

## Appendix A-9

### Engineering Change Notices

An Engineering Change Notice (ECN) is a change in a directive, guideline, standard, specification or engineering practice that is approved by the Director, Office of Traffic & Safety. The Notice is a temporary measure to disseminate new information that will typically, if approved, become a permanent guideline, standard, specification or engineering practice after six months.

#### ECN Initiation

ECN's are initiated to propose any changes to existing traffic standards, specifications or engineering practices. ECN's may also be initiated to meet new laws, apply updated construction practice, and to take advantage of new cost saving methods.

Any member of SHA may propose a change to the existing Traffic Standards, Specifications, or Engineering Practices. The individual who proposes the change, the Submitter, must complete an ECN form. This form should include:

1. Brief Description – The Submitter will give the ECN a brief name or description (for example, Crosswalks at School Crossings).
2. Requestor's Name – The Requestor is the Submitter. If the Submitter is not an employee of SHA (i.e., persons from MdTA, County Government, or Consulting Engineers), the Submitter will need to have an SHA employee act as a Sponsor.
3. Problem Statement – The Submitter will describe the purpose of the change (new laws, updated construction practice, cost savings).
4. Change From – An explanation of the existing standard, specification, or engineering practice.
5. Change To – A definition of the proposed standard, specification, or engineering practice including precise wording if possible.

6. Attachment – Supporting documentation which may include sketches, other Division's/Department's/Agency's practice, the wording of a new law and cost-benefit analysis including the existing costs and the proposed's ramifications.

The request with all supporting documentation will be forwarded to the Engineering Support Team (EST) Team Leader who will evaluate the ECN and ensure all necessary documentation is included. If any part of the ECN package (the form and supporting documentation) is missing, the EST Team Leader will return it to the submitter for the appropriate additional information.

When the package is complete, the EST Team Leader will distribute copies of the pending ECN package to ECN Team members and to other individuals who have a particular knowledge or interest in the subject matter for review and comment. The Team will have at least two weeks to review the packet prior to a vote, which is arranged by the Team Leader. All Team members, invited guests, and the Submitter should be present for the scheduled vote.

#### If Approved by the ECN Team

If the ECN Team approves the ECN, the EST Team Leader will rewrite the ECN, including any amendments, and forward the ECN to the Director, Office of Traffic & Safety for his approval. If the Director approves the ECN, the EST Team Leader will re-assign a unique ECN number, distribute copies of the approved ECN to all interested parties, and the approved ECN will be uploaded to the TEDD Intranet site for internal SHA access.

Should the Director choose not to approve the ECN, the EST Team Leader will inform the Submitter and the ECN Team at the next scheduled meeting and return the ECN package to the Submitter.

#### If NOT Approved by the ECN Team

If the ECN Team does not approve the ECN, the EST Team Leader will return the ECN to the Submitter along with a reason for the Team's decision.

If the Submitter wishes to appeal the Team's decision, the Submitter must submit an appeal in writing to the Chief, Traffic Engineering Design Division. The appeal must include the initial ECN proposal, the reason for the Team's rejection, and the rationale for the appeal. The appeal must be endorsed by either the Chief, Traffic Engineering Design Division, or the Director, Office of Traffic and Safety for the ECN to be reconsidered. Upon receipt of the appeal, the EST Team Leader will schedule a new vote.

### **ECN's and the TEDD Intranet Site**

Various results of ECN's can be accessed through SHA's TEDD Intranet site for internal SHA use. Designers, inspectors, and other SHA staff may access the Intranet site in conjunction with other reference material such as the 2001 Specifications Book, the Book of Standards, shelf typicals, and even this Traffic Control Design Manual.

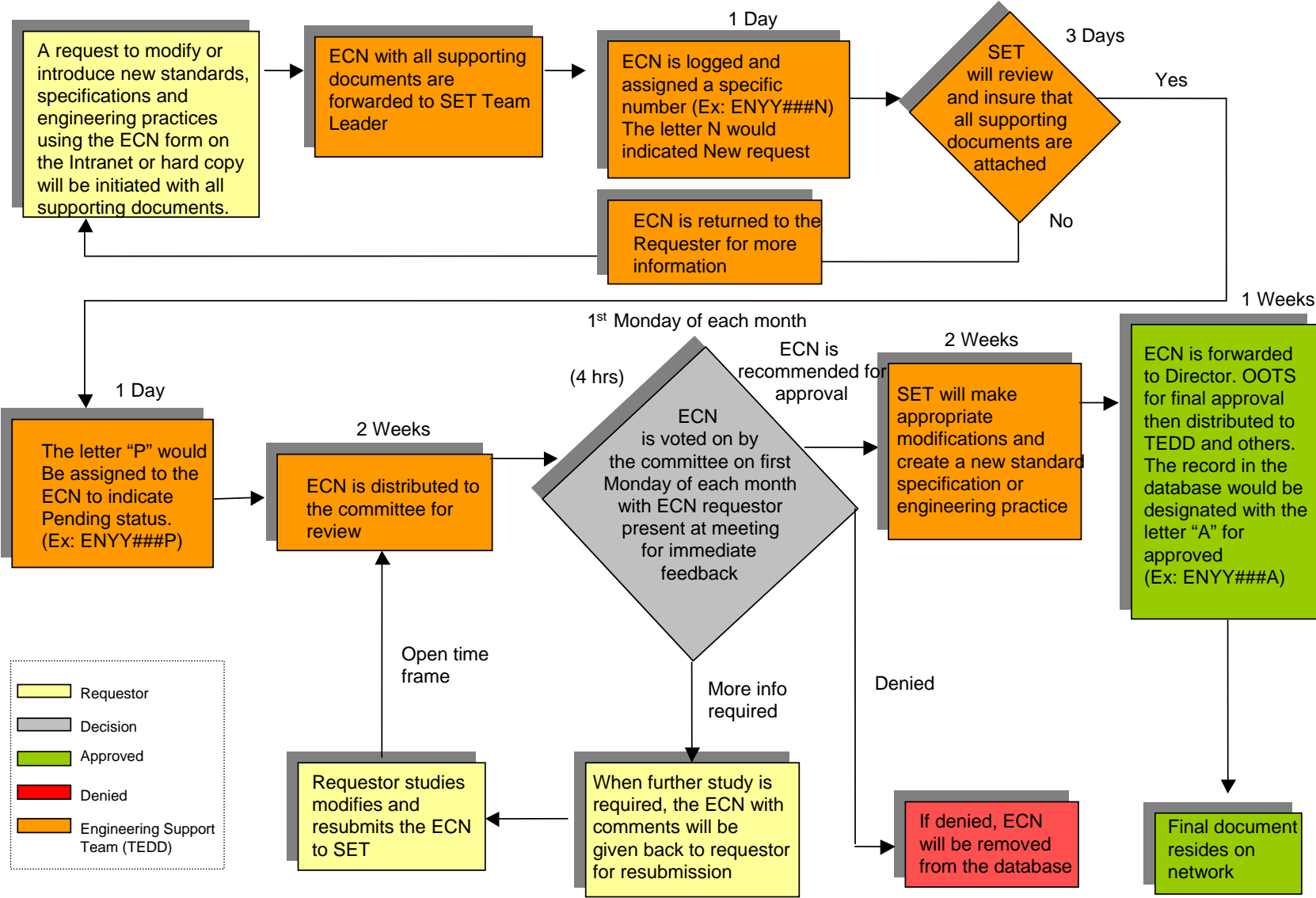
ECN's are updated daily for new entries or as needed. ECN change of status occurs on a once a month frequency. Contact the ECN Team for the most up to date changes and additions.

