuators.

B. Contractor's Options

Not applicable.

C. Detailed Material Requirements

The temporary sand container crash cushion(s) for maintenance of traffic shall be either the Fitch Inertial Barrier System as manufactured and distributed by FIBCO, Inc., One Boston Place, Massachusetts; the Energite Inertial Barrier System, manufactured and distributed by the Energy Absorption System, Inc., One E. Wacker Drive, Chicago, Illinois; or County approved equal.

01441.03 EXECUTION

A. Installation

The yellow plastic containers shall be assembled in accordance with the manufacturer's recommendation and placed in a prescribed configuration of specified weights in individual containers as shown on the TCP. The components, assembly, and filling of the individual containers shall be in accordance with the manufacturer's design manual. The designs for the temporary crash cushion(s) shown in the TCP have been selected for a specific purpose and site condition. Any request by the Contractor for deviation or modification of the configuration must have the manufacturer's written statement concurring with the change prior to submittal to the County Engineer for approval.

B. Sand Container Replacement

During the intended life of the crash cushions, the Contractor shall provide the necessary maintenance in order that each individual container remains in its original and intended position. Should the container(s) become damaged or destroyed, the Contractor shall immediately replace them with those of equal weight. The Contractor shall perform any necessary regrading before placing the container(s) back into the original intended position and shall remove any debris or remnant of damaged container(s) from the Project site.

C. Removal

After the crash cushion has served its intended purpose, the Contractor shall completely remove the installation from the project site and perform any necessary regrading, cleanup, sodding, seeding, and mulching of the area to the satisfaction of the County Engineer.

01441.04 METHOD OF MEASUREMENT

A. Sand Container Installation

RESERVED FOR FUTURE USE

B. Sand Container Replacement

RESERVED FOR FUTURE USE

01441.05 BASIS OF PAYMENT

A. Sand Container Installation

**TEMPORARY SAND CONTAINER CRASH CUSHIONS
FOR MAINTENANCE OF TRAFFIC**

01441-3

RESERVED FOR FUTURE USE

B. Sand Container Replacement

RESERVED FOR FUTURE USE

C. Ownership of Removed Materials

RESERVED FOR FUTURE USE

SECTION 01450

TEMPORARY PAINTED STRIPE MARKING FOR MAINTENANCE OF TRAFFIC

01450.01 GENERAL

A. Description

This work shall consist of furnishing and installing, complete in place, traffic paint, white and yellow, that is used for maintenance of traffic in the striping of traffic lanes which could be shifting time to time as the project progresses.

B. Related Work Included Elsewhere

Traffic control plan; Section 01411

C. Quality Assurance

The County Engineer will inspect all materials before and/or after installation to ensure compliance with the Contract Documents.

D. Submittals

1. Shop Drawings

Shop drawings shall be submitted as specified in the "General Provisions" for all paint supplied. The shop drawings shall include general product description and storage and application recommendations.

2. Certificates of Compliance

Certificates of compliance shall be submitted as specified in the "General Provisions" stating that the paint meets the reflectivity requirements contained in the Manual on Uniform Traffic Control Devices.

01450.02 MATERIALS

A. Materials Furnished by the County

The County will not furnish any materials for temporary painted stripe marking.

B. Contractor's Options

Not applicable.

C. Detailed Material Requirements

1. A 20-second dry paint by an approved source of supply shall be used. It shall meet the reflectivity requirements of the Manual on Uniform Traffic Control Devices.
2. The pigmented binders, white and yellow, shall provide the proper anchorage and refraction for glass beads when both binder and spheres are applied in the stipulated quantities with the specialized equipment so that the glass beads are induced into the paint spray fan with a pressurized bead gun.
3. The pigmented binder shall show no evidence of excessive settling or livering upon storage in the sealed container as received, to the degree that it would make reincorporation difficult by standard and normal methods, or so as to detrimentally affect its application with the specialized equipment.

