

# CATEGORY 100

## SECTION 101 - CLEARING AND GRUBBING

**101.01 DESCRIPTION.** This work shall consist of clearing and grubbing within the limits specified in the Contract Documents.

### **101.01.01 Definitions.**

(a) **Clearing.** Clearing within the construction area includes removing and disposing of trees, brush, shrubs, vegetation, rotten wood, rubbish, fences and structures not specified in the Contract Documents for removal and disposal. Clearing outside the construction area is the removing and disposing of rubbish.

(b) **Grubbing.** Grubbing is removing from the ground and disposing of all stumps, roots and stubs, brush and debris.

(c) **Limits.** Limits of clearing and grubbing include the construction area and all ditch areas and stream or channel change areas. Limits of clearing may include the area between the construction area and the right-of-way or easement lines.

(d) **Clearing and Grubbing Unit.** A clearing and grubbing unit is the area of erodible earth material exposed at one time, not to exceed 20 acres (8 ha).

**101.02 MATERIALS.** Not applicable.

### **101.03 CONSTRUCTION.**

**101.03.01 Erosion and Sediment Control.** Unless otherwise specified in the Contract Documents or as directed by the Engineer, the clearing and grubbing area shall be limited to one 20 acre (8 ha) grading unit per grading operation. Once this first unit is 50 percent graded, the Contractor will be allowed to proceed with the second 20 acre (8 ha) grading unit. With the permission of the Engineer, the Contractor may be allowed to exceed the

one grading unit requirement to balance earth work or when grading interchanges. Erosion and sediment control shall conform to the Contract Documents and Section 308.

**101.03.02 Vegetation.** The Engineer will designate and mark any trees, shrubbery and plants that are to remain in place, and the Contractor shall protect them from any damage as specified in GP-7.11 Preservation and Restoration of Property. Branches of trees overhanging the roadway shall be cut and properly trimmed to maintain a vertical clearance of 16 ft (5 m). All trimming shall be done under the supervision of a tree expert furnished by the Contractor and licensed by the State of Maryland, including trimming of trees by the Contractor for any other reason. Trimming and repair of cuts and scars shall conform to Section 712.

**101.03.03 RESERVED-** See 110.0

**101.03.04 Mailboxes.** All mailboxes within the limits of construction shall be removed and reset as directed by the Engineer.

**101.03.05 Grubbing.**

(a) **Excavation Areas.** Within areas to be excavated, all imbedded stumps and roots shall be removed to a depth of not less than 3 ft (0.9 m) below the subgrade or slope surfaces. All depressions made below the subgrade or slope surfaces by the removal of stumps shall be refilled with materials suitable for embankment and shall be compacted as specified in Section 204.

(b) **Low Embankments.** Areas where the total depth of the embankment is less than 3 ft (1 m) shall be grubbed.

(c) **High Embankments.** Areas where the embankment is 3 ft (1 m) or more in depth, trees and stumps shall be cut off as close to the ground as is practicable but not to exceed 1 ft (0.3 m) above the ground surface. Near the toe of embankment slopes, none of the stumps or trees shall extend above a point 1 ft (0.3 m) beneath the slope surfaces.

**101.03.06 Stream and Channel Changes.** Stream or channel change areas shall be cleared and grubbed 5 ft (1.5 m) beyond the top of the cut slopes.

**101.03.07 Disposal.**

- (a) **Burning.** If perishable material is burned, it shall be burned under the constant care of a watchperson. Burning shall conform to the applicable laws and ordinances of Baltimore County.
  
- (b) **Disposal Locations.** Materials and debris which cannot be burned and perishable materials shall be removed from the right-of-way and disposed of by the Contractor. The Contractor shall make all necessary arrangements to obtain suitable disposal locations and shall furnish the Engineer with a copy of resulting agreements.
  
- (c) **Wood Disposal.** Disposal of wood to the general public shall be accomplished off the job site. Any plan for such disposal shall be submitted to and approved by the Engineer prior to beginning the clearing and grubbing operation.

**101.04 MEASUREMENT AND PAYMENT.** Clearing and Grubbing will not be measured for payment but will be paid for at the Contract lump sum price. The payment will be full compensation for the removal and disposal of fences, removal and resetting of mailboxes, selective tree trimming and scar repair when not covered as a specific pay item in the Contract Documents, and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

**SECTION 102 - REMOVAL AND DISPOSAL OF EXISTING BUILDINGS**

**102.01 DESCRIPTION.** This work shall consist of the removal and disposal of existing buildings, including foundations, footings or any part thereof, and backfilling, as specified in the Contract Documents. The work also includes protection of the buildings until the removal and disposal are ac-

completed as directed by the Engineer. Locations of buildings included in the work will be designated in the Contract Documents by the circled numbers ①, ②, ③, etc.

**102.02 MATERIALS.** Not applicable.

**102.03 CONSTRUCTION.** The Contractor shall schedule the buildings and appurtenances for removal, razing, or occupation as one of the first items of work.

Any building used by the Contractor for purposes such as field office, storage, etc., may remain as an exception to the above but shall be removed and disposed of immediately when vacated.

Buildings and appurtenances designated for removal may be disposed of by burning if they are not located close to habitable dwellings and if not prohibited by local or state laws, regulations, ordinances, or by the fire marshall.

Salvaged materials shall become the property of the Contractor and the materials, when sold by the Contractor, shall be removed by the purchaser only during daylight working hours and in company with a Contractor's representative.

The Contractor shall be responsible for posting and protecting the buildings from vandalism or theft until they are removed.

**102.04 MEASUREMENT AND PAYMENT.** Removal and Disposal of Existing Buildings will not be measured for payment but will be paid for at the Contract lump sum price. The payment will be full compensation for all material, labor, equipment, tools, and incidentals necessary to complete the work. All buildings not designated for removal and disposal in the Contract Documents will not be measured but will be incidental to Section 101 Clearing and Grubbing.

The Administration reserves the right to eliminate from this item any or all buildings or structures. For each building eliminated from this item, the item will be credited to the extent of the cost eliminated, which will be determined from a breakdown to be submitted by the Contractor showing the tabulation of individual unit costs used in arriving at the Contract price for this item. A breakdown of the Contract lump sum price for Removal and Disposal of Existing Buildings shall be submitted to the Engineer prior to beginning work.

## **SECTION 103 - ENGINEERS OFFICE**

**103.01 DESCRIPTION.** This work shall consist of furnishing, cleaning, and maintaining in good condition a suitable office at a location approved by the Engineer. It shall be separated from any building used by the Contractor and shall be for the exclusive use of the Administration's personnel. The type of office will be specified in and shall conform to the Contract Documents.

**103.02 MATERIALS.** Not applicable.

**103.03 CONSTRUCTION.** The Engineers office shall be set up, equipped and made ready for use a minimum of five days before starting work and shall remain until all field records have been completed. Upon removal, the location shall be cleaned up and, if necessary and appropriate, reseeded. The area shall be left in a condition acceptable to the Engineer.

A parking area shall be provided and maintained as specified in the Contract Documents. The parking area shall be stabilized as directed by the Engineer.

Refer to Section 915 for Plant Laboratory.

**103.03.01 Separate Housing Unit. Deleted**

### **103.03.02 Building Substitute (Trailer).**

- (a) The office shall be entirely enclosed, waterproofed and sealed inside with wallboard which will provide efficient insulation against heat and cold.
- (b) The building shall have a pitched roof and two ventilating louvers, one in each gable, in order to provide for circulation of air between the roof and ceiling. It shall be attractively painted on the outside.
- (c) A sign, at least seven (7) feet long and eighteen (18) inches high shall be provided to read:

**FIELD OFFICE  
DEPARTMENT OF PUBLIC WORKS  
BALTIMORE COUNTY**

The letters shall be not less than three (3) inches high and shall be white on black background. The sign shall have a white border, at least one and on-half inches wide, around it.

- (d) Floors shall be double thickness with building paper between.
- (e) Ceiling height shall be not less than seven (7) feet.
- (f) All doors, both exterior and interior, shall be equipped with locks.
- (g) Windows, to furnish natural light shall be constructed so as to open and close and shall have latches.
- (h) Screens shall be provided for all windows and exterior doors, and the building shall be generally fly-tight. The screen doors shall be equipped with springs and latches.
- (i) The office shall be supplied with satisfactory artificial lighting and lighting service for the duration of the project. Electric lights and current shall be supplied and at least two duplex convenience outlets shall be installed in each room.