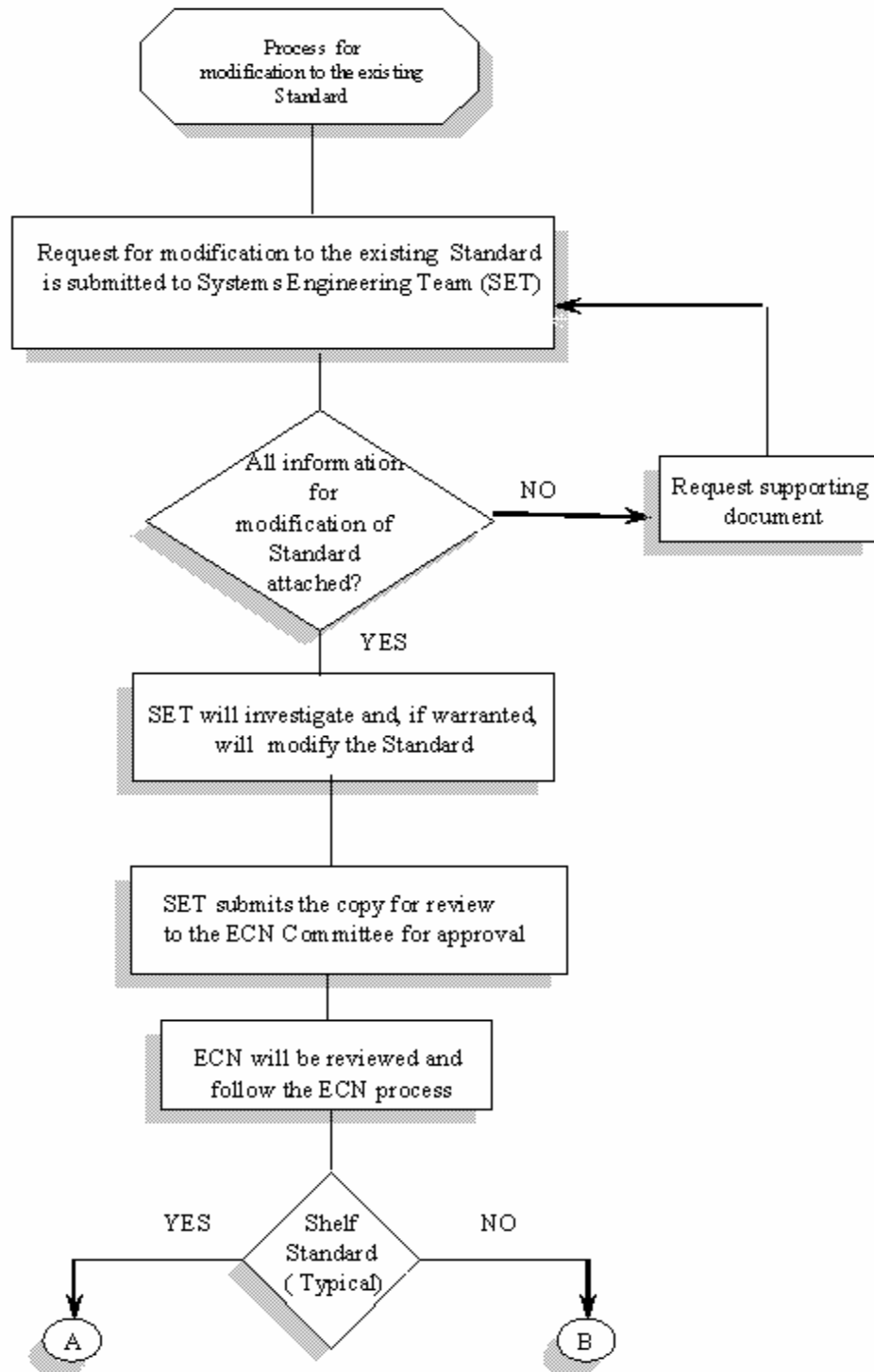
### **ECN Team & Technical Advisory Groups**

The ECN Team is composed of the Executive Committee, whom are permanent voting members.

Technical Advisory Groups (TAG Teams) consist of the Construction Technical Group, Intelligent Transportation Systems Technical Group, Information Technology/CADD Systems Technical Group, Lighting Technical Group, Maintenance of Traffic Technical Group, Pavement Marking Technical Group, Signing Technical Group, Signals Technical Group, and the Structures Technical Group.

# ENGINEERING CHANGE NOTICE





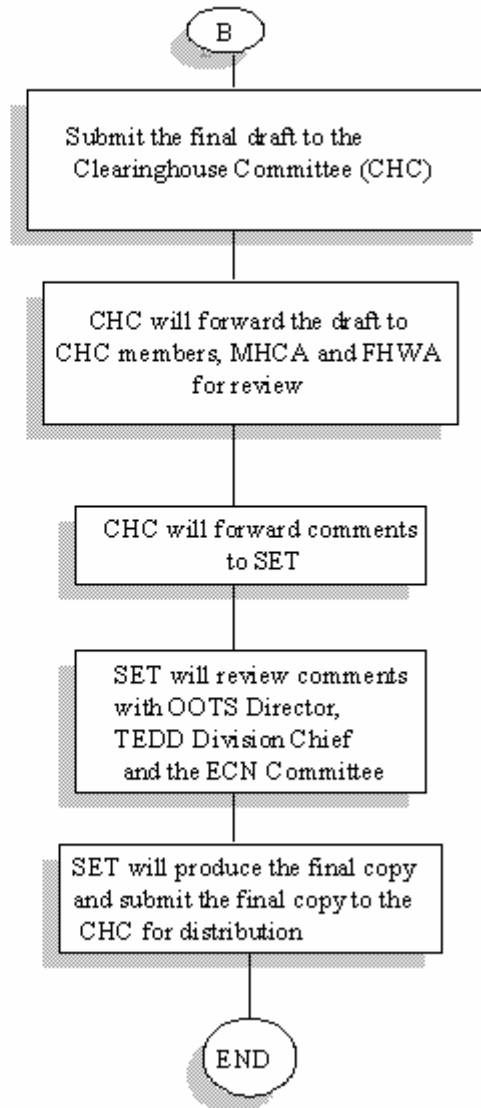
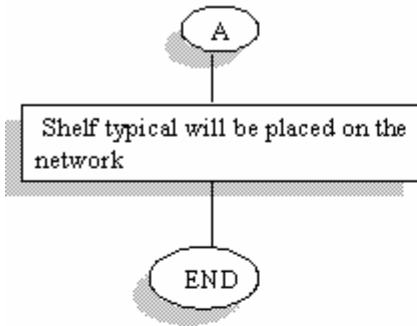
APPROVED \_\_\_\_\_  
 CHIEF – TRAFFIC ENGINEERING DESIGN DIVISION