01450.03 EXECUTION

A. Application

Paint shall be applied in accordance with the manufacturer's direction. The location of the lines shall be in accordance with the Manual on Uniform Traffic Control Devices, the Traffic Control Plan (TCP), and/or directed by the County Engineer. Newly applied paint shall be dry so as not to track when crossed by a vehicle 20 seconds after application.

B. Removal

1. When it is desired to shift lanes, all previously applied paint shall be removed to the satisfaction of the County Engineer. The Contractor shall remove the paint so that there is no damage to the existing or ultimate surface courses. Removal shall not be by painting over the existing pavement markings.
2. Prior to opening previously closed or shifted lanes to traffic, all temporary painted striping shall be removed and a new temporary painted striping applied, if necessary, so as not to confuse the traveling public.

01450.04 METHOD OF MEASUREMENT

A. Paint Application

RESERVED FOR FUTURE USE

B. Paint Removal

RESERVED FOR FUTURE USE

01450.05 BASIS OF PAYMENT

A. Paint Application

RESERVED FOR FUTURE USE

B. Paint Removal

RESERVED FOR FUTURE USE

SECTION 01451

TEMPORARY PAVEMENT TAPE MARKING FOR MAINTENANCE OF TRAFFIC

01451.01 GENERAL

A. Description

This work shall consist of furnishing and installing, complete in place, and removal of temporary reflective marking tape. Such tapes are intended for temporary use on construction projects. Placement shall be as shown on the Traffic Control Plan (TCP) and/or as directed by the County Engineer. The tape shall be removed when its is no longer required for a particular construction phase or sequence, or at the completion of the Project.

B. Related Work Included Elsewhere

Traffic control plan; Section 01411.

C. Quality Assurance

1. The County Engineer will inspect all materials before and/or after installation to ensure compliance with the Contract Documents.
2. The temporary pavement tape marking material as supplied shall be of good appearance, free from cracks, and edges shall be true, straight, and unbroken. The material shall be available in rolls, and there shall be no more than three splices per 50 yards of length. The material shall be packaged in accordance with accepted commercial standards. When the material is stored under normal conditions, it shall be suitable for use for a period of at least one year after purchase.

D. Submittals

1. Shop Drawings

Shop drawings shall be submitted as specified in the "General Provisions" for all tape supplied. The shop drawings shall include general product description and storage and application recommendations.

2. Certificates of Compliance

Certificates of compliance shall be submitted as specified in the "General Provisions" stating that the tape meets the requirements specified in Section 01451.02.

01451.02 MATERIALS

A. Materials Furnished by the County

The County will not furnish any materials for temporary pavement tape marking.

B. Contractor's Options

Not applicable.

C. Detailed Material Requirements

1. General

The temporary pavement tape marking material shall consist of a weather and traffic resistant reflective film on a conformable backing.

2. Color

The temporary pavement tape marking material shall be a reflective white or yellow color as specified for pavement markings in the current edition of the Manual on Uniform Traffic Control Devices.

3. Reflectivity

The white and yellow film shall have the following initial minimum reflective intensity values measured in accordance with Federal Test Method Standard 370:

| | <u>White</u> | <u>Yellow</u> |
|--|--------------|---------------|
| Observation Angle | 0.2° - 0.5° | 0.2° - 0.5° |
| Specific Intensity/Unit Area Candelas/Foot Candle/sq. ft. | 0.65 - 0.50 | 0.48 - 0.32 |
| Entrance Angle | -4° | -4° |

4. Adhesive

The temporary pavement tape marking material shall be capable of being affixed to bituminous concrete, Portland cement concrete, or similar surfaces when applied according to the manufacturer's recommendations at surface temperatures down to 35 Degrees Fahrenheit and shall require no protective devices such as traffic cones or barricades after application.

5. Skid Resistance

The surface of the reflective film shall provide a minimum skid resistance value of 35 BPN when tested according to ASTM E 303.