- (j)** If work is in progress during cold weather, there shall be heating equipment capable of heating the office to at least 70 degrees F; if work is in progress during hot weather, the facility must have cooling equipment capable of cooling the office to at least 78 degrees F. The power or fuel, which may be required, shall be supplied by the Contractor.
- (k)** All offices shall be provided with neat, sanitary toilet and hand-washing accommodations for the exclusive use of the County employees; and such facilities shall meet the requirements of the State Department of Health and Mental Hygiene or other authorities having jurisdiction.
- (l)** The field office is to be maintained in a clean and sanitary manner. Trash shall be removed and the office broom-cleaned daily. The floors shall be damp-mopped weekly. Interior and exterior windows shall be cleaned weekly.
- (m)** The office shall be furnished with the equipment as noted herein and as listed in the tabulation which follows:

  - (1)** One office-type desk having at least two drawers on each side and minimum top dimensions of not less than 23 inches (.81 m) x 60 inches (1.5m)
  - (2)** Comfortable chairs and stools as required.
  - (3)** One fire-resistant filing cabinet (D.label) equipped with lock.
  - (4)** A plan rack
  - (5)** Utility tables, as required, 30 inches (.75 m) x 72 inches (1.8 m)
  - (6)** Slant-top drafting tables, as required, about 40 inches (.99 m) high at the front edge and having top dimensions of not less than 36 inches (.90m) x 72 inches (1.80m)

- (7) Closets, as required, extending the full height from floor to ceiling, measuring not less than 24 inches (.60m) x 30 inches (.75 m) in plan and equipped with locks and at least two shelves.
- (8) Overhead cabinets of lengths as specified and not less than 15 inches (.36 m) deep and 18 inches (.45 m) high, equipped with a hinged door for each two feet (.6 m) of length, satisfactory door latches, and at least one shelf.
- (9) One sanitary-type water cooler supplied with water, which shall be kept cooled
- (10) One adding machine with recording tape for all-type field offices
- (11) One printing calculator with manual for all-type field offices.
- (12) One fire extinguisher - Dry Chemical, Multi-purpose ABC (minimum size, 10 pounds), equipped with a visual air pressure gauge. The fire extinguisher shall be checked monthly for stored pressure, etc., also checked and tagged annually and after each use by a licensed company.
- (13) First Aid Kit equivalent to 24-unit first aid kit described on page 193 of First Edition, 1973, of Standard First Aid & Personal Safety - the American National Red Cross. The first aid kit shall be checked monthly and replenished to full complement monthly and after any accident.
- (14) One stretcher, "Army Litter" - type.
- (15) One electric typewriter
- (16) A telephone or telephones for the exclusive use of the Engineer. The telephone numbers and addresses of hospitals, ambulances, and fire and police departments in the vicinity shall be conspicuously posted in the office.

(17) A telephone answering machine.

(18) A fax machine.

**REQUIREMENTS FOR ENGINEER'S OFFICE BY  
SPECIFIC TYPE OF OFFICE\***

Office Type Number	1	2	3
MD SHA			
Standard Plate Number	MD-103.01	MD-103.02	MD-103.03 or MD-103.04
<b>CONSTRUCTION</b>			
Floor Space, minimum (Sq. Ft)	150	200	400
Inside Dimension min.(ft)	10x15	10x20	20x20
Rooms, number & size (ft)	1	1	2-10x20
Door(s)	1	1	2 exterior
Window Area, min. (sq ft)	30	45	40 per room
Closet(s)	1	1	2
Overhead Cabinet, length (ft) 6	8	8	
<b>EQUIPMENT</b>			
Desk, office-type	1	1	1
Chairs	3	3	6
Stool(s)	1	1	2
Filing Cabinet(s) w/lock (one in each office; must be fire-resistant)	1(2-drwrr)	1(2-drwrr)	2(4-drwrr)
Utility Cabinet w/3 adjustable shelves	1	1	1
Plan Rack	1	1	1
Utility Tables	1	1	2
Drafting Table(s)	1	1	2
Water Cooler, sanitary type	1	1	1
Adding Machines	1	1	1
Printing Calculator	1	1	1
Fire Extinguisher	1	1	1
First Aid Kit	1	1	1
Stretcher, "Army Litter" type	1	1	1
Electric Typewriter	1	1	1
Telephone Installation	1	1	2

*\* In lieu of the required building for the Engineer's Office, the Contractor may be permitted to furnish adequately arranged trailer space equivalent to the minimum*

*floor space requirements for Office Type No. 1 or Office Type No. 2 if acceptable to the engineer. Trailer space, meeting the requirements of MD SHA Standard Plate MD-103.04 may be substituted for Office Type No. 3.*

*By the time the Field Office is made available to County personnel, the Contractor shall furnish the Engineer with evidence that insurance has been obtained and is in effect and which will protect the County to the extent of \$10,000 (non-deductible) against any loss of its property in the field office as a result of fire, theft, vandalism, wind, storm or flood. The insurance coverage will also include losses and damages to the Administration employees' property stored in the office for use in performance of their duties.*

*This insurance must be kept in effect until the project has been completed and the Engineer has removed all records. Evidence of renewal of the policy, as necessary, must be forwarded to the Engineer as noted under GP-7.14. The Contractor shall submit to the Engineer a certificate of insurance.*

*The insurance must be in form, substance and coverage satisfactory to the County. Payment of the required insurance will be included in the Lump Sum item bid for "Mobilization".*

**103.04 MEASUREMENT AND PAYMENT.** Engineers Office will not be measured for payment but will be paid for at the Contract lump sum price.

Payment of 50 percent of the Contract lump sum price will be payable on the first monthly estimate subsequent to complete installation of the Engineers Office. The remaining 50 percent will be prorated and paid in equal amounts on each subsequent monthly estimate. The number of months used for prorating will be the number estimated to complete the work. The final month's pro-rata amount will not be paid until the office is removed and the area is restored. The payment as described will be full compensation for all material, labor, equipment, tools, site preparation, utility cost, and incidentals necessary to provide, equip, maintain, insure, remove and dispose of the Engineers Office and clean up the site. The Contract lump sum price will apply to the Engineers Offices constructed as specified, equivalent trailer space, or other office space when such substitution is permitted. When specified, payment will also include the separate housing unit.

All costs for the telephones and answering machines required for each specific office including furnishing, installation, maintenance, replacement,

tapes for answering machine and monthly service charges (local and long distance) will not be measured but the cost will be incidental to the Contract lump sum price for the specific type of Engineers Office.

All costs for the construction and stabilization of the parking area will be measured and paid for with the pertinent pay items used as directed by the Engineer.

## **SECTION 104 —MAINTENANCE OF TRAFFIC**

**104.00 GENERAL.** This work shall consist of maintaining traffic, vehicular and pedestrian, on or along any transportation facility as specified in the Contract Documents. This Section sets forth the traffic control requirements necessary for the safe and continuous maintenance of traffic throughout the area affected by the work, and is intended to minimize inconveniences to the traveling public, while providing for the safety of motorists, pedestrians and workers.

Work shall be as specified in the Contract Documents or as directed by the Engineer. These documents shall include the latest Manual on Uniform Traffic Control Devices (MUTCD), Standard Specifications and Interim Specification Addenda (ISA), the Administration's (here meaning SHA, not Baltimore County) Book of Highway Standards (Standards), Traffic Control Plans (TCP), Plans, the Invitation for Bids (IFB), and Special Provisions.

When speed of traffic is noted, this means the posted speed or prevailing travel speed, whichever is higher unless otherwise specified.

Items used for temporary maintenance of traffic shall be removed from the project site when no longer needed and become the property of the Contractor, unless otherwise specified in the Contract Documents.

Ninety percent of all reflective barrier markers, warning lights, and raised pavement markers shall be operational at any given time unless more are specified by the Engineer. Any deficiencies shall be corrected within 24 hours.

Upon initial installation reflectorized traffic control signs shall have a minimum of 70 percent reflectivity specified in 950.03.01 over 90 percent of their reflectorized surface, and channelizing devices shall have a minimum of 80 percent reflectivity specified in 950.03.01 over 90 percent of their reflectorized surface.

The Engineer may direct that traffic control devices, such as yield or stop signs that become damaged be replaced within four hours of notification to the Contractor. The Contractor shall take the necessary corrective action as approved by the Engineer to adequately warn and protect the public until the signs are replaced.

The Contract Documents specify one or more of the items listed in the following sections. When work is specified to be accomplished under the item Maintenance of Traffic, the work will be incidental to the lump sum price for Maintenance of Traffic. When work is required other than the above and no pay item is specified in the Contract Documents, refer to GP-4.07 (Negotiated Payment Provision) for basis of payment.

#### **104.01 TRAFFIC CONTROL PLAN (TCP).**

**104.01.01 DESCRIPTION.** This work shall consist of the development and implementation of a TCP. The TCP will include the design and placement of such items as signing, pavement markings, delineation, channelization, barriers, crash cushions and other items as required.

TCPs may be implemented within a single project or jointly between two or more projects. In situations where TCPs are jointly implemented, care shall be exercised to present correct and nonconflicting guidance to the traveling public.

The Contractor shall implement the Administration's TCP or he may develop his own TCP. The Contractor's TCP shall be submitted in writing to the Engineer at least 20 days prior to starting any work. Changes to the approved TCP shall be submitted in writing at least five days prior to implementing the change. For an emergency, the approval process will be completed within four hours. The Contractor shall have written approval of any

TCP changes from the Engineer prior to their implementation. No work shall begin until the required traffic control patterns and devices are in place.

Unless otherwise specified in the Contract Documents, all travel lanes shall be restored at the end of the work day and no travel lane shall be reduced to less than 10 ft (3 m). Prior to opening the closed lane or shoulder, the Contractor shall clear the lane or shoulder of all material, equipment, and debris.