PROCESS No.  
 01-04

Rev. 04/04/\_\_\_\_ /

**Maryland Department of Transportation**  
**STATE HIGHWAY ADMINISTRATION**  
 TRAFFIC ENGINEERING DESIGN DIVISION  
**PROCESS FOR MODIFICATION TO THE EXISTING STANDARD**



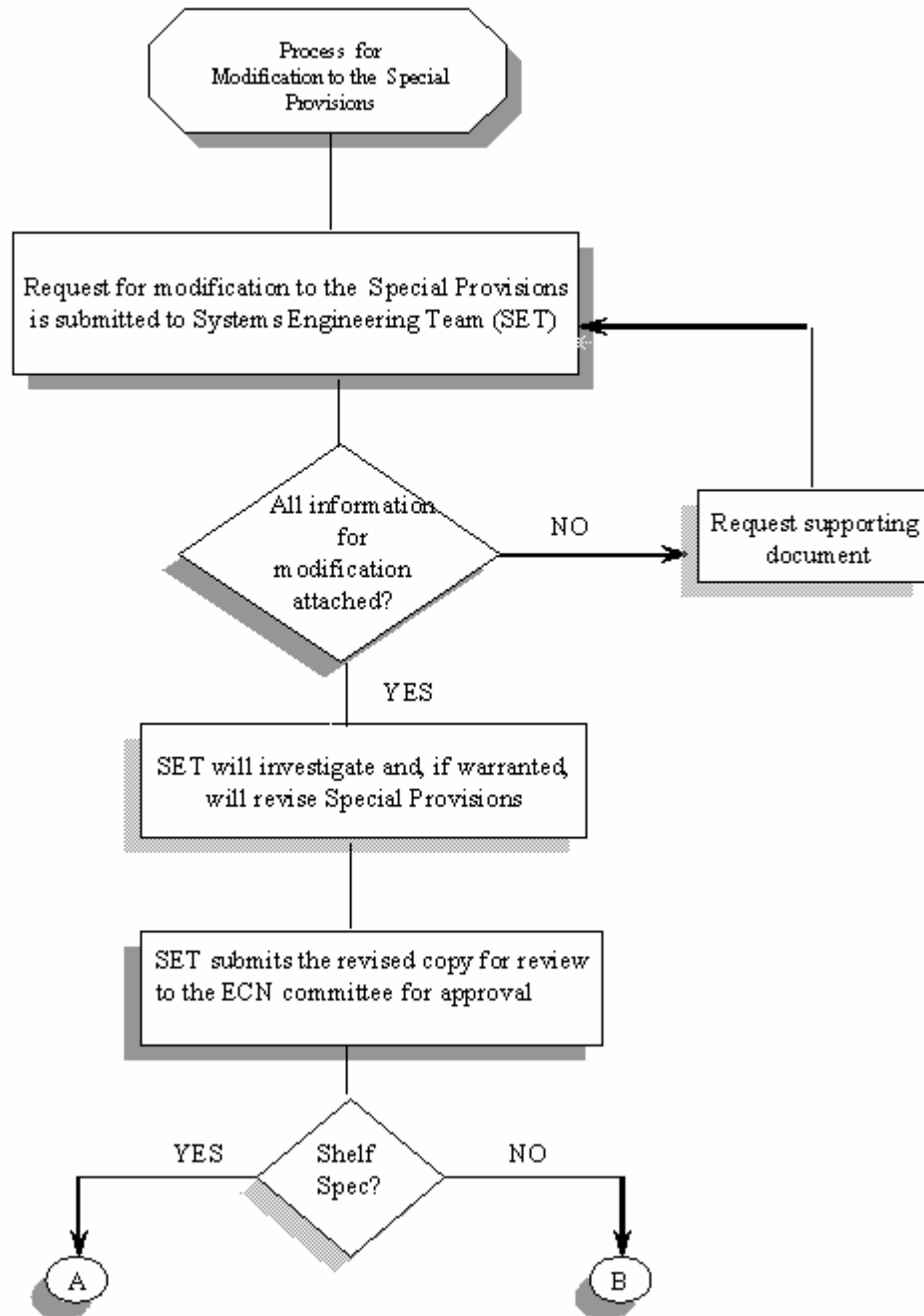
APPROVED \_\_\_\_\_  
CHIEF – TRAFFIC ENGINEERING DESIGN DIVISION



**PROCESS No.**  
01-04

Rev. 04/04/ / \_\_\_\_\_

**Maryland Department of Transportation**  
**STATE HIGHWAY ADMINISTRATION**  
TRAFFIC ENGINEERING DESIGN DIVISION  
**PROCESS FOR MODIFICATION TO THE EXISTING STANDARD**