6. Durability and Wear Resistance

Samples of the material shall be applied to a 4-inch x 4-inch metal test panel which is a minimum thickness of 0.040 inches and prepared for application according to the recommendations of the manufacturer. The applied sample shall be tested in accordance with Federal Test Method Standard No. 141, Method 6192, using a CS-17 wheel and 1000 gram load and shall not wear through to the metallic surface in less than 3000 cycles. Care should be taken to adjust the vacuum suction for the most effective removal of the abradings.

01451.03 EXECUTION

A. Preparation

The pavement should be clean and dry with all contaminants such as dirt and loose asphalt particles removed prior to application of temporary pavement marking material. Loose or poorly adhered painted markings must be removed as well and an effort should be made not to apply temporary pavement marking tape over existing painted surfaces.

B. Installation

The temporary pavement tape marking material may be installed either by hand application or mechanical applicator in accordance with the manufacturer's recommendations. The temporary pavement marking tape material shall be maintained and/or replaced by the Contractor until final removal is directed by the County Engineer.

C. Removal

The Contractor must physically demonstrate to the County Engineer that there will be no damage to the pavement surface upon removal of the temporary pavement tape marking material. However, the illusion of a line may appear due to adhesive residue remaining after removal of the tape. All tape and all adhesive residue remaining that is indicated by the County Engineer for removal shall be completely removed by the Contractor.

01451.04 METHOD OF MEASUREMENT

A. Tape Installation

RESERVED FOR FUTURE USE

B. Tape Removal

RESERVED FOR FUTURE USE

01451.05 BASIS OF PAYMENT

A. Tape Installation

RESERVED FOR FUTURE USE

B. Tape Removal

RESERVED FOR FUTURE USE

SECTION 01470

TEMPORARY GRADED AGGREGATE, BITUMINOUS CONCRETE, AND/OR CALCIUM CHLORIDE FOR MAINTENANCE OF TRAFFIC

01470.01 GENERAL

A. Description

1. This work shall consist of furnishing and placing graded aggregate, bituminous concrete, and/or calcium chloride for maintenance of traffic. These materials shall be used to maintain the existing roadway surface and shoulders including crossroads, ramps, approaches, crossovers, and entrances within the limits of the Project for the duration of the Contract.
2. The County Engineer shall be the sole judge as to when patching or repairs are to be performed. The Contractor shall not perform any repairs without orders from the County Engineer.
3. Any hazardous condition which exists or develops during the term of the Contract such as potholes, shoulder defects, etc., shall be repaired or patched by the Contractor to the satisfaction of the County Engineer.

B. Related Work Included Elsewhere

1. Aggregate base and subbase courses; Section 02621.
2. Bituminous concrete pavements; Section 02641.

C. Quality Assurance

1. The County Engineer will inspect all materials before any/or after installation to ensure compliance with the Contract Documents.
2. Periodically the County Engineer and the Contractor shall review the Project to determine what, if any, repairs are required to the existing facilities.

D. Submittals

None.

01470.02 MATERIALS

A. Materials Furnished by the County

1. The County will not furnish any materials for the maintenance of roadways, shoulders, ramps, approaches, crossovers, or entrances.

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2. The Contractor may purchase potable water from the County's potable water system for calcium chloride application in accordance with current County policies and procedures. The Contractor shall contact the County Department of Fiscal Service, Meter Section, for requirements. A backflow prevention device must be placed in accordance with the Standard Details prior to drawing County water.

B. Contractor's Options

Not applicable.

C. Detailed Material Requirements

1. Graded Aggregate

Graded aggregate shall meet the gradation requirements of AASHTO M 43, Size number 57, as specified in Section 02621.02.

2. Bituminous Concrete

Bituminous concrete shall meet the requirements specified in Section 02641.02.

3. Calcium Chloride

Calcium chloride shall meet the requirements specified in Section 02621.02.

01470.03 EXECUTION

A. Maintenance

Any hazardous condition which exists or develops during the term of the Contract such as potholes, shoulder defects, etc., shall be repaired or patched by the Contractor to the satisfaction of the County Engineer.