**104.01.02 MATERIALS.** Not applicable.

**104.01.03 CONSTRUCTION.** Not applicable.

**104.01.04 MEASUREMENT AND PAYMENT.** Any traffic control plan developed by the Contractor will not be measured but the cost will be incidental to other pertinent items specified in the Contract Documents.

## **104.02 MAINTENANCE OF TRAFFIC (MOT).**

**104.02.01 DESCRIPTION.** This work shall consist of maintaining traffic safely and efficiently through and/or around the area affected by the work.

### **104.02.02 MATERIALS.**

Traffic Materials

950

### **104.02.03 CONSTRUCTION.**

- (a) **Traffic Manager (TM).** The Contractor shall assign to the project an employee or employees to serve in the capacity of TM. When an item is included in the Contract Documents the TM shall serve in the capacity full time. When an item is not included in the Contract Documents, the cost for the TM will be incidental to the lump sum price for MOT. The TM in this case may assume additional duties. The TM shall be experienced and trained in traffic control. The Contractor shall submit the TM's name to the Engineer for

approval at least 10 days prior to commencing any work on the project. The TM shall provide proof of completing an Administration (here meaning SHA, not Baltimore County) approved Work Zone Traffic Control (WZTC) training course within the last three years. Change in the appointment of any TM throughout the duration of the Contract will require a written submission to and approval by the Engineer.

The TM shall implement the TCP, maintain an up to date TCP and provide an acceptable copy to the Engineer following any changes.

The TM shall closely coordinate his operations with the Engineer and shall supervise the maintenance of traffic on the project, including those involving subcontractors. The TM shall be required to make on-site inspections of the area affected by the work on a regular basis including Saturdays, Sundays, and holidays and be available for consultation at all times. When the TCP is in place, the TM shall be responsible for making daily inspections during hours of operations. A minimum of one night inspection per week will be required. More inspections may be required as directed by the Engineer. The monitoring of the maintenance of traffic by the TM shall include surveillance of any area affected by the work of the Contract during holiday periods. The TM shall maintain a daily log for the inspections and shall include the date, time, condition of maintenance of traffic and any corrective action taken.

The TM shall also be responsible for coordination between adjacent work zone operations to assure that inappropriate or conflicting traffic control sign messages or devices are not displayed to traffic.

The TM shall immediately notify the Engineer of any accident or incident within the area affected by the Contract.

The TM shall make inspections during and immediately after adverse weather conditions to ensure that the traffic control devices are clean, undamaged, and in their proper position. The superintendent shall be the traffic manager for the project and he shall meet all requirements of a Traffic Manager for this section.

**(b) Maintenance of Existing Roadway.** The Contractor shall be responsible for maintaining the existing roadway surface and shoulders, including crossroads, ramps, approaches, crossovers, medians, detour roads, entrances, and pavement markings within the limits of the project, throughout the duration of the Contract.

Any hazardous condition which exists or develops throughout the duration of the Contract, such as potholes and shoulder defects shall be repaired or patched by the Contractor as directed by the Engineer.

**(c) Existing Regulatory, Warning, and Guide Signs.** Existing signs which are no longer applicable, due to temporary traffic conditions, shall be relocated when necessary, turned, completely covered or removed with the approval of the Engineer. They shall be properly redisplayed to traffic as soon as conditions warrant. The Contractor shall replace at no cost to the Administration any existing signs misplaced or damaged by the Contractor's operations.

**(d) Storage and Movement of Equipment, Materials, and Vehicles.**

No equipment or material shall be stored or permitted to stand in unprotected areas or open areas within 10 ft (3 m) from where traffic is being maintained unless protected by traffic barriers. Storage of equipment and materials may be permitted closer than 10 ft (3 m), subject to the following restrictions:

**(1)** Temporary traffic barriers, approved by the Engineer, shall be in place prior to storage of any equipment or materials.

**(2)** No equipment or materials shall be permitted to stand within 4 ft (1.2 m) behind the face of the traffic barrier.

Areas used for storage of equipment and materials shall be restored to their original condition immediately upon completion of their use. No additional compensation will be provided for this work.

Vehicles and equipment shall enter and leave the work area in the direction of the traffic flow.

Paving work conducted on, or adjacent to the traveled way, shall be performed in the direction of traffic flow unless written approval is obtained from the Engineer prior to beginning such work.

The Contractor's vehicles and equipment shall enter on and exit from the roadway, at interchanges or legally allowed public use crossovers. Making U-turns across any medians or crossovers signed FOR USE OF AUTHORIZED VEHICLES ONLY by the Contractor's vehicles or equipment are prohibited unless written approval is granted by the Engineer.

**(e) Warning Lights and Devices.** Warning lights and flags shall be used on warning signs as specified in the TCP, the Contract Documents, or as directed by the Engineer. During hours of darkness, any channelizing device used to warn of a spot hazard shall have one Type A low intensity flashing warning light attached to the side adjacent to traffic. Two Type A low intensity flashing warning lights shall be attached to the top of each Type III barricade.

**(f) Temporary Pavement Markings.**

**(1)** Temporary pavement markings (TPMs) are those markings placed upon the roadway to serve an area of work activity or a work phase for a period of time after which they are to be removed.

When approved by the Engineer, a less than full complement of pavement markings and reduced dimension markings for dashed center lines and lane lines may be permitted. Where less than a full complement of pavement markings or reduced dimension markings are used, the time of use shall not exceed two weeks.

**(2)** TPMs may be either full dimension or reduced dimension as specified in the Contract Documents or as directed by the Engineer.

**(3)** Full dimension TPMs shall conform to the MUTCD, Part III and the Pavement Marking Dimension Table.

**(4)** Reduced dimension TPMs shall conform to the MUTCD, Part III and the Pavement Marking Dimension Table except that the dashed center lines and lane lines may consist of four foot segments and 36 ft gaps. All other dimension elements shall be as specified in the MUTCD and the Pavement Marking Dimension Table.

**(5)** TPMs generally use short lived marking materials that are easily removed. Material requirements are described elsewhere in these Specifications.

**(6)** Specific TPM requirements:

**(a)** As a minimum at the close of each day, the roadway shall have all center and lane lines in place.

**(b)** During the work day while work activity is underway, center and lane lines shall be in place or the lines shall be represented by channelizing devices, signs, or other traffic control devices to clearly define and mark all vehicle paths.

**(c)** Along two-lane, two-way roadways, the center line shall consist of a continuous double solid yellow center line, a single dashed yellow center line at full dimension, or a single dashed yellow center line at reduced dimension as directed by the Engineer.

**(d)** No passing zones shall be marked and signed as specified in the Contract Documents or as directed by the Engineer. All no passing zones may be identified by signing for a period not to exceed seven days.

(e) Along multi-lane, undivided roadways the center line shall be identified using a continuous double solid yellow line.

(1) If a two-way left turn is present, see (f) below.

(2) If the roadway is three lanes, the center line may be either a continuous double solid yellow center line or a continuous single solid yellow and single dashed yellow combination center line permitting vehicles in the single lane direction to pass. For the placement of no passing zones see (f)(6)(d) above.

(f) Along multi-lane undivided roadways having a two-way left turn lane, the two-way left turn lane need not be marked provided that channelizing devices are used continuously throughout the length of the left turn lane at a maximum spacing of 200 ft to delineate the left turn lane, separate the opposing flows of traffic and provide areas within which left turning vehicles may store while awaiting opportunities to turn.

(g) Along multi-lane roadways having reversible lanes, the lanes shall be marked with the full complement of pavement markings as described in the MUTCD Part III.

(h) Where edge lines are not in place, appropriate channelizing devices or other delineation shall be used to delineate the edge of the roadway.

(i) Specific pavement marking and complementary signing details are shown on the WZTC Standard Drawings

(j) For the latest approved TPM materials contact the Administration's (here meaning SHA, not Baltimore County) Office of Materials and Research.

<b>PAVEMENT MARKING DIMENSION TABLE</b>			
LINE TYPE	MATERIAL	REQUIRED MINIMUM EFFECTIVE WIDTH	
		EXPRESSWAYS AND FREEWAYS	OTHER ROADWAYS
Lane Lines	Paint Preformed Tape	6 in. 4 in.	6 in. 4 in.
Lane Shifts Lane Divides and Severe Allignment Changes	Paint Preformed Tape	8 in. 6 in.	6 in. 6 in.
Center Lines (See Note 1)	Paint Preformed Tape	6 in. (if operated two ways) 4 in. (if operated two ways)	5 in. 4 in.
Edge Lines	Paint Preformed Tape	Same as adjacent lane or shift line	Same as adjacent lane or shift line
Ramp Edge Lines	Paint Preformed Tape	6 in. 4 in.	6 in. 4 in.
Gore Marking	Paint Preformed Tape	8 in. 8 in.	—
Auxiliary	Paint Preformed Tape	Same as particular line being extended	Same as particular line being extended
NOTE 1: Discernible space between double lines shall be 4 to 5 in.			
NOTE 2: The 8 in. tape width can be achieved by placing two-4 in. wide segments of preformed tape adjacent to each other as approved by the Engineer.			