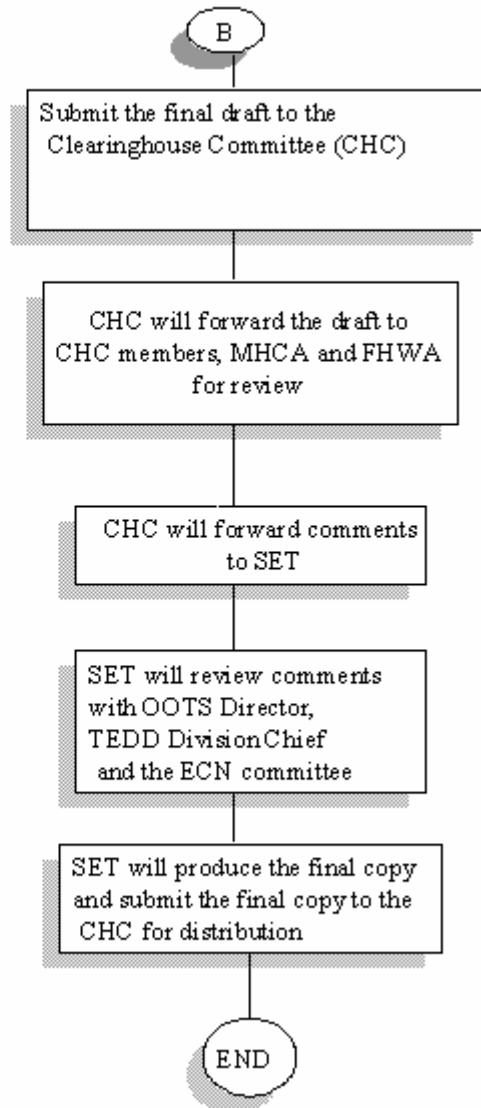
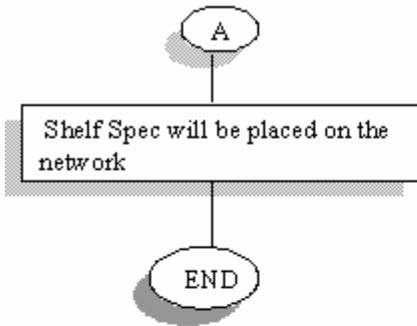
APPROVED \_\_\_\_\_  
CHIEF – TRAFFIC ENGINEERING DESIGN DIVISION



PROCESS No.  
01-02

Rev. 04/04/ /

**Maryland Department of Transportation**  
**STATE HIGHWAY ADMINISTRATION**  
TRAFFIC ENGINEERING DESIGN DIVISION  
**PROCESS FOR MODIFICATIONS TO THE**  
**SPECIAL PROVISIONS**



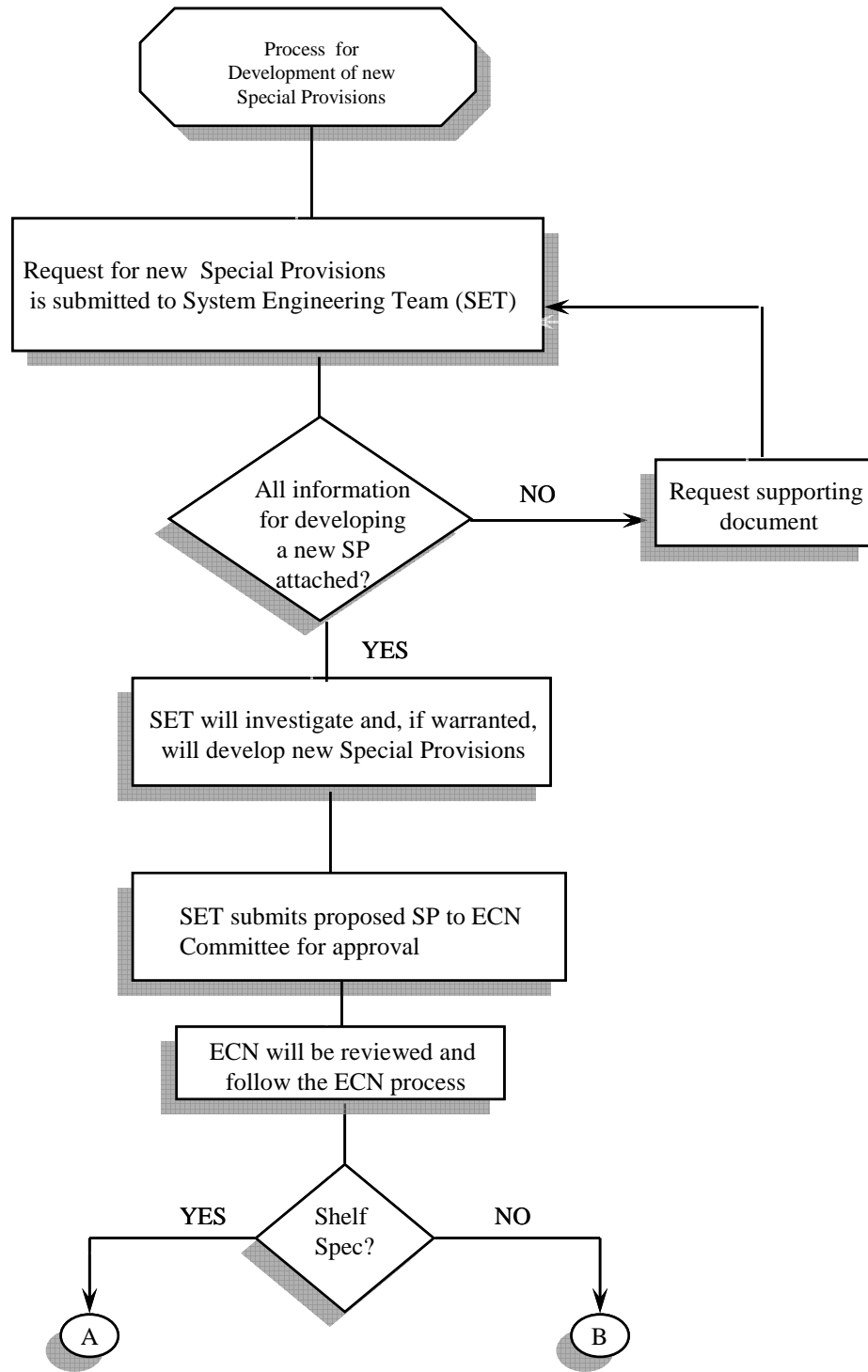
APPROVED \_\_\_\_\_  
CHIEF – TRAFFIC ENGINEERING DESIGN DIVISION



PROCESS No.  
01-02

Rev. 04/04/ /

**Maryland Department of Transportation**  
**STATE HIGHWAY ADMINISTRATION**  
TRAFFIC ENGINEERING DESIGN DIVISION  
**PROCESS FOR MODIFICATIONS TO THE**  
**SPECIAL PROVISIONS**



