CONTRACTUAL AGREEMENT

This Agreement is made by and between the American Association of State Highway and Transportation Officials, Inc. a corporation of the District of Columbia, with offices at 444 N. Capitol St. N.W., Suite 249, Washington, D.C. 20001, hereinafter referred to as the "ASSOCIATION," and Arizona Department of Transportation, with offices at 206 South 17th Avenue, Phoenix, Arizona, hereinafter referred to as the "MEMBER DEPARTMENT."

WITNESSETH

Whereas, the ASSOCIATION is operating the National Transportation Product Evaluation Program, hereinafter referred to as the "NTPEP", which requires that testing of certain materials, products and devices be carried out and reported in a prescribed manner approved by the ASSOCIATION; and

Whereas, the MEMBER DEPARTMENT is willing to carry out testing of certain materials, products and devices as specified herein, in accordance with the procedures established by the ASSOCIATION for the NTPEP:

Now, Therefore, in consideration of the mutual covenants and agreements hereinafter set forth, the sufficiency of which is hereby acknowledged, the ASSOCIATION and the MEMBER DEPARTMENT agree as follows:

1. Technical Assistance

(a) The MEMBER DEPARTMENT shall do the test deck evaluations and furnish the data to Virginia Department of Transportation as outlined in the attached "Project Work Plan for Field and Laboratory Evaluations of Sign Sheeting Material," hereinafter referred to as the "Project Work Plan," which is hereby incorporated into this Agreement.

(b) The MEMBER DEPARTMENT is equipped and qualified to do the test deck evaluations and furnish the data to Virginia Department of Transportation as outlined in the Project Work Plan.

(c) The MEMBER DEPARTMENT shall furnish all necessary personnel, materials, facilities, equipment, service and all other resources and capabilities necessary or desirable to do the test deck evaluations and furnish the data to Virginia Department of Transportation as outlined in the Project Work Plan.

(d) The MEMBER DEPARTMENT agrees in performing the test deck evaluations and furnishing the data to Virginia Department of Transportation as outlined in the Project Work Plan, it will do the work in an acceptable workmanlike manner, as determined by the ASSOCIATION and in conformance with general practice as recognized by the state departments of highways and transportation that comprise the ASSOCIATION.

2. Period of Performance

(a) The MEMBER DEPARTMENT shall complete the work described in the Project Work Plan in accordance with the following general schedule:

1. Test panels will be fabricated by Virginia Department of Transportation in April 2000. The panels will be shipped from Virginia to Arizona as soon as practical and the sign sheeting materials will be installed on the field test decks no later than June 2000.

2. Status reports will be made to the NTPEP Coordinator every six months.

3. Test data for inclusion in the "Year 1" interim report will be sent to Virginia Department of Transportation by July 1, 2001; test data for inclusion in the "Year 2" interim report will be sent to the Virginia Department of Transportation by July 1, 2002; and test data for inclusion in the "Year 3 -- Final Report" test deck report will be sent to Virginia Department of Transportation by July 1, 2003.

(b) Whenever the MEMBER DEPARTMENT knows, or reasonably should know or anticipates, that any condition beyond its control is delaying or threatens to delay the timely performance of the testing work and the making of timely reports, it shall advise ASSOCIATION of the actual or expected delay, the cause thereof, and the then expected completion date of the testing work and reports.

3. Costs and Payments

(a) The cost per sample (test deck evaluation only) under this Agreement and the Project Work Plan shall be $150.00 (Exactly One Hundred Fifty dollars and no cents) per sample color adhesive and type per location. This amount is a fixed price per sample tested,(test deck evaluation only) and furnish data to Virginia Department of Transportation for the interim and final reports. It is agreed that in no event will the ASSOCIATION pay the MEMBER DEPARTMENT for costs incurred in excess of the fixed price per sample, unless a mutually acceptable separate written agreement is entered into between the parties.

(b) If testing work under this Agreement is terminated by the ASSOCIATION without cause, the amount payable to the MEMBER DEPARTMENT will be in proportion to the percentage of completion of the testing work as described in the Project Work Plan, as of the effective date of such termination or suspension.

(c) The ASSOCIATION shall make payments to the MEMBER DEPARTMENT in accordance with the following procedure:

1. The MEMBER DEPARTMENT shall submit an invoice to the ASSOCIATION for reimbursement for the test deck evaluation work when it has completed all the evaluations on the samples and furnished data to Virginia for all the approved products as identified by the NTPEP Coordinator at the fee schedule outlined in (a) above, payable to the MEMBER DEPARTMENT under this Agreement, and the invoice being supported with accepted accounting principles and procedures.