**(g) Channelizing Devices.** When channelizing traffic, the requirements shall conform to Section 6C of the MUTCD and the following:

- (1)** Maximum spacing for channelizing devices in a taper shall be equal to the posted speed limit.

- (2) Maximum spacing for channelizing devices in a tangent shall be equal to twice the posted speed limit.
- (3) Channelizing devices shall be spaced at 25 ft intervals to define interchange gore areas or other unusual highway alignments unless a closer spacing is directed by the Engineer.

**104.02.04 MEASUREMENT AND PAYMENT.** Unless otherwise specified, the Contract lump sum price for Maintenance of Traffic will be full compensation for all work necessary to maintain traffic, including relocating, turning, completely covering or removing, maintaining in like new condition and cleaning all existing and temporary traffic signs, and any other traffic control devices not included elsewhere in these Specifications but are necessary for the fulfillment of the Contract requirements and implementation of the approved Traffic Control Plan, and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

- (a) When additional Contract pay items for Maintenance of Traffic are specified in the Contract Documents, measurement and payment will conform to the pertinent pay items included in the Contract Documents.
- (b) Maintenance of Existing Roadway. Measurement and payment for this work will conform to the pertinent pay items included in the Contract Documents.
- (c) Items for cones, reflective collars, anchoring devices, STOP/SLOW paddles, sign flags, and warning lights will not be measured but the cost will be incidental to the Contract lump sum price for Maintenance of Traffic unless otherwise specified in the Contract Documents.
- (d) Temporary traffic control devices, which in the Engineer's opinion need replacement, shall be replaced immediately by the Contractor. The cost to replace traffic control devices, including all material, labor, equipment and tools, will not be measured but will be incidental to the Contract lump sum price for Maintenance of Traffic except when specifically set up in the Contract Documents as a separate Contract pay item.

- (e) Materials, equipment, and labor necessary for the construction and removal of temporary or detour roads will be measured and paid for at the Contract unit price for the pertinent items used.
- (f) The Traffic Manager will be measured and paid for at the Contract price per unit day unless otherwise specified in the Contract Documents. The payment will be full compensation for all materials, fees, equipment, tools, and incidentals necessary to complete the work. A unit day shall consist of any 24 hour calendar day period.

When an item for a Traffic Manager is not specified, the cost for the Traffic Manager will not be measured but will be incidental to the Contract lump sum price for Maintenance of Traffic.

### **104.03 TEMPORARY RAISED PAVEMENT MARKERS (RPMs).**

**104.03.01 DESCRIPTION.** This work shall consist of furnishing and installing temporary RPMs as specified in the Contract Documents or as directed by the Engineer.

**104.03.02 MATERIALS.** Temporary RPMs shall conform to the approved list maintained by the SHA's (and recognized by Baltimore County for this item) Office of Traffic and Safety.

**104.03.03 CONSTRUCTION.** All material, labor, equipment, tools and incidentals necessary for the complete installation of temporary RPMs, as specified in the Contract Documents, shall conform to the manufacturer's recommendations.

**104.03.04 MEASUREMENT AND PAYMENT.** The payment will be full compensation for all material, labor, equipment, tools, and incidentals necessary to complete the work.

Increases or decreases in quantities will not be a basis for renegotiation of the Contract unit price per each.

- (a) Temporary Raised Pavement Markers will be measured and paid for at the Contract unit price per each, installed in a manner acceptable to the Engineer.
- (b) Removal of Temporary Raised Pavement Markers will be measured and paid for at the Contract unit price per each, removed in a manner acceptable to the Engineer.
- (c) The Administration will reimburse the Contractor at the Contract unit price per each marker damaged by snowplow operations.

**104.04 TEMPORARY PRECAST CONCRETE TRAFFIC BARRIER (TCB) FOR MAINTENANCE OF TRAFFIC.**

**104.04.01 DESCRIPTION.** This work shall consist of furnishing, placing, resetting, painting, and removing TCBs for use at locations specified in the Contract Documents or as directed by the Engineer.

**104.04.02 MATERIALS.**

Vertical Panels, Reflective	As approved by the Office
Barrier Markers and Warning Lights	of Traffic & Safety
Waterborne Acrylic Paint	912.15
Precast Concrete Traffic Barrier	950.01

**104.04.03 CONSTRUCTION.** The Contractor shall be responsible for maintaining TCBs in alignment and in a like new condition acceptable to the Engineer.

Resetting TCBs shall consist of removing and relocating TCBs as directed by the Engineer.

Items such as reflective barrier markers, vertical panels (object markers), and warning lights, shall be installed on the TCB as specified in the Contract Documents. Both faces and the top of the TCB shall be painted or repainted as directed by the Engineer.

#### **104.04.04 MEASUREMENT AND PAYMENT.**

- (a) Temporary Precast Concrete Traffic Barrier and Reset Temporary Precast Concrete Traffic Barrier will be measured and paid for at the Contract unit price per linear foot measured along the center line of the top of the barrier. The payment will be full compensation for furnishing, placing, painting, maintaining and removal from the project site as directed by the Engineer, and for all material, labor, equipment, tools, and incidentals necessary to complete the work.
  
- (b) Reflective barrier markers, vertical panels, and warning lights will be measured and paid for at the Contract unit price per each. The payment will be full compensation for furnishing, placing, maintaining and removal from the project site as directed by the Engineer and for all materials, labor, equipment, tools, and incidentals necessary to complete the work.
  
- (c) The payment to reset the Temporary Precast Concrete Traffic Barrier will be full compensation for removal from its original placement, transporting and resetting it in its new temporary location, applicable portions of 104.04.04(a), and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

#### **104.05 TRAFFIC BARRIER W BEAM (TBWB) FOR MAINTENANCE OF TRAFFIC.**

**104.05.01 DESCRIPTION.** This work shall consist of furnishing, erecting, maintaining, resetting, and removing temporary TBWB at locations specified in the TCP or as directed by the Engineer.

#### **104.05.02 MATERIALS.**

Traffic Barrier W Beam	918.01
Traffic Barrier Posts	918.02
Hardware for Traffic Barriers	918.03

### **104.05.03 CONSTRUCTION.**

**TBWB.** Construction methods shall conform to the applicable portions of Section 612 Metal Traffic Barriers.

**TBWB-Replacement.** Any portion of the TBWB that is damaged shall be replaced immediately. This work shall be accomplished utilizing the Contract item TBWB for Maintenance of Traffic Replacement. The TBWB shall be installed to the correct horizontal and vertical alignments.

**TBWB-Reset.** When work is sufficiently completed through a traffic control area, and TBWB is no longer required, the TBWB and all components shall be removed and reset in a new work area as specified in the Contract Documents or as directed by the Engineer. The area shall be restored to its original condition.

**104.05.04 MEASUREMENT AND PAYMENT.** The payment will be full compensation for furnishing and installing all cables, posts, brackets, Traffic Barrier W Beam, hardware, galvanizing, excavation, back-filling, concrete connections to rigid structures, removal, restoration of the area, and for all material, labor, equipment, tools, and incidentals necessary to complete the work as directed by the Engineer.

- (a) Traffic Barrier W Beam for Maintenance of Traffic will be measured and paid for at the Contract unit price per linear foot measured from end to end, including all types of end sections.
- (b) Traffic Barrier W Beam Replacement for Maintenance of Traffic will be measured and paid for as described in the preceding paragraph, with the exception that the limits of linear measurement will be at the ends of the newly installed Traffic Barrier W Beam, including end sections.
- (c) Reset Traffic Barrier W Beam for Maintenance of Traffic will be measured and paid for as described in paragraph (a) above.

## **104.06 TUBULAR MARKERS.**

**104.06.01 DESCRIPTION.** This work shall consist of furnishing, installing and removing tubular markers for maintenance of traffic. Tubular markers shall be used to provide reflective delineation for channelizing traffic through work areas and detours as specified in the Contract Documents or as directed by the Engineer.

### **104.06.02 MATERIALS.**

Tubular Markers	As approved by the Office of Traffic & Safety
Reflectorization	950.03

**104.06.03 CONSTRUCTION.** Tubular markers shall be installed on paved surfaces only, as recommended by the manufacturer and as approved by the Engineer.

**104.06.04 MEASUREMENT AND PAYMENT.** Tubular Markers will be measured and paid for at the Contract unit price per each. The payment will be full compensation for the removal of and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

Tubular markers that are damaged as a result of traffic operations shall be replaced and will be measured and paid for at the Contract unit price per each for Replacement of Tubular Marker Mast. If the base detaches from the pavement, the entire tubular marker assembly shall be replaced by and at the Contractor's expense.

## **104.07 ARROW PANEL (AP).**

**104.07.01 DESCRIPTION.** This work shall consist of the temporary use of APs to supplement, but not replace, standard signing as specified in the Contract Documents.

APs shall be self contained, vehicle mounted or portable and shall be ap-

proved by the Engineer. Self-contained trailer units shall be used unless otherwise specified in the Contract Documents.