APPROVED \_\_\_\_\_  
CHIEF – TRAFFIC ENGINEERING DESIGN DIVISION



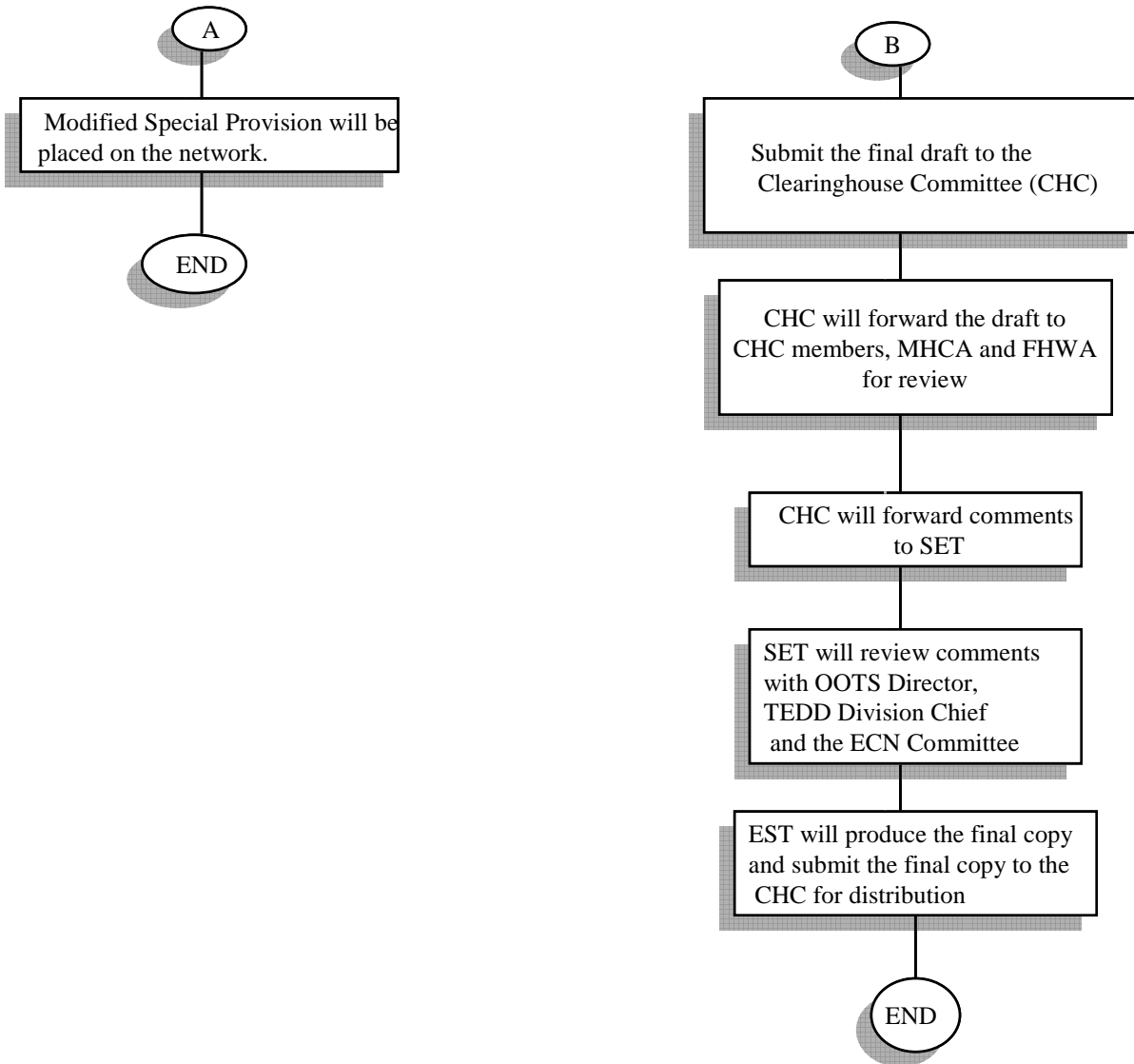
PROCESS No.  
01-01

Rev. 04/04/ /

**Maryland Department of Transportation**  
**STATE HIGHWAY ADMINISTRATION**  
TRAFFIC ENGINEERING DESIGN DIVISION  
**PROCESS FOR DEVELOPMENT OF NEW**  
**SPECIAL PROVISIONS**