2. Upon written request by and at the expense of the ASSOCIATION, the MEMBER DEPARTMENT shall permit a designated representative of the ASSOCIATION to inspect, copy and audit the MEMBER DEPARTMENT's books and records relating to the performance of this Agreement.

4. **Stop Work Order**

The ASSOCIATION may, upon not less than a ten day written notice to the MEMBER DEPARTMENT, require the MEMBER DEPARTMENT to stop all, or any part of the work called for by this Agreement. Upon receipt of such a stop work order, the MEMBER DEPARTMENT agrees to comply with its terms and take all reasonable steps to minimize the incurring of additional costs allocated to the work covered by the stop work order during the period of work stoppage.

5. **Termination**

(a) This Agreement may be terminated by the ASSOCIATION with a 30-day written notice to the MEMBER DEPARTMENT. In the event of termination by the ASSOCIATION without cause, the MEMBER DEPARTMENT shall be paid all costs and obligations incurred in accordance with this Agreement prior to the date of termination. Such reimbursement, together with other payments already made, shall not exceed the per sample cost times the number of samples approved for testing by the NTPEP Coordinator.

(b) This Agreement may be terminated by the MEMBER DEPARTMENT with a 30-day written notice to the ASSOCIATION.

(c) Upon termination of the Agreement prior to its full term, the MEMBER DEPARTMENT agrees to provide to the ASSOCIATION all data collected up to the time of termination, and to provide required reports through such termination date.

6. **Reports**

(a) Interim reports shall be prepared and delivered to the ASSOCIATION as required in the Project Work Plan.

(b) After completion of the testing work, or upon termination of this Agreement under Section 5, the MEMBER DEPARTMENT shall make a final reporting in the manner described in the Project Work Plan.

7. **Indemnification**

(a) To the Extent provided by law, the MEMBER DEPARTMENT hereby assumes its responsibilities for any loss resulting from bodily injuries (including death) or damages to property, arising out of any act or failure to act on the MEMBER DEPARTMENT's part, or the part of any employee of the MEMBER DEPARTMENT in the performance of the work undertaken under this agreement and contract.

(b) To the Extent provided by law, the ASSOCIATION hereby assumes its responsibilities for any loss resulting from bodily injuries (including death) or damages to property, arising out of any act or failure to act on the ASSOCIATION's part, or the part of any employee of the ASSOCIATION in the performance of the work undertaken under this agreement and contract.

8. **Proprietary Rights to Data**

It is agreed that the ASSOCIATION shall be the owner of and shall have the exclusive proprietary rights, to the exclusion of the MEMBER DEPARTMENT, to all data and reports resulting from this Agreement, shall hold copyright thereto, and have the exclusive right to publish, disclose, disseminate and use in whole or in part any data and information received or developed under this Agreement.

9. **Term of the Agreement**

The term of this Agreement shall be for the period as stated in the Project Work Plan, measured from the effective date of the Agreement.

10. **Effective Date**

This Agreement shall become binding on the parties hereto and of full force and effect upon the signing thereof by the duly authorized officials for the ASSOCIATION and the MEMBER DEPARTMENT, the effective date being that upon which the last party hereto executes the Agreement as stated below.

11. **Jurisdiction**

This Agreement shall be construed in accordance with and governed by the laws of the District of Columbia and the State of Arizona.

12. **Interpretation**

Where interpretation of the Project Work Plan and the terms of this Agreement becomes necessary, recourse shall first be had to the operating procedures established by the ASSOCIATION for the NTPEP, including the appeals process thereof.

13. **Completeness**

This Agreement is the complete and exclusive statement of the arrangement between the parties, and supersedes all proposals, oral or written, and all other communications between the parties relating to the subject matter thereof. It may be amended from time to time in writing by the mutual consent of the parties hereto.

14. Communications

All communications concerning this Agreement, including invoices and reports, shall be sent to:

For the ASSOCIATION:

Mujeeb A. Basha, PE
NTPEP Coordinator
AASHTO
444 N. Capitol St. NW, Ste 249
Washington, D.C. 20001
(202) 624-3695
mujeebb@aashto.org

For the MEMBER DEPARTMENT:

Mr. Doug Forstie, PE
Assistant State Engineer, Materials Group
Arizona Department of Transportation
206 South 17th Avenue
Phoenix, Arizona 85007

In Witness Whereof, the parties have set their hands and seals by their duly authorized agents and representative on the day and year below written:

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

Witness: _____ **By:** _____

Date 04/18/2000 **Title:** **Executive Director**

ARIZONA DEPARTMENT OF TRANSPORTATION (ADOT)

Witness: _____ **By:** _____

CATHERINE J. HEGEL

Date 5 June 2000 **Title** Contract Administrator

AASHTO'S

National Transportation Product Evaluation Program

PROJECT WORK PLAN FOR THE FIELD AND LABORATORY EVALUATION OF SIGN SHEETING MATERIALS

March 17, 2000

FIELD AND LABORATORY EVALUATIONS OF SIGN SHEETING MATERIALS

Sign Sheeting Manufacturers wishing to participate in the AASHTO National Transportation Product Evaluation Program must submit a product evaluation form (PEF) to the AASHTO NTPEP Coordinator by the deadline indicated in attached solicitation. The Product Evaluation Form must include Material Safety Data Sheets on the process color inks to be used with the sheeting along with other pertinent information. The AASHTO NTPEP Coordinator will assign each material a number as indicated below: (examples)

SSM-XX-1	Manufacturer "A" Engineer Grade Pressure Sensitive Sheeting
SSM-XX-2	Manufacturer "A" Engineer Grade Heat Activated Sheeting
SSM-XX-3	Manufacturer "B" High Performance Grade Pressure Sensitive Sheeting
SSM-XX-4	etc.

Where XX is the last two digits of the submittal year.

The manufacturer will be notified as indicated in the attached solicitation of the NTPEP Coordinator's decision to test their material. At a later date the Virginia DOT will also notify the manufacturer where to ship the material for testing. The materials will be sent to a Virginia DOT sign shop. Suppliers will submit to the assigned sign shop one roll of sign sheeting material approximately 1 meter (36 inches) wide by 15 meters (50 feet) long of each color and adhesive backing they have elected to have tested and evaluated. In some cases it will be necessary submit larger quantities as advised by Virginia DOT, in order to provide an adequate amount of material for testing.

The process color inks to be used with this sheeting must also be sent to the sign shop. The process colors suppliers have elected to have tested and evaluated should be one or more of the following colors: red, blue, green, orange, yellow, brown and black.

The samples must be clearly labeled with the assigned SSM-XX- number. The sample identification should include lot no., batch no., drum no., etc. The samples of material must arrive at the sign shop by April 1 of the submittal year.

A week in April convenient to the sign shop will be assigned to fabricate test panels for outdoor exposure testing. Representatives of the manufacturers are requested to be present to provide guidance and expertise in the handling of their specific product.

If ink is submitted, it is particularly important that the representative be completely familiar with the ink application process. Manufacturers will normally be expected to arrange for disposal of leftover ink if it is not compatible with the Sign Shop waste stream. Virginia retains the right to recover from the manufacturer any excessive cost that results from disposal of surplus material.

SIGN SHOP PROCEDURE

1. Lead State Coordinator meets with Sign Shop Foreman and Manufacturer's Representative. Coordinator outlines procedure to track material. Coordinator explains that the sign shop personnel are at the disposal of the Representative, whatever directions or recommendations he suggests will be carried out. The sign panels will be 100 mm x 300 mm x 2.5 mm (4" x 12" x 0.1"), the aluminum alloy to be 5052-H38. The Representative may reject any test panel.

2. State Coordinator records all information on materials for testing: Item No., color, size, Lot No., etc. for sheeting and ink submitted.

3. State Coordinator assigns panel number to each color and ink combination submitted.

4. Aluminum sign blanks may have some defects from the manufacturing, packaging and shipping processes. The Representative and the sign shop personnel may reject any panels they deem unacceptable.

5. Aluminum sign blanks shall be prepared in accordance with ASTM D4956-99, Subsection 7.2 before application of sheeting.

6. Sheeting will be applied according to manufacturer's recommendation using equipment available in the sign shop. If UV cured ink is submitted, the manufacturer may be requested to provide UV curing equipment if it is not available in the Sign Shop.

   It will be applied three different ways.

   (A) Pressure-Sensitive sheeting may be applied by placing the 100 mm x 300 mm (4" x 12") panels on a large aluminum sign blank. The sign blank will then run through a pressure sensitive applicator.

   (B) Pressure-Sensitive sheeting may also be applied by small hand applicators.

   (C) Heat-Activated sheeting will be applied by vacuum and heat.

7. Inks are applied according to the manufacturer's recommendation. The ink covers an area 75 mm x 280 mm (3" x 11") leaving approximately 10 mm (1/2") border around the edge of the panel for handling purposes.