APs shall have both manual and automatic dimmer devices. These devices shall be capable of reducing the light intensity by 50 percent. Photo cells for the automatic dimmers shall be periodically cleaned to prevent malfunctioning of the brightness control. The use of dimmer devices shall be mandatory during the night operation of any APs. Manual and automatic dimmer devices shall be designed to include a fail safe 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.

The Contractor shall furnish and test the APs as directed by the Engineer 24 hours in advance of actual use to insure that the units are functioning properly.

**(a) Self-Contained AP Trailer Unit.**

- (1) The AP Type C shall conform to the minimum requirements specified in the MUTCD.
- (2) Lamps shall be sealed beam No. 4412 A-Par 46, or as approved by the Engineer, conforming to the ITE Specifications.
- (3) The AP shall be arranged with a double pointed arrow configuration capable of displaying a left arrow, right arrow, double arrow and a four corner caution mode. Sequential chevron display is also acceptable if all operational modes can be displayed.

**(b) Vehicle Mounted AP.**

- (1) The AP Type B shall conform to the minimum requirements specified in the MUTCD.
- (2) The lamps shall be sealed beam No. 4412 A-Par 46, or as approved by the Engineer, conforming to the ITE Specifications.

- (3) The AP shall be arranged with a double pointed arrow configuration capable of displaying a left arrow, right arrow, double arrow and a four corner caution mode. Sequential chevron display is also acceptable if all operational modes can be displayed.

**(c) Portable AP.**

- (1) The AP Type A shall conform to the minimum requirements of the MUTCD, except that the AP may conform to the shape of the double headed arrow as long as all other dimensions and requirements specified in the Contract Documents are met.
- (2) Lamps shall be 1295 GE or sealed beam No. 4415A or as approved by the Engineer, conforming to the ITE Specifications.
- (3) The AP shall be arranged with a double pointed arrow configuration capable of displaying a left arrow, right arrow, double arrow and a four corner caution mode; sequential chevron display is also acceptable if all operational modes can be displayed.

**104.07.02 MATERIALS.** Not applicable.

**104.07.03 CONSTRUCTION.** APs shall be used to close any lanes of a multi-lane highway. APs shall be placed as directed by the Engineer. The Contractor shall maintain all APs in good operating order.

- (a) APs shall conform to the applicable requirements of Section 6E-7 of the MUTCD. APs shall only be used to supplement other required traffic control devices. APs shall be used in the “Arrow” mode only when closing a through travel lane on a multi-lane roadway. Only one AP in the “Arrow” mode shall be used for each stationary lane closure. Moving work operations may utilize one or more APs for a single lane closure. Care shall be taken in the

placement of APs to avoid driver confusion in the vicinity of ramps, median crossovers, and side road intersections.

- (b) APs shall be aimed at approaching traffic to insure that the minimum legibility distance as specified in Section 6E-9 of the MUTCD is met. APs shall be erected so that the arrow is level in relation to the roadway.
- (c) For stationary lane closures, the AP shall be placed on the shoulder at the beginning of the taper (nearest to oncoming traffic) or, where there are narrow or no existing shoulders in the closed lane behind the channelizing devices as near to the beginning of the taper as possible.
- (d) For moving maintenance type activities along multi-lane high-ways where a lane is closed, the AP 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 APs in the arrow mode may be required to supplement this work operation. APs shall always remain upstream of the maintenance vehicle where adequate recognition distance is available. The vehicle carrying the AP shall also be equipped with signing and lighting as required by the standard TCPs.
- (e) APs shall only display the “Caution” mode for a lane closure on a two-lane, two-way roadway, or for a shoulder closure on any roadway. The “Caution” mode on an AP shall show only one light in each corner of the AP.

**104.07.04 MEASUREMENT AND PAYMENT.** Arrow Panels will be measured and paid for at the Contract price per unit day. A unit day shall consist of any approved usage within a 24 hour calendar day period. If a unit is used for part of a day, it will be measured as a unit day.

The payment will be full compensation for all material, labor, equipment, tools, incidentals required to set up and operate at the site as required, and at any relocated site as required by the Traffic Control Plan or as directed

by the Engineer. Each Arrow Panel will be paid for only once per unit day, regardless of how many times it is relocated.

**104.08 TEMPORARY TRAFFIC SIGNS (TTS).**

**104.08.01 DESCRIPTION.** This work shall consist of furnishing and installing TTS on or along any transportation facility as specified in the Contract Documents.

The Contractor shall maintain sign faces free of tape, tape residue, or any other foreign matter, and shall remove any advertisements from signs and supports. Supplemental signs shall not cover any part of the face of the primary sign.

**104.08.02 MATERIALS.**

Wood Sign Supports	921.05 and 921.06
Reflectorization	950.03
Signs	950.08
Portable Sign Supports	As approved by the (SHA) Office of Traffic & Safety

**104.08.03 CONSTRUCTION.** TTS shall be as specified in the Contract Documents or as directed by the Engineer.

The signing shall conform to Section 6B of the MUTCD or the Administration’s (here meaning SHA, not Baltimore County) Standard Highway Sign Booklet (SHSB). All work area warning signs shall be 48 X 48 in. (1219 X 1219 mm) unless otherwise specified. The SHSB may be obtained from the (SHA, not Baltimore County) Office of Traffic and Safety, Traffic Engineering Design Division, Telephone No. (410)787-4022. Designs of signs not included in the SHSB may be prepared by the Contractor in sketch form, to scale, and approved by the Engineer (Baltimore County) or such sign designs may be obtained upon seven day request from the Office of Traffic and Safety. Requests shall be directed to the Engineer (Baltimore County) in writing.

Signs that will be in place for more than three working days shall be mounted on two 4 X 4 in. (100 X 100 mm) posts, unless otherwise specified at a minimum height of 5 ft (1.5 m) from the near edge of the roadway pavement to the bottom of the sign in rural areas and 7 ft in urban areas. Additional bracing of signs is prohibited. The tops of the wood posts shall not protrude more than 3 in. (75 mm) beyond the nearest edge of the sign. Wood posts shall be placed a minimum of 4 ft (1.2 m) into the ground for 4 X 4 in. (100 X 100 mm) wood posts and a minimum of 5 ft (1.5 m) into the ground for 4 X 6 in. (100 X 150 mm) wood posts.

Signs mounted on portable supports for temporary conditions shall be mounted so the bottom of the sign shall not be less than 1 ft (0.3 m) above the roadway pavement elevation. Higher mountings are desirable. Portable sign supports shall be self-erecting, able to withstand a wind velocity of 70 MPH and shall be able to maintain themselves within five degrees rotation around their vertical axis.

Fabricated wood signs or flexible roll up signs shall be used only as directed by the Engineer. Fabricated aluminum signs including material thickness shall conform to the SHSB. Diamond shaped warning signs 48 X 48 in. (1219 X 1219 mm) or larger shall be 0.100 in. (2.5 mm) minimum thickness.

TTS shall not be installed until inspected and approved by the Engineer. The signs shall not be displayed to traffic until directed by the Engineer. TTS shall be properly maintained, remain in place only as needed, and be immediately removed thereafter. Where operations are performed in phases or stages, only those signs that apply to the present conditions shall be displayed to traffic.

When a sign is not indicative of actual conditions such as during periods of partial shutdown or extended periods of no work being performed (including lunch times and overnight periods), the Contractor shall remove the sign, turn it away from all traffic, or completely cover it with an opaque material that is approved by the Engineer. The entire work zone setup does not have to be removed for non-work periods of time up to one hour. Special care shall be exercised to properly space signs along the highway to insure that

traffic is provided adequate sight distance to both work zone signs and existing signs.

Signs shall not be obscured by weeds, shrubs, trees, construction equipment, materials or waste materials, personal vehicles, or any other obstruction and shall conform to the sight distance requirements as specified by the Administration.

TTS for both daytime and nighttime use shall be reflectorized.

**Sign Replacement.** Signs shall be new or in like new condition. Signs that become faded, illegible, or damaged shall be replaced as directed by the Engineer. Signs that are not new will be permitted to be used only if their reflective intensity at a divergence angle of 0.2 degrees and incidence angle of minus four degrees conforms to at least 70 percent of the values specified in 950.03.01. At other times throughout the duration of the Contract the sign reflectivity intensity shall be a minimum of 60 percent. The acceptability of the signs shall be measured by means of 60 percent and 70 percent calibrated 1 ft square test plates at the appropriate times. The test plates shall conform to these requirements.

#### **104.08.04 MEASUREMENT AND PAYMENT.**

- (a) Temporary Traffic Signs will be measured and paid for at the Contract unit price per square foot. The payment will be full compensation for furnishing, erection, relocation, maintenance, cleaning, replacement due to damage or normal wear, removal, and for all materials, labor, equipment, tools, and incidentals necessary to complete the work.
  
- (b) Signs damaged by traffic will be measured and paid for at the Contract unit price per square foot for Temporary Traffic Signs. The payment will be full compensation for the furnishing and erection of any replacement signs. The replacement of the sign supports will not be measured but the cost will be incidental to the Contract unit price per square foot for Temporary Traffic Signs.

Temporary traffic signs and all associated hardware, fittings, posts, brackets, and incidentals shall be removed from the project site when no longer needed and become the property of the Contractor.