B. Preparation

Prior to the placement of temporary surfacing materials, the area shall be graded, leveled, compacted, and cleaned of all loose and foreign materials.

C. Graded Aggregate

1. Graded aggregate for temporary maintenance of traffic shall be placed and compacted in accordance with Section 02621.03 and as specified herein.
2. The material shall be uniformly spread over the prepared surface to the limits directed by the County Engineer.
3. Immediately after spreading, each layer shall be compacted by mechanical means so as to produce a dense and unyielding surface.

D. Bituminous Concrete

1. Bituminous concrete for temporary maintenance of traffic shall be placed and compacted in accordance with Section 02641.03 and as specified herein.
2. The material shall be machine spread and leveled in a uniform layer to the depth and limits directed by the County Engineer except on areas, where, on account of irregularities, unavoidable obstacles, or where machine spreading is impractical as determined by the County Engineer, the mixture shall be spread with lutes. The use of garden rakes will not be allowed.
3. After spreading and leveling, the bituminous concrete shall be thoroughly and uniformly compacted by mechanical means.

E. Calcium Chloride

1. Calcium chloride for temporary maintenance of traffic shall be Placed in accordance with Section 02621.03 and as specified herein.
2. After the graded aggregate has been placed as specified in Section 01470.03, Article B, calcium chloride shall be applied uniformly to the surface at a rate of 1 pound per square yard or at a rate directed by the County Engineer. If the surface is dry, it shall be sprinkled immediately before the calcium chloride is applied.

01470.04 METHOD OF MEASUREMENT

A. Maintenance of Existing Roadway

RESERVED

B. Graded Aggregate

RESERVED FOR FUTURE USE

C. Bituminous Concrete

RESERVED FOR FUTURE USE

D. Calcium Chloride

RESERVED FOR FUTURE USE

01470.05 BASIS OF PAYMENT

A. Maintenance of Existing Roadway

RESERVED FOR FUTURE USE

B. Graded Aggregate

RESERVED FOR FUTURE USE

C. Bituminous Concrete

RESERVED FOR FUTURE USE

D. Calcium Chloride

RESERVED FOR FUTURE USE

SECTION 01500

PROTECTION OF THE ENVIRONMENT

01500.01 GENERAL

A. Description

1. Charles County requires the Contractor to at all times conform to the control measures stipulated in the Standard Details, these Specifications, as shown on the Plans, as directed by the Maryland Department of the Environment (MDE) Inspector. The County Engineer may contact appropriate authorities if the contractor fails to install and/or maintain the sediment control measures.
2. Furnish, install, maintain, and remove temporary erosion, sediment, and environment protection and control measures as shown, specified, or both shown and specified on the approved sediment and erosion control plan and as directed by the MDE Inspector.
3. Provide all labor, materials, equipment, and services necessary for and incidental to the complete and satisfactory application of the temporary erosion, sediment, and environment protection and control measures throughout the term of the Contract.
4. The measures shall include, but are not limited to, the use of berms, dikes, dams, sediment basins, sediment traps, gravel or stone, filters, silt fences, straw bale dikes, fiber mats, netting, gravel or crushed stone, mulch, grasses, slope drains, and other appropriate methods approved by the Charles County Soil Conservation District to control erosion and siltation from erodible material exposed by construction activity on the project.
5. Sediment control devices shall be provided by the Contractor, whether or not specifically shown on the plans, to control surface drainage from within the construction site; borrow, waste, and storage areas, and all other areas disturbed by the Contractor's operations.
6. The Contractor shall be responsible for obtaining Sediment Control approvals and/or Permits from the appropriate agency for all off-site borrow or spoil areas, off-site storage areas and other areas used by the Contractor but not provided for by the County.
7. The Contractor will be responsible for inspection of erosion control measures at least weekly and after each rain event. Any measure which has been damaged or requires maintenance shall be immediately repaired to insure the maximum effectiveness of the installed measures. The Contractor shall maintain at the site a written record of the Contractor's inspections and the type and time of completion of all corrective work.
8. The installation of control measures shall be coordinated with the construction of the permanent drainage and paving facilities, and shall be constructed in accordance

with the phasing schedule on the approved sediment and erosion control plan to assure effective and continuous environmental control.