8. Screen size used with the ink:
   Monofilament White Mesh No.158 HITECH thread diameter 64 microns (0.0025"), mesh opening 90 microns (0.0035"), open areas 32%, 2 meter width.

9. The Manufacturer's Representative will be allowed to select the panels that will go to the six DOT test deck sites in five different States.

10. Once the panels have been selected for the test deck a sample of sheeting approximately 4 meters

(12 feet) in length and 1 meter (36 inches) wide will be sent to Louisiana DOTD for laboratory testing.

TEST PANEL PREPARATION AND TRACKING PROCEDURE

The manufacturer submits their sign sheeting material to the designated Virginia DOT sign shop for test panel preparation. The sign shop cooperating with the company representative fabricates test panels for outdoor weathering at AASHTO NTPEP Test Decks. The sign panels are 100 mm x 300 mm (4" x 12"). Panels will be fabricated in the following excess quantities in order to provide an adequate selection of good quality specimens.

5 panels per test deck for each color of sheeting selected for testing and evaluation.

10 panels per test deck for each color ink selected for testing and evaluation.

Extra panels will be made if necessary.

The manufacturer will examine all the panels fabricated and give approval before any of the panels are inked. After approval of the panels fabricated with each of the selected sheeting color, 3 panels per test deck will be selected to go to the AASHTO NTPEP test decks while the remaining selected color panels will be inked according to the following scenario with extra panels being made when necessary.

6 panels per test deck of each selected sheeting color with each ink color selected

Each panel will receive a number for tracking purposes. The numbers run consecutively from 1 to 10,000 beginning with the first available number for the year in which the panels are made.

The manufacturer will examine all the above panels and select three panels of each sheeting and ink combination to go to each of the AASHTO NTPEP test decks.

The panels selected per color and ink combination that are to go to the test deck will be assigned the first available number for the year along with a letter (e.g. 551A). One-third of the (same color) panels will be assigned the letter A. One-third of the (same color) panels will be assigned the letter B. The other one-third of the (same color) panels will be given a letter C.

The process will continue until all panels have been given a number and a letter

The number and letter combination will then be etched on the back of each sign panel with an electric engraver.

One set of panels will be sent to each of the AASHTO NTPEP Test Decks.

One set of panels is defined as the 3 panels of each color sheeting and ink submitted by the supplier per test deck site and labeled as follows:

Example: 551A, 551B, 551C

552A, 552B, 552C

553A, 553B, 553C

etc.

A set of these test panels will be sent to each AASHTO NTPEP test deck: one in Louisiana, one in Minnesota, one in Phoenix, Arizona one in Flagstaff, Arizona, one in North Carolina, one in Virginia. A test deck consists of a number of Outdoor Exposure racks facing south and inclined at an angle of 45 degrees from the horizontal as stated in ASTM G7-97.

TEST DECK LOCATIONS

Arizona's test decks are located in Phoenix and Flagstaff.

Louisiana's test deck is located in Baton Rouge at the Louisiana D.O.T.D. Traffic Services Section on Tom Drive.

North Carolina's test deck is located at its Wilmington Division of Highways Headquarters about 15 miles from the Atlantic Ocean in Wilmington, North Carolina.

Minnesota's test deck is located near the Maplewood test laboratory north of St. Paul, Minnesota.

Virginia's test deck is located at its McDowell Area Headquarters on Route 250 between the Shenandoah Mountains and the Allegheny Mountains near the Virginia- West Virginia border.

TEST DECK PROCEDURE

1. Each Test Deck will receive 3 panels for each color per type selected for test by the suppler and labeled xA, xB, and xC.

2. Each panel received by the test deck will be examined closely. Any minute flaw will be recorded in a notebook.

3. The following tests will be performed on each panel. Testing intervals will be as indicated in the Field Evaluation Test Schedule (Appendix A). Panels with black ink will not be tested except for visual evaluation. White, yellow and orange sheeting, if designated as Construction Grade by the manufacturer, will require full evaluation after one year of exposure.

3.1 Coefficient of Retroreflection Values will be measured in a 15 or 30 meter (50 or 100 foot) Light Tunnel in accordance with ASTM D4956-99, Subsection 7.3. The Coefficient of Retroreflection value will be recorded at an observation angle of 0.2 degrees and an entrance angle of -4 degrees and +30 degrees. The rotational angle will be 0 and 90 degrees. The rotational angle of 0 degrees is when the number and letter on the back of the panel are at the top (closest to the light source). Panels with ink should be masked in such a way as to exclude the non-inked borders from the reading area. Field exposed test panels will be washed with water and dried prior to measurement.