## **104.09 TEMPORARY CRASH CUSHION TELESCOPING ATTENUATOR.**

**104.09.01 DESCRIPTION.** This work shall consist of furnishing, installing, removing, and resetting temporary telescoping attenuator in conformance with the manufacturer's recommendations. The attenuator shall be located as specified in the Contract Documents or as directed by the Engineer.

**104.09.02 MATERIALS.** Each telescoping attenuator shall consist of a number of predetermined individual cartridges, miscellaneous metal work, diaphragms, fender panels, a backup system, base pad, anchor device, and a nose device as specified in the Contract Documents or as directed by the Engineer.

**104.09.03 CONSTRUCTION.** Daily visual inspections of the devices shall be performed to determine that no undetected damage has occurred, and that the attenuator is capable of functioning as intended.

The nose section on the telescoping attenuator shall be reflectorized as approved by the Engineer. Following an impact, an approved reflectorized drum conforming to 104.12 will suffice temporarily as reflectorization of the attenuator, until the damaged attenuator can be replaced. The damaged attenuator shall be replaced no later than four hours after the Contractor is notified.

### **104.09.04 MEASUREMENT AND PAYMENT.**

- (a) Temporary Crash Cushion Telescoping Attenuator will be measured and paid for at the Contract unit price per each for the type specified in the Contract Documents, installed as specified in the Traffic Control Plan, and accepted by the Engineer.

The payment will be full compensation for all base pads, anchors, fastenings, fixtures, erection of materials, backup blocks, supports, galvanizing of metal parts, connections to bridges, structures or fixed objects, and for all material, labor, equipment, tools, and incidentals necessary to provide a completed telescoping attenuator. Cost of removal will be incidental to the Contract unit price per each. Removal shall include patching of any holes made to anchor or stabilize the attenuator, and cleaning and clearing the area of all debris.

When the system has served its purpose or when directed by the Engineer each complete attenuation system, including all attachment hardware will be inspected on site by the Engineer and upon verbal approval the system as inspected with the instruction manual shall be delivered to the location specified by the Engineer, at which time the unit will become the property of the County. Damaged or missing bolts, nuts, etc. discovered during the inspection shall be replaced at the Contractor's expense. Any system that has failed the inspection and all damaged parts shall become the property of the Contractor.

- (b) Remove and Reset.** Remove and Reset Temporary Crash Cushion Telescoping Attenuator will be measured and paid for at the Contract unit price per each for the type specified in the Contract Documents, removed, relocated, and reset in a manner acceptable to the Engineer. The conditions specified in paragraph (a) for the initial installation and removal of the attenuator shall be applicable to removing and resetting the attenuator.
- (c) Repairs.** Repairing damaged temporary telescoping attenuators will be measured and paid for at the Contract unit price per each for Temporary Crash Cushion Telescoping Attenuator Spare Parts Package for the type specified in the Contract Documents. The payment will be full compensation for the complete furnishing and erection, repairing, fastenings, fixtures, backup blocks, supports, galvanizing metal parts, reconnection to fixed objects where necessary, complete clearing and removal of debris and damaged unsalvageable parts, and for all material, labor, equipment, tools, and

incidentals necessary to construct the attenuator to the configuration specified in the Traffic Control Plan or as directed by the Engineer.

Telescoping Attenuator Spare Parts Package not used for repairs shall be delivered to the location directed by the Engineer, at which time they will become the property of the County.

## **104.10 TEMPORARY CRASH CUSHION SAND FILLED PLASTIC BARRELS (SFPB).**

**104.10.01 DESCRIPTION.** This work shall consist of furnishing and installing SFPB. SFPB shall be arranged as specified in the TCP or as directed by the Engineer.

### **104.10.02 MATERIALS.**

Plastic Barrels	As approved by the (SHA)Office of Traffic & Safety
Sand	901 — Table 901A

**104.10.03 CONSTRUCTION.** The ground shall be leveled with material comparable to the existing ground to support the system prior to installing the SFPB.

The components, assembly, placing configuration, and filling of the individual standard yellow plastic barrels with varying weights of sand shall conform to the manufacturer's recommendations or as specified in the Contract Documents. Each SFPB shall be separated from all other SFPB by a distance of 3 in. (75 mm). The distance between the last row of SFPB and the object being shielded shall be 12 in. (300 mm). SFPB may be permitted to stand on pallets 4 in. (100 mm) or less in height.

The first barrel of the SFPB configuration shall be reflectorized as specified in the Contract Documents. Following an impact, an approved reflectorized drum, conforming to 104.12, will suffice temporarily as reflectorization of the SFPB until the damaged SFPB can be replaced. The damaged barrels

shall be replaced no later than four hours after the Contractor is notified.

All sand to be placed in the barrels shall be dry and loose. Bags of sand are prohibited. The Contractor shall have available sufficient replacement items including sand. The barrels shall be watertight. An antifreeze agent shall be added to the sand in conformance with the manufacturer's recommendations.

Immediately after the SFPB have served their intended purpose, the Contractor shall remove the installation and restore the site as directed by the Engineer.

**104.10.04 MEASUREMENT AND PAYMENT.** Temporary Crash Cushions Sand Filled Plastic Barrels will be measured and paid for at the Contract unit price per barrel for one or more of the items listed below and specified in the Contract Documents.

- (a) Temporary Crash Cushions Sand Filled Plastic Barrels for Maintenance of Traffic.
- (b) Replace Temporary Crash Cushions Sand Filled Plastic Barrels for Maintenance of Traffic.
- (c) Remove and Reset Temporary Crash Cushion Sand Filled Plastic Barrels for Maintenance of Traffic.

The payment will be full compensation for all furnishing, cleaning, placing, replacement, remove and reset, and removing from the project the individual weighted barrels, excavation, sand, regrading, antifreeze agent, machinery, labor, equipment, tools, and incidentals necessary to install, maintain, replace, remove and reset, and remove from the project the Sand Filled Plastic Barrels in a manner acceptable to the Engineer.

**104.11 TEMPORARY PAINTED STRIPE MARKINGS,  
REMOVAL OF TEMPORARY PAINTED STRIPE  
MARKINGS, AND THE REMOVAL OF EXISTING  
PAINTED STRIPE MARKINGS.**

**104.11.01 DESCRIPTION.** This work shall consist of furnishing and installing temporary painted stripe markings, white or yellow, to be used for striping roadway or traffic lanes, the removal of temporary painted stripe markings, and the removal of existing painted stripe markings. The stripe markings shall be painted as specified in the Contract Documents, or as directed by the Engineer.

**104.11.02 MATERIALS.**

Paint	Refer to Contract Documents or Administration's (here meaning SHA, not Baltimore County) approved list
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**104.11.03 CONSTRUCTION.** Paint shall be applied in conformance with the manufacturer's recommendations. The location of the lines shall be as specified in the Contract Documents or as directed by the Engineer. Newly applied paint shall be dry so as not to track when crossed by a vehicle 60 seconds after application. The Contractor shall demonstrate, by a test stripe, that these requirements can be met.

When it is desired to shift lanes, all nonapplicable pavement markings within and adjacent to the travel way shall be completely removed in a manner acceptable to the Engineer. The Contractor shall remove all nonapplicable pavement markings so that there is no damage to the existing or ultimate surface courses. Removal shall be achieved by methods approved by the Engineer.

**104.11.04 MEASUREMENT AND PAYMENT.**

- (a) Temporary Painted Stripe Markings will be measured and paid for at the Contract unit price per linear foot, satisfactorily applied and accepted by the Engineer. The payment will be full compensation for all beads, pigmented binder, solvents, waste disposal, and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

- (b) Removal of Temporary Painted Stripe Markings and the Removal of Existing Painted Stripe Markings will be measured and paid for at the Contract unit price per linear foot satisfactorily removed and accepted by the Engineer. The payment will be full compensation for all material, labor, equipment, tools, and incidentals necessary to complete the work.

## **104.12 DRUMS FOR MAINTENANCE OF TRAFFIC.**

**104.12.01 DESCRIPTION.** This work shall consist of furnishing and placing drums and maintaining in like new condition, as warning or channelizing devices to control and maintain traffic. The drums shall be located as specified in the Contract Documents or as directed by the Engineer.

Drums shall be manufactured of low density polyethylene (PE) to withstand impact without damage to themselves or vehicles. The drum shall be 36 in. (900 mm) in height and a minimum of 18 in. (450 mm) in diameter. The reflective stripes shall be horizontal, circumferential, orange and white, 6 in. (150 mm) wide, two each of white and orange alternating with the top stripe being orange. Drums may have one or more flat sides as long as the minimum 18 in. (450 mm) diameter is satisfied.

### **104.12.02 MATERIALS.**

Plastic Drums	As approved by the Office of Traffic & Safety
Reflectorization	950.03

**104.12.03 CONSTRUCTION.** Drums shall be adequately weighted with bags of sand to keep them from moving. These bags, with no other attachments, shall rest on the base of the drum. The drums shall be maintained in like new condition.

The Contractor will be permitted to neatly stencil his name or identification mark at the bottom of the nonreflective portion of the drum in maximum 2 in. (50 mm) high letters. No other markings or writings will be permitted on the vertical side of the drum.