**PROCESS FOR DEVELOPMENT OF NEW SPECIAL PROVISIONS CONTINUED'**



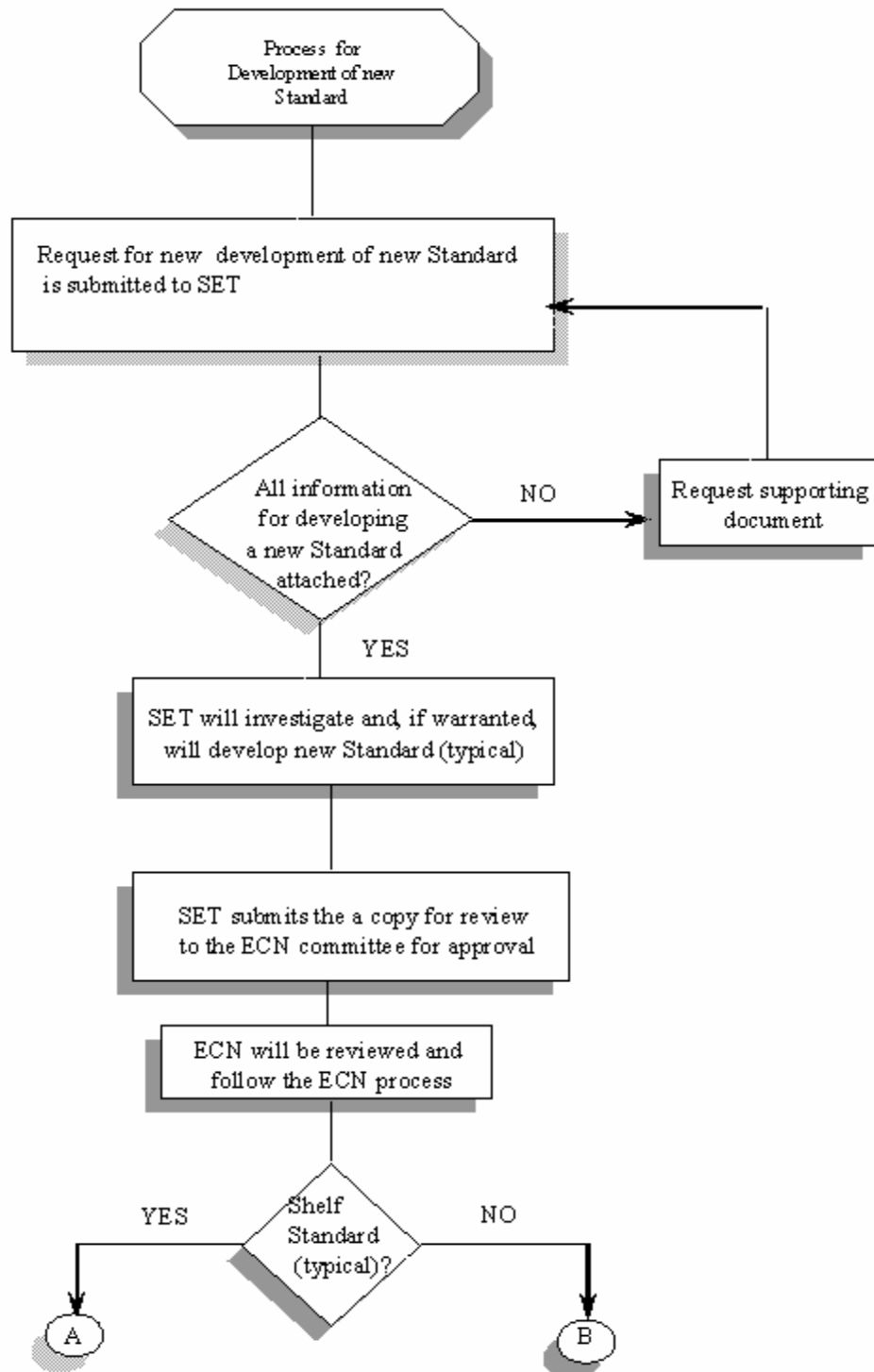
APPROVED \_\_\_\_\_  
CHIEF – TRAFFIC ENGINEERING DESIGN DIVISION



**PROCESS No.**  
 01-01

Rev. 04/04/\_\_\_\_ / \_\_\_\_\_

**Maryland Department of Transportation**  
**STATE HIGHWAY ADMINISTRATION**  
TRAFFIC ENGINEERING DESIGN DIVISION  
**PROCESS FOR DEVELOPMENT OF NEW**  
**SPECIAL PROVISIONS**



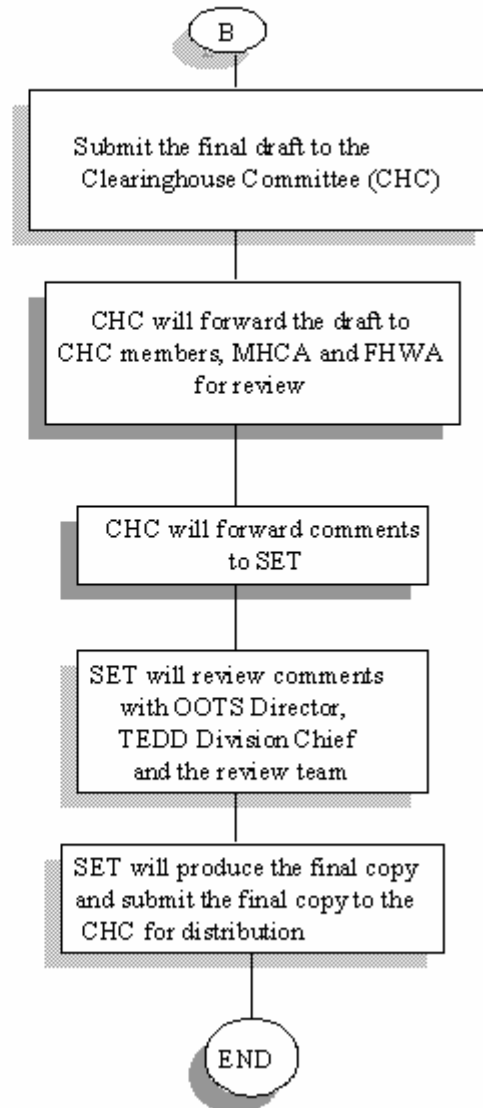
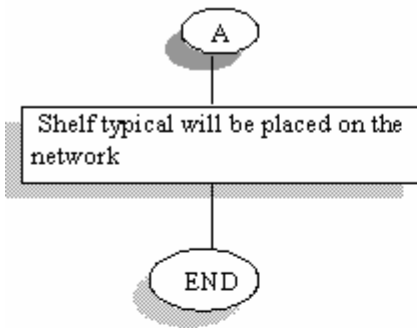
APPROVED \_\_\_\_\_  
 CHIEF – TRAFFIC ENGINEERING DESIGN DIVISION



PROCESS No.  
 01-03

Rev. 04/04/ /

**Maryland Department of Transportation**  
**STATE HIGHWAY ADMINISTRATION**  
 TRAFFIC ENGINEERING DESIGN DIVISION  
**PROCESS FOR DEVELOPMENT OF NEW STANDARDS**



APPROVED \_\_\_\_\_  
CHIEF – TRAFFIC ENGINEERING DESIGN DIVISION



**PROCESS No.**  
 01-03

Rev. 04/04/ / \_\_\_\_\_

**Maryland Department of Transportation**  
**STATE HIGHWAY ADMINISTRATION**  
TRAFFIC ENGINEERING DESIGN DIVISION  
**PROCESS FOR DEVELOPMENT OF NEW STANDARDS**

## SPECIFICATIONS

A Specification is a technical requirement for a particular item of a contract that is mandated by the latest edition (2001) of the *Maryland Department of Transportation, State Highway Administration's Standard Specifications for Construction and Materials*, the contract Special Provisions (SP), or a Special Provision Insert (SPI). The Specification will provide enough information for that item to be properly furnished, installed and paid for under a contract. Job specific specifications, new or modification to an existing spec., must be reviewed and approved by TEDD.

### Format/Organization

Specifications are divided into four (4) sections: Description, Materials, Construction, and Measurement and Payment.

**Description:** This section provides an overview of what the work shall consist of in that specification. This includes requirements such as pickup, fabrication, assembly, and installation amongst other things. The description section will also direct the user to the Contract Documents for specific instructions or to another specification if necessary.

**Materials:** This section identifies the specific materials necessary to achieve the stated description of the specification. This section provides desired material properties including grade, size, weight, minimum strength, composition and other requirements and references to other Section 900 narratives.

**Construction:** Installation methods and instructions are provided in the Construction section of a specification. This includes installation of the specified item as well as any preparation that is required such as maintenance of traffic, soil preparation, excavation and stakeouts. Further instructions can also be provided regarding the restoration of the ground, roadway and job site which may include backfill, testing and/or utility connections.

**Measurement and Payment:** This section describes in detail how the materials will be measured (eg. units) and how the item will be paid. Typical units used are as follows: linear feet (LF) for longitudinal measurements, square feet (SF) for area, cubic yards (CY) for volume, pound (lb) or ton (TON) for weight, and per each (EA) or lump sum (LS) for various other items. For all items, other than those paid for by lump sum, the Engineer will make measurements to determine the final quantities after the work in the field is completed.