B. Related Work Included Elsewhere

1. Land, Air, and Water Pollution, Section GP7.13.
2. Excavating, placing embankments, permanent grading, dewatering of excavations, and all earthwork related to the construction of sediment control devices: Sections 02210, 02220, 02230, 02250, and 02260.
3. Clearing and grubbing; Section 02110.
4. Permanent seeding and sodding: Section 02820.

C. Standards

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D. Definitions

Land disturbance is defined as any surface disturbance, earth movement and/or land changes including, but not limited to, tilling, clearing, grading, excavating, stripping, filling, and related activities.

E. Permits and Agreements

1. Charles County Capital Improvement Projects

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2. Developer Constructed Facilities
 - a. The Developer must obtain all Sediment Control Permits and approvals for work constructed in Charles County. It is the Developer's responsibility to ensure that the Developer's Contractor meets all the terms and conditions of the permits and approvals during the Contractor's performance of the work.
 - b. The Developer must obtain all Waterway Construction Permits from the appropriate State of Maryland agency for any applicable construction within wetlands and/or flood plains of the waters of the State of Maryland and such permits as may be applicable from the United States Army, Corps of Engineers for construction within navigable waters. It is the Developer's responsibility to insure that the Developer's Contractor meets all the terms and conditions of the permit and approvals during the Contractor's performance of the work.
3. All arrangements for access ways (other than County right-of-way) to borrow areas, spoil areas, etc., shall be obtained by the Contractor in writing and shall be shown on the sediment control plan and shall contain a clause to the effect that the requirements and standards for sediment control, restabilization and restoration of the access ways and other disturbed areas shall meet or exceed the restabilization and restoration standards for County rights-of-way. A copy of the access

agreement and a copy of any additionally required State or County permits shall be sent to the County Engineer prior to the Contractor beginning work in any areas outside of the right-of-way.

F. Notifications

1. The Developer for projects whose ownership is intended to be transferred to Charles County shall notify, at least 48 hours before commencing any construction on the Project:
 - a. The Department of Development Services for projects administered by the Department of Development Services.
2. The site, work areas, materials, plans, specifications, and permits shall be available at all times at the project site during working hours for inspection by representatives of the respective Departments, the Charles County Soil Conservation District, and other governmental agencies from which permits were obtained.

01500.02 MATERIALS

A. Materials Furnished by the County

The County will not furnish any materials for protection of the Environment.

B. Contractor's Options

The Contractor may make such substitutions as allowed by the Charles County Soil Conservation District and approved by the County Engineer.

C. Detailed Material Requirements

1. Stone

Crushed stone shall meet the requirements of AASHTO M43 No. 1 (4" to 3/4") as specified in Section 02621. Crusher run stone (Maryland GA Base or GA S/B) is not acceptable.
2. Riprap

Class I, small riprap 3" to 15" in size (2 pounds to 150 pounds) shall be as specified in Section 02291.
3. Filter Fabric

Fabric for use in riprap pipe outlets shall conform to Section 921.09 of the "MSHA Standard Specifications for Construction and Materials (1993)".

01500.03 EXECUTION

A. General

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PROTECTION OF THE ENVIRONMENT

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B. Straw Bale Dikes and Silt Fences

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C. Crushed Stone and Riprap

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D. Calcium Chloride

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01500.04 METHOD OF MEASUREMENT

A. General

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B. Straw Bale Dikes and Silt Fences

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C. Crushed Stone and Riprap

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D. Calcium Chloride

RESERVED FOR FUTURE USE

01500.05 BASIS OF PAYMENT

A. General

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B. Lump Sum

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C. Straw Bale Dikes

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D. Silt Fence

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E. Crushed Stone for Erosion Control

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F. Class I Small Riprap for Erosion Control

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G. Payment for Calcium Chloride

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