Drums damaged by traffic shall be replaced no later than four hours after the Contractor is notified.

**104.12.04 MEASUREMENT AND PAYMENT.** Drums for Maintenance of Traffic will be measured and paid for once at the Contract unit price per each. The payment will include reflectorization, setting, resetting, removing, bags of sand, maintenance, cleaning of drums to like new condition, and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

Where drums have been set and are subsequently damaged by traffic, and in the opinion of the Engineer, are not repairable they shall be replaced and will be measured and paid for at the Contract unit price per each.

### **104.13 BARRICADES FOR MAINTENANCE OF TRAFFIC.**

**104.13.01 DESCRIPTION.** This work shall consist of furnishing and installing Type I, Type II, or Type III barricades for maintenance of traffic. Barricades shall be used as specified in the Contract Documents or as directed by the Engineer.

All barricade rails shall conform to the minimum design requirements as specified in Section 6C of the MUTCD, unless otherwise specified in the Contract Documents. The barricade reflective sheeting and its installation will be approved by the Engineer.

The barricade frame shall be designed and fabricated in conformance with the Contract Documents.

### **104.13.02 MATERIALS.**

Barricades	As approved by the Office of Traffic & Safety.
Reflectorization	950.03

**104.13.03 CONSTRUCTION.** All materials, equipment, and labor necessary for the complete installation of the barricades, as specified in the TCP, shall conform to the Contract Documents.

Barricades damaged by traffic shall be replaced no later than four hours after the Contractor is notified.

### **104.13.04 MEASUREMENT AND PAYMENT.**

- (a) Barricades will be measured and paid for at the Contract unit price per each for one or more of the three types of barricades specified in the Contract Documents and accepted by the Engineer. The payment will be full compensation for all material, labor, equipment, tools, warning lights (when required by the Traffic Control Plan) and incidentals necessary to complete the work.
- (b) The installation, maintenance, and removal of the barricades and the maintenance and removal of any required warning lights will not be measured but the cost will be incidental to the Contract unit price per each for the type of barricade specified in the Contract Documents.
- (c) Only Type III barricades damaged by traffic and nonrepairable will be replaced and measured and paid for at the Contract unit price per each. The payment will be full compensation for furnishing, erection, removal of the nonrepairable barricades, and for all materials, labor, equipment, tools, and incidentals necessary to complete the work.
- (d) The replacement cost for Type I and Type II barricades will not be measured but will be incidental to the Contract unit price per each for each type of barricade.

## **104.14 CONES FOR MAINTENANCE OF TRAFFIC.**

**104.14.01 DESCRIPTION.** This work shall consist of furnishing and installing new or like new cones in conformance with the Contract Documents. Cones shall be a minimum of 28 in. (711 mm) high, with a minimum circular inside diameter of 10 in. (250 mm) at the base.

Cones shall be reflectorized during periods of darkness and be equipped with cone anchor collars as approved by the Engineer and as needed to maintain an upright position.

### **104.14.02 MATERIALS.**

Cones	As approved by the (SHA)Office of Traffic & Safety
Reflectorization	950.03

**104.14.03 CONSTRUCTION.** Cones shall be installed as specified in the Contract Documents or as directed by the Engineer.

Cones damaged by traffic shall be replaced no later than four hours after the Contractor is notified.

**104.14.04 MEASUREMENT AND PAYMENT.** Cones for Maintenance of Traffic and cones that have to be replaced will not be measured but the cost will be incidental to the Contract lump sum price for Maintenance of Traffic.

## **104.15 FLAGGER.**

**104.15.01 DESCRIPTION.** This work shall consist of furnishing flaggers when specified in the Contract Documents or as directed by the Engineer. Flagging shall conform to Section 6F of the MUTCD. All outfits and equipment will be approved by the Engineer. Flaggers shall have completed an Administration (here meaning SHA, not Baltimore County) approved WZTC training course within the last three years. The failure of any flagger to perform the required duties shall be grounds for the Engineer to require a replacement.

Flaggers shall use STOP/SLOW paddles unless otherwise allowed by the Engineer, paddles shall be 24 x 24 in. (610 x 610 mm) with minimum 8 in. (200 mm) high letters. Reflective sheeting on the STOP/SLOW paddle shall be encapsulated sheeting conforming to 950.03. Standard paddle sign designs shall be as specified in the Contract Documents.

Two-way radios or pilot vehicles shall be used whenever flaggers are not within sight distance of each other, or when directed by the Engineer.

**104.15.02 MATERIALS.** Not applicable.

**104.15.03 CONSTRUCTION.** Not applicable.

**104.15.04 MEASUREMENT AND PAYMENT.** Flaggers will be measured and paid for at the Contract unit price per hour when specified in the Contract Documents. The payment will be full compensation for clothing, STOP/SLOW paddles, pilot cars or other vehicles, air horns or bull horns, field telephones, walkie talkies, site illumination, and for all material, labor, equipment, tools, and incidentals necessary to complete the work. When an item for Flagger is not specified, the cost for the Flagger will not be measured but will be incidental to the contract lump sum for Maintenance of Traffic.

**104.16 MODIFICATION OF EXISTING SIGNS.**

**104.16.01 DESCRIPTION.** This work shall consist of relocating, removing, covering, modifying, reerecting, or changing existing highway signs relating to the construction activity. This work is in addition to the temporary traffic signs specified in 104.08.

**104.16.02 MATERIAL.** Not applicable.

**104.16.03 CONSTRUCTION.** Modification of existing signs shall be as specified in the Contract Documents or as directed by the Engineer.

**104.16.04 MEASUREMENT AND PAYMENT.** Modification of Existing Signs will be measured and paid for using one or more of the items listed below and specified in the Contract Documents.

The payment will be full compensation for all excavation, backfill, hardware, relocation, removal, covering, modifying, reerecting changes to existing highway signs, and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

- (a) Relocate Wood Sign Supports per each.
- (b) Sign Modifications to Overhead Sign Structures per linear foot.
  
- (c) Relocate Sign per square foot.
  
- (d) Remove Sign per square foot.
  
- (e) Modify Copy per character.
  
- (f) Shield per each.
  
- (g) Cover Sign per square foot.
  
- (h) Relocate Sign Luminaire per each.

## **SECTION 105 - AGGREGATE FOR MAINTENANCE OF TRAFFIC**

**105.01 DESCRIPTION.** This work shall consist of constructing base courses using either Graded Aggregate Subbase for Maintenance of Traffic or Bank Run Gravel for Maintenance of Traffic as specified in the Contract Documents or as directed by the Engineer.

### **105.02 MATERIALS.**

Graded Aggregate Subbase	901, Table 901 A
Bank Run Gravel Subbase	901, Table 901 A

**105.03 CONSTRUCTION.** Refer to the applicable portions of 501.03.

**105.04 MEASUREMENT AND PAYMENT.** Graded Aggregate Sub-

base for Maintenance of Traffic and Bank Run Gravel Subbase for Maintenance of Traffic will be measured and paid for at the Contract unit price per ton.

The payment will be full compensation for all aggregate, hauling, placing, compacting, removal and disposal, and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

## **SECTION 106 - HOT MIX ASPHALT FOR MAINTENANCE OF TRAFFIC**

**106.01 DESCRIPTION.** This work shall consist of constructing Hot Mix Asphalt (HMA) Pavement for Maintenance of Traffic as specified in the Contract Documents or as directed by the Engineer.

### **106.02 MATERIALS.**

Tack Coat (Rapid Setting)	904.04
Hot Mix Asphalt (HMA)	904.06
Crack Filler	911.01 & 911.01.01
Production Plant	915

**106.03 CONSTRUCTION.** Refer to the applicable portions of 504.03.

**106.04 MEASUREMENT AND PAYMENT.** Hot Mix Asphalt for Maintenance of Traffic will be measured and paid for at the Contract unit price per ton. The payment will be full compensation for all tack coat, crack filler, hauling, placing, compacting, removal and disposal, and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

## **SECTION 107 - CONSTRUCTION STAKEOUT**

### **107.01 DESCRIPTION**

- (a) The Engineer shall furnish and set construction stakes establishing lines, grades, and measurements required to be furnished for the contracted work under these Specifications for highway and utility

work. For all structure work, including bridges and buildings, the Engineer shall furnish the centerline stakeout and the benchmark for reference points, with the balance of the grades and measurements to be furnished by the Contractor. The Contractor shall provide and have available to the project an adequate engineering staff which is competent and qualified to set all lines and grades needed to construct bridges and buildings.

- (b) Only those benchmarks shown on the drawings shall be used for construction. The Contractor shall furnish the assistance for their preservation after being set. The Contractor shall, however, be held responsible for their preservation. If, in the opinion of the Engineer, the benchmarks are willfully or carelessly disturbed or destroyed by the Contractor or his employees, the entire cost of replacing them shall be charged against the Contractor and the cost shall be deducted from the Contractor's final payment.
- (c) Where electronic alignment control devices are used, the Contractor shall verify the alignment by conventional methods at intervals of 100 ft for lines 200 ft long between structures, or at changes in alignment when the structure is on a curve, and at the midpoint of lines under 200 ft long as defined above.
- (d) For all Developer Projects the term "Engineer" in paragraph (a) shall be the Developer's Engineer as the term applies to construction stakeout.