Payment to the Contractor will be made for the actual quantities of Contract items performed in accordance to the Plans and Specifications. If the actual quantities show either an increase or decrease from the bid quantities of less than 25%, the Contract unit prices will still prevail. Payment will typically include all material, labor, equipment, tools, and incidentals necessary to complete the work. Similarly, some items will not be measured but the cost will be incidental to the Contract unit price of a bid item. An example of this is when trenching and backfilling, which has its own specification, is incidental to the price for the installation of pertinent conduit, detector tape, wire, or duct cable.

### Hierarchy of Specifications

All contracts maintained by the State Highway Administration are based on the *Maryland Department of Transportation, State Highway Administration's Standard Specifications for Construction and Materials* (Blue Book). The Blue Book should be consulted first in the design process. Next, Special Provisions Inserts (SPI), which are changes to the Standard Specifications, should be consulted. SPIs are issued after the Blue Book was printed and should be referenced until the next specification book is published. Further, certain projects require specific needs, so Special Provisions (SP) are created. An SP is a site/project specific requirement written into the project's Contract Documents to address the unique requirements of the project. The SP modifies or supplements the Standard Specifications for Construction and Materials and/or SPIs for the particular project. If used often enough, an SP may warrant becoming a Special Provisions Insert (SPI) if approved by the SHA Clearinghouse Committee. In the event of any

discrepancy between the various Contract Documents, as specified in the Terms and Conditions of the Blue Book in section TC-3.01, “the governing order from highest to lowest shall be Special Provisions, Plans, Special Provisions Inserts, and Standard Specifications” related to the item.

### Claims Avoidance Techniques

- Verify if Standard Specifications will cover your needs
- Double check referenced codes and standards for currency
- Do not duplicate Specification information on drawings
- Clearly describe what the specification is for in the Description Section
- Provide sufficient/pertinent materials references so a Contractor can develop an accurate bid
- Provide necessary description of what construction techniques will be required or anticipated to perform the task. Don't over state nor understate
- In the Measurement and Payment Section clearly, definitively and absolutely describe how the item will be paid for and what it does and does not include

**STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MATERIALS**

**SECTION 813 — SIGNS**

**813.01 DESCRIPTION.** This work shall consist of furnishing and installing signs of sheet aluminum or extruded aluminum panels, all with a reflective or nonreflective sheeting background, and all direct applied or silk screened copy or demountable copy with bolts and fittings to erect the signs as specified in the Contract Documents or as directed by the Engineer. Sign supports shall be as specified in Sections 802, 803, and 812.

The sign installation shall include clearing work to provide for good sight distance.

**813.02 MATERIALS.**

Sign Panel Supports and Hardware	909.07, 921.05, 921.06, 950.04, A 123, A 153 and A 709
Reflective and Nonreflective Sheeting	950.03
Sign Materials	950.08

The Administration will supply traffic signal related signs and their mounting hardware for span wire, mast arm, and signal pole mounted signs. All other mounting hardware shall be supplied by the Contractor and shall be manufactured from stainless steel.

**813.03 CONSTRUCTION.** Extruded aluminum shall have demountable copy. Sheet aluminum shall have direct applied or silk screen copy. After installation of the signs is completed, they will be inspected. If specular reflection is apparent on any sign, its positioning shall be adjusted by the Contractor as directed by the Engineer.

Each new sign location shall be inspected to determine if clearing is required. All clearing and disposal shall be done as specified in Section 101. Any tree limbs protruding within the limits of clearing shall be removed as specified in Section 712. The limits of clearing for each location shall be as specified in the Contract Documents.

**813.04 MEASUREMENT AND PAYMENT.**

**813.04.01** Signs will be measured and paid for at the Contract unit price per square foot of area of the vertical front face of the completed sign with no deduction for required shaping. The payment will be full compensation for the mounting hardware and for all material, labor,

equipment, tools, and incidentals necessary to complete the work.

**813.04.02** Administration furnished signs and mounting hardware will be measured and paid for at the Contract unit price per square foot for the completed sign installed. The payment will be full compensation for all transportation, drilling holes as specified, installation, and for all materials, labor, equipment, tools, and incidentals necessary to complete the work.

**813.04.03** Clearing for signing will not be measured but the cost will be incidental to the Contract unit price for furnishing and installing the signs.

sample

**SPECIAL PROVISIONS**

550 — NONTOXIC LEAD FREE WATERBORNE MARKINGS

CONTRACT NO. ContNum

1 of 3

**CATEGORY 500  
PAVING**

**SECTION 550 — NONTOXIC LEAD FREE WATERBORNE  
PAVEMENT MARKINGS**

**550.01 DESCRIPTION.** This work shall consist of furnishing and applying nontoxic lead free waterborne pavement markings (fast-dry, 60 second no-track) to pavement surfaces as specified in the Contract Documents or as directed by the Engineer.

**550.02 MATERIALS.**

Nontoxic Lead Free Waterborne Pavement Markings 951.01

**550.03 CONSTRUCTION.**

**550.03.01 Quality Assurance/Quality Control.** Refer to 549.03.01.

**550.03.02 Cleaning Pavement Surfaces.** Refer to 549.03.02.

**550.03.03 Application.** The location, width, and type of marking, shall be as specified in the Contract Documents or as directed by the Engineer.

Applying pavement markings over longitudinal joints is prohibited; they shall preferably be offset 2 in. from them.

Nontoxic lead free waterborne pavement markings shall conform to the following:

- (a) **Formulation Selection.** The Contractor shall select, purchase, and apply paint from the current approved list of prequalified formulations conforming to these Specifications, which is maintained by the Office of Materials and Technology.
- (b) **Temperature.** The markings shall be applied when the paint, ambient, and surface temperature and relative humidity conform to the manufacturer's recommendations.
- (c) **Glass Beads.** The Contractor shall apply the beads uniformly across the surface of the stripe, at the rate of 6 to 7 lb/gal of paint. When large type glass beads are specified, they shall be applied uniformly across the surface of the stripe at the rate of 12 lb/gal of paint, by special gravity fed bead guns conforming to the manufacturer's recommendations.
- (d) **Thickness.** The paint shall be applied at a wet film thickness of  $14 \pm 1$  mils.