3.2 Chromaticity will be measured in accordance with ASTM D4956-99, Subsection 7.4 and recorded for panels A, B and C. Panel C will be retained in the laboratory for comparison purposes. Chromaticity values for panels A and B will be averaged and reported.

3.3. Portable reflectometer and portable color meter readings will be taken. Each panel shall be measured on the top, middle, and bottom. The average of these readings on each panel shall be recorded on the report. In the case of barricade or other preprinted sheeting, the different colored areas will be read separately. Field exposed test panels will be wiped with a soft damp cloth and allowed to dry prior to being read. The control panel (Panel C) will be read at the test deck site at the same time the test panels are being read. When readings are taken in the field, the air temperature shall be recorded. Extreme temperatures may affect the readings.

3.4 Visual comparison with the control sample will be made at the time intervals indicated in Appendix A. Samples will be evaluated as to shrinkage, expansion, blistering and cracking, as described in Appendix B.

4. Panels labeled xA and xB will be placed on the outdoor exposure racks on June 1, of the submittal year or as soon as possible thereafter.

5. Panels labeled xC will be stored in a file cabinet or other suitable indoor storage place protected from the sunlight and weather and temperature extremes. Panels should not be stored in vertical stacks of more than 10 panels. Horizontal stacking is preferred. Panels should be stacked face to face and should be separated by slip sheeting and foam packing material .

6. When panels xA and xB are removed from the Outdoor Exposure Racks for full evaluation, they will be returned to the Outdoor Exposure Racks within four weeks for continuing exposure. Records will be maintained indicating the length of time the panels were not exposed due to testing or for any other reason.

7. Weather information from the National Weather Service station nearest each test deck will be summarized and recorded in the final report.

8. Findings will be reported to AASHTO NTPEP Sign Sheeting Committee as follows:

1 year report: laboratory data and full field evaluation of construction grade materials.

2 year report: full field evaluation of all materials

3 year report: full field evaluation of all materials

9. At the end of the test period, the panels will be retained by the test site state in accordance with Section 5 of the Test Deck Procedure

APPENDIX A

FIELD EVALUATION TEST SCHEDULE

	Initial	6 months	I year	2 years	3 years
Light tunnel ASTM D4956-95, 8.3	X		Construction grade only	X	X
Lab color ASTM D4956-95, 8.4	X		Construction grade only	X	X
Portable retroreflectometer	X	X	X	X	X
Portable color meter	X	X	X	X	X
Visual evaluation	X	X	X	X	X

APPENDIX B

VISUAL RATING SYSTEM

SHRINKAGE - L-S-300C SUBSECTION 4.4.9.2

Shrinkage will be reported as the number of mm (inches) between edge of the sheeting and the edge of the Aluminum panel at the specified time interval. Expansion will also be noted in this category.

CRACKING

This category will evaluate sheeting or the ink on sheeting for cracking, crazing or scaling. An abbreviation will be made on the report form. The explanation of the abbreviation will appear in the Notes on Visual Data Collection.

BLISTERING

This category will evaluate sheeting or the ink on sheeting for Blisters, Delamination or Edge Lifting. An abbreviation will be made on the report form. The explanation of the abbreviation will appear in the Notes on Visual Data Collection.

LABORATORY EVALUATIONS

Upon completing the preparation of the panels for the outdoor test decks, samples of the remaining sheeting will be received from Virginia DOT for evaluation in the Louisiana DOTD Materials and Testing Laboratory. Test methods used in evaluation of the sign sheeting materials shall be as listed in Table 1.

TABLE 1
TEST METHODS USED IN EVALUATION
OF RETROREFLECTIVE SIGN SHEETING

Tests Performed	Fed. Spec. L-S-300C	ASTM D4956-99	Comments
Adhesion: Protective Liner Removability Adhesive Peel Strength		 7.10 7.5	
Flexibility		7.9	
Impact Resistance		7.11	
Heat Resistance	4.4.10.1		
Cold Resistance	4.4.10.2		Tested at -29 deg C (-20 deg F)
Humidity Resistance	4.4.10.3		Tap water used in testing
Shrinkage		7.8	
Daytime Color: Fluorescent colors		7.4 E 991-97	
Luminance Factor (Y%): Fluorescent colors		7.4 E 991-97	
Specular Gloss		7.12	
Coefficient of Retroreflection		7.3	
Reboundable Sheeting:			
Impact Resistance		S2.2.1	
Flexibility		S2.2.2	
Adhesion		S2.2.3	