## **SECTION 108 - MOBILIZATION**

**108.01 DESCRIPTION.** This work shall consist of the construction preparatory operations, including the movement of personnel and equipment to the project site and for the establishment of the Contractor's offices, buildings, and other facilities necessary to begin work.

**108.02 MATERIALS.** Not applicable.

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

**108.04 MEASUREMENT AND PAYMENT.** Mobilization will not be measured for payment but will be paid for at the Contract lump sum price.

The cost of all required insurance and bonds will be incidental to the Contract lump sum price for mobilization.

Payment of 50 percent of the Contract lump sum price will be made in the first monthly estimate after the Contractor has established the necessary facilities. The remaining 50 percent will be prorated and paid in equal amounts on each of the next five monthly estimates. The payment will be full compensation for all material, labor, equipment, tools, and incidentals necessary to complete the work.

Payment of the Contract lump sum price will not be made more than once, regardless of the fact that the Contractor may have, for any reason, shut the work down on the project, moved his equipment away from the project and then back again.

If an item for mobilization is not provided, the cost of mobilization will be incidental to the other items specified in the Contract Documents.

## **SECTION 109 FIXED PRICE CONTINGENT ITEMS**

**109.01 DESCRIPTION:** To provide for certain contingencies during construction, some contracts include Fixed Price Items for use as the work proceeds. These items only apply when included in the proposal with prices established prior to bidding. Should any of these items not be included in the proposal as described above, they shall be addressed as described elsewhere in the Specifications and, if to be paid for, as bid by the Contractor.

Only those items listed below may be treated as Fixed Price Contingent Items, and then only if and as directed by the Engineer:

- (1) Borrow with on-site disposal of unsuitable material at location designated by owner. (See Section 203 except as modified below.)
- (2) Borrow with proper off-site disposal of unsuitable material. (See Section 203 except as modified below.)
- (3) Class 3 Excavation with select backfill and on-site disposal of unsuitable material at location designated by owner. (See Sections 301 and 302 except as modified below.)
- (4) Class 3 Excavation with select backfill and proper off-site disposal of unsuitable material. (See Sections 301 and 302 except as modified below.)
- (5) Test Pit in roadways. (See Section 205 except as modified below.)
- (6) Test Pit outside of roadways. (See Section 205 except as modified below.)
- (7) Calcium Chloride (See Section 921.02 except as modified below.)
- (8) Mix No. 2 Concrete for Miscellaneous Structures
- (9) Temporary Traffic Signs (See Section 104 except as modified below.)
- (10) Geotextile: (See section 921.09 except as modified below.)

## **109.02 MATERIALS Not applicable**

## **109.03 CONSTRUCTION**

1. Borrow with On-site Disposal of Unsuitable Material at Location Designated by Owner:

Material found to be unsuitable by the Engineer shall be disposed of at a location on the site as directed by the Engineer.

**2. Borrow with Proper Off-site Disposal of Unsuitable Material:**

Material found to be unsuitable by the Engineer shall be removed from the site and properly disposed of.

**3. Class 3 Excavation with Select Backfill and On-site Disposal of Unsuitable Material:**

Material found to be unsuitable by the Engineer shall be disposed of at a location on the site as directed by the Engineer.

**4. Class 3 Excavation with Select Backfill and Proper Off-site Disposal of Unsuitable Material:**

Material found to be unsuitable by the Engineer shall be removed from the site and properly disposed of.

**5. Test Pit Excavation in Roadway Paving: (See section 205.)**

**6. Test Pit Excavation Outside of Roadway Paving: (See Section 205.)**

**7. Calcium Chloride:**

Place calcium chloride uniformly at and in the amounts as directed by the Engineer to abate dust conditions or to bind crushed stone paving.

**8. Mix No.2 Concrete:**

This item covers the furnishing and placing of air-entrained concrete work as directed by the Engineer, and furnishing all labor, tools, equipment and appliances necessary to complete the work as directed by the Engineer (Refer to Sections 305, 609 and 610).

**9. Temporary Traffic Signs: (See Section 104.)**

**10. Geotextile: (See Category 300)**

## **109.04 MEASUREMENT AND PAYMENT**

- 1. Borrow with On-site Disposal of Unsuitable Material at Location Designated by Owner:**

Payment for furnishing suitable backfill shall be in accordance with the stipulated price per cubic yard in place and compacted. Price is full compensation for excavating, hauling, depositing and compaction of material and disposal of unsuitable material on-site. Payment shall not be made for material placed outside of specified trench widths.

- 2. Borrow with Proper Off-site Disposal of Unsuitable Material:**

Payment for furnishing suitable backfill shall be in accordance with the stipulated price per cubic yard in place and compacted. Price is full compensation for excavating, hauling, depositing and compaction of material and removal and proper off-site disposal of unsuitable material. Payment shall not be made for material placed outside of specified trench widths.

- 3. Class 3 Excavation with Select Backfill and On-site Disposal of Unsuitable Material at Location Designated by Owner:**

Payment for furnishing suitable backfill shall be in accordance with the stipulated price per cubic yard in place and compacted. Price shall include disposal of unsuitable material on-site. Payment shall not be made for material placed outside of specified trench widths.

- 4. Class 3 Excavation with Select Backfill and Proper Off-site Disposal of Unsuitable Material:**

Payment for furnishing suitable backfill shall be in accordance with the stipulated price per cubic yard in place and compacted. Price shall include removal and proper off-site disposal of unsuitable material. Payment shall not be made for material placed outside of specified trench widths.

**5. Test Pit Excavation in Roadway Paving:**

Test Pit Excavation in Roadway Paving will be measured and paid for at the contract unit price per cubic yard for the material actually removed from within the limits specified. The payment will be full compensation for all material, labor, equipment, tools, and incidentals necessary to complete the work. Tamped backfill will not be measured but the cost will be incidental to the Contract unit price per cubic yard for Test Pit Excavation in Roadway Paving. Any pavement to be replaced will be paid for as specified in Section 106.

**6. Test Pit Excavation outside of Roadway Paving:**

Test Pit Excavation outside of Roadway Paving will be measured and paid for at the contract unit price per cubic yard for the material actually removed from within the limits specified. The payment will be full compensation for all material, labor, equipment, tools, and incidentals necessary to complete the work. Tamped backfill will not be measured but the cost will be incidental to the Contract unit price per cubic yard for Test Pit Excavation outside Roadway Paving. Any pavement to be replaced will be paid for as specified in Section 106.

**7. Calcium Chloride:**

Payment shall be at the stipulated price per ton, which price is full compensation for all materials, equipment and labor necessary to accomplish this item.

**8. Mix No. 2 Concrete:**

**A. Price per Cubic Yard:**

Payment for furnishing and placing air-entrained concrete work in roads, paving, curbs, gutters, footways, etc., if and as directed, is made at the stipulated price per cubic yard. This price

includes furnishing and placing air-entrained concrete work as required and furnishing all labor, tools, equipment and appliances necessary to complete the work as shown, specified and directed.

**B. Paving Beyond Limits:**

Payment is not made for replacing paving beyond limits shown in the Standard Details. Payment is never made for replacement of damaged paving when the damage is due, in any way, to the Contractor's fault or negligence.

**9. Temporary Traffic Signs: (See Section 104.)**

**10. Geotextile:** Payment for geotextile shall be in accordance with the stipulated price for the specified class of geotextile per square yard furnished and installed in place within the limits specified or as directed by the Engineer.

**SECTION 110 - ADJUSTING AND REPLACING  
FENCES, SHRUBS, TREES, HEDGES ETC.**

**110.01 DESCRIPTION.** This item includes the removal and relocation adjacent to the work of fences, shrubs, trees, hedges, mail boxes etc., all as directed by the Engineer.

**110.02 MATERIALS**

See Category 900, MATERIALS.

**110.03 CONSTRUCTION METHODS**

Existing fences shall be carefully removed as directed by the Engineer and to the extent required to permit construction operations. The Contractor shall safely store all elements during the time that they are down and, when possible, re-erect them at the locations designated by the Engineer. If, through no fault of the Contractor, these elements cannot be re-erected, then they shall be replaced on a force account basis for the cost of the materials only.

Shrubs and trees shall be transplanted with sufficient earth to insure that no damage to their major root system occurs. General reference is made to Section 36.13-3 for acceptable planting methods. After transplanting has been accomplished, it shall be the Contractor's responsibility to water all plants until their growth is established. The relocation of trees will only be required when indicated on the Plans.

#### **110.04 METHOD OF MEASUREMENT & BASIS OF PAYMENT**

This item will not be measured. Payment for this work will be at the lump sum price for "Adjusting and Replacing of Fences, Shrubs, Hedges, Trees, etc." which price shall be full compensation for all excavation materials, removing, transporting, planting, equipment, labor, tools, and any other work incidental to the satisfactory completion of this item. The replacement of materials as specified above will be paid for on a force account basis for the cost of the materials only.