**SPECIAL PROVISIONS**

CONTRACT NO. ContNum

**550 — NONTOXIC LEAD FREE WATERBORNE MARKINGS**

2 of 3

- (e) **Color.** The color of the dry markings shall match Federal Standard 595 (33538 - yellow or 37886 - white). The Contractor shall supply the specified color chips for the Engineer's use to visually determine that the waterborne material matches the specified color.
- (f) **Dry Time.** The applied paint shall dry to a no-track condition within 60 seconds. The no-track time shall not be exceeded when the pavement temperature is between 40 and 120 F and under all humidity conditions, providing the pavement is dry. The no-track time shall be determined by passing over the applied line at approximately 30 degrees with a standard passenger car or pickup truck. When viewed from a distance of 50 ft, the pavement surface shall show no evidence of the paint being picked up and redeposited on the pavement by the vehicle.
- (g) **Retroreflectance.** Refer to 549.03.03(h). At the time of the paint application, the minimum retroreflectance values shall be 250 and 150 mcd/L/m<sup>2</sup> for white and yellow, respectively.
- (h) **Widths.** Refer to 549.03.03(e).
- (i) **Alignment.** Refer to 549.03.03(f).
- (j) **Layout Markings.** Refer to 549.03.03(i).
- (k) **Empty Containers.** Refer to 549.03.03(j).

**550.03.04 Quality Control Test Strip.** Refer to 549.03.04.

**550.03.05 Application Equipment.** The equipment used for application of the paint shall be approved by the Engineer prior to start of work, and shall be capable of applying waterborne traffic paint that has been approved by the Administration. The Contractor shall provide access to the paint application equipment for inspection by the Engineer.

The paint carriage on the left side of the paint truck shall have three paint and bead guns. The paint carriage on the right side of the paint truck shall have two paint and bead guns.

All 10 in. lines shall be applied using two paint and bead guns. Raising the paint carriage in order to paint these lines with one paint and one bead gun is prohibited.

The footage counter used to measure pavement markings shall be calibrated and a notarized certification shall be submitted to the Engineer prior to application.

Testing performed by the Administration will provide the basis for final acceptance.

**550.03.06 Protection During Application.** Refer to 549.03.05.

**SPECIAL PROVISIONS**

CONTRACT NO. ContNum

**550 — NONTOXIC LEAD FREE WATERBORNE MARKINGS**

3 of 3

**550.03.07 Observation Period.** Refer to 549.03.06. The Contractor shall not be responsible for pavement markings when the Engineer determines that they have been damaged by plowing. The full Observation Period only applies to those pavement marking materials used as permanent pavement markings for a project.

**550.04 MEASUREMENT AND PAYMENT.** Measurement and payment for the pertinent Nontoxic Lead Free Waterborne Pavement Marking items will be as specified in 549.04. The Contract unit price will be used for the application of the pavement markings and will again be used for the removal and replacement of the pavement markings only when required due to plow damage. The reflectometer will become the property of the Contractor at the completion of the project.

sample



Maryland Department of Transportation  
State Highway Administration

**SPECIAL PROVISIONS INSERT**  
604 — CONCRETE TRAFFIC BARRIERS

CONTRACT NO. ContNum

1 of 1

**CATEGORY 600**  
**SHOULDERS**

**SECTION 604 — CONCRETE TRAFFIC BARRIERS**

**604.04 MEASUREMENT AND PAYMENT.**

516 **DELETE**: The first paragraph, “The payment will...complete the work.” in its entirety.

**INSERT**: The following.

The payment will be full compensation for all concrete, test panels, excavation, removal of existing pavement including saw cuts, disposal of excess or unsuitable material, concrete footer, forms, reinforcement, drilled holes, drainage, appurtenances, geotextile, No. 57 aggregate, conduit, boxes and fittings, backfilling, and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

## NEGOTIATED AND WRITE-IN ITEMS

### WRITE-IN ITEMS

A Write-in item is an item identified in the preliminary design of an Advertised contract that does not have an associated category code number. This item may not have been used by SHA in the past or is very different from what has been used. In these circumstances a Write-in item will be requested and given a category code number of 800000. Accordingly, a Special Provision to the Standard Specifications for Construction and Materials will be developed or an existing Special Provision will be modified for that particular contract.

### NEGOTIATED ITEMS

A negotiated item is an item specified in the project design that does not exist in an Areawide contract's bid items list. Hence, there is no associated bid price for such items and a unit price must be agreed upon between the State and the Areawide Contractor.

Under existing Areawide contracts the need for negotiable items shall be determined during preliminary design. The project schedule will be adjusted if necessary, and research for negotiable item vendors, model numbers, costs, etc. shall begin.

At this point a cost estimate to furnish and install the item will be produced. This should include the cost of the items plus a 20% markup and 5% tax. The man-hours and \$ rate plus 65% to install shall be included in the estimated price. The equipment hours and \$ rate plus 20% shall also be included in the estimate to install the item. Wage rates are provided in the IFB, and the Equipment rates are from the Rental Rate Blue Book.

When negotiable items and cost estimates have been recognized, a prepared memo for the negotiable item to be negotiated shall be submitted to SHA's Traffic Operations Division (TOD). This memo shall include a detailed description of the item, provide specifications, typicals for the work to be completed, and any other pertinent information such as vendors, phone numbers, addresses, etc.

Following this, TOD will contact the Contractor and request a price based on the information provided. The response is to be requested within 3 weeks. The Contractor shall submit a price including a detailed breakdown of cost, labor, tax and profit to complete the work.

If the Contractor's cost is within 10% of the engineers estimated cost, the item shall be approved. If the Contractor's cost is more than 10% of the engineers estimate, TEDD shall reevaluate their estimate to determine where the discrepancies are and make the appropriate adjustments as needed.

At this time the Design Engineer shall re-evaluate the PS&E schedule and adjust as necessary. TEDD and TOD will then agree on the price and/or re-negotiate. Once the price has been agreed upon, TOD will set up the item for the remainder of the Contract. TEDD will then PS&E the project to PMO. Note: No project should go to PS&E without approved negotiable items.

Sample Estimate of Negotiable Item

**MATERIALS**

1 – 60" X 60" LED "RED SIGNAL AHEAD" sign	\$10,708.00
2 – "Astro Brac" mounting brackets with form tubes	\$ 384.00
	\$ 11,092.00
20% allowable markup	\$ 2,218.40
5% tax (on the materials only)	\$ 554.60
Materials Total	<b>\$13,862.00</b>

**LABOR**

2 Men for 12 hours each = 24 hrs. @ \$27.50 per hour =	<b>\$ 660.00</b>
--	------------------

**EQUIPMENT**

Service Truck 12 hrs. @ \$15.00 per hour	=	\$ 180.00
Bucket Truck 12 hrs. @ \$25.00 per hour	=	\$ 300.00
Equipment Totals		<b>\$ 480.00</b>

**TOTALS**

MATERIAL	\$13,862.00
LABOR	\$ 660.00
EQUIPMENT	\$ 480.00
	<b>\$15,002.00</b>

**QUOTE FROM CONTRACTOR MUST BE WITHIN 10%**