ARIZONA DEPARTMENT OF TRANSPORTATION

REPORT NUMBER: FHWA/AZ 86/226-II

PHOENIX METROPOLITAN AREA EXTERNAL TRIP STUDY

Volume II
Survey Procedures Manual

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December 1986

Prepared for:
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in cooperation with
U.S. Department of Transportation
Federal Highway Administration

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PHOENIX METROPOLITAN AREA

EXTERNAL TRAVEL STUDY

Volume II

SURVEY PROCEDURES MANUAL

Prepared For:

ARIZONA DEPARTMENT OF TRANSPORTATION

ARIZONA TRANSPORTATION RESEARCH CENTER

Prepared By:

BARTON-ASCHMAN ASSOCIATES, INC.

Research Project No. HPR-PL-1 (27) Item 226

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1.

INTRODUCTION

The Maricopa Association of Governments Transportation and Planning Office (MAGTPO) is updating the computer models used to prepare forecasts of traffic volumes in the Phoenix area. Those forecasts are used to establish future roadway needs in the area. One element of the modeling effort involves external travel. External travel is defined as trips having an origin or a destination outside the study area. Trips having both origin and destination outside the area, but passing through the area, are also considered external trips.

To establish the magnitude and nature of external tripmaking, a series of roadside interviews will be conducted. Seventeen external stations have been identified by MAGTPO. It is at these locations that surveys will be conducted to establish:

1. Trip origin;
2. Trip destination;

3. Trip purpose;
4. Vehicle garaging location;
5. Vehicle occupancy;
6. Vehicle classification; and
7. State of vehicle registration.

In addition, an overall vehicle classification count will be performed, as well as a 24-hour count of traffic. This information will be used in factoring the results of the survey sample to correspond to the universe of traffic at a given location.

As the end result of this work, the MAGTPO computer models will be refined to allow the estimation of future external travel in the Phoenix area.

This document describes the procedures utilized in carrying out the roadside interviews. Chapter 2 describes the roles of the various survey personnel. In Chapter 3, the layouts of the survey stations are described, including detailed traffic control plans for each general roadway type.

2.

SURVEY PERSONNEL INSTRUCTIONS

INTRODUCTION

This section is intended to provide survey personnel with instructions on how to conduct surveys of drivers on selected Maricopa County roads. As part of a six-person crew you will be participating in an effort to learn more about certain characteristics of travelers in the Phoenix area. In order to help you better understand your job, this booklet describes the purpose of the survey and your responsibilities as part of the survey team.

STUDY PURPOSE

All major metropolitan areas in the United States currently have ongoing transportation planning programs. In the Phoenix, Arizona metropolitan area, the Maricopa Association of Governments Transportation and Planning Office (MAGTPO) has the responsibility for this program. Information from this program is used to derive future year traffic forecasts which are the

basis for all roadway improvement projects in the metropolitan area. Needless to say, it is essential to periodically update methods and procedures to produce reliable results.

MAGTPO is currently involved in a major effort to update all aspects of the transportation model for the Phoenix metropolitan area. One component of this model estimates external travel, which is travel through the region and into the region. The purpose of this study is to update the external travel portion of this model to reflect current conditions and advancements in the state-of-the-art.

The overall study has four broad objectives. The work that you will do relates to the first of these objectives, which is:

- To collect, in a cost-effective way, current data on travel which passes through the Phoenix region, or which originates or is destined to the Phoenix region and passes through the cordon line.

PARTICIPANTS IN THE STUDY

Over the survey period, you will be part of a group of 12-24 people who will participate daily in conducting the survey. This group will be stationed at various locations across Maricopa County interviewing travelers and obtaining information regarding the types of vehicles being driven.

Your work is the most important part of the project. Without a successful survey, the outcome of the project will be meaningless.

The overall project is being directed by Barton-Aschman Associates, Inc. for the Arizona Department of Transportation. Representatives of that firm will

be responsible for establishing your daily work assignments and ensuring that you have the materials necessary to complete the assignments. Also, Barton-Aschman employees will be available to answer any questions you might have about your assignments.

TIME PERIOD

The survey will be conducted over a 3-4 week time period beginning near the end of April. During that period, surveys will be performed Monday through Thursday. On Fridays and on certain Mondays, you might be asked to assist in preparing the field data for computer analysis.

ADMINISTRATIVE MATTERS

Before describing what you will actually do during the survey period, it is important to first explain some general rules and requirements. These are things that you should keep in mind as you get ready to conduct the survey.

PUNCTUALITY

It is essential that you report to work on time, and that you meet your supervisor as scheduled. Persons who fail to be on time will be dismissed.

APPEARANCE

You will be meeting the public daily when performing the survey. The willingness of people to respond to the survey depends largely on how you look. Therefore, you will be expected to present a neat appearance.

BEHAVIOR

Be courteous and polite at all times, while maintaining a business-like attitude. The success of the survey will be somewhat dependent on the impression that you give to drivers entering the survey area.

Some drivers will appear angry at having their trip interrupted. Reply politely, and give them the survey description handout that has been prepared. A copy of that handout is shown as Exhibit 1. If the person is abusive and/or indicates that he will not cooperate by participating in the survey, simply thank the person and step back from the car. If the driver continues to be abusive, walk toward the rear of the car and call your supervisor. Under no circumstances should you become involved in an argument or any sort of confrontation.

Any problems that you encounter should be reported to your supervisor.

SUPERVISORS

Each survey station will be assigned a Barton-Aschman employee who will act as your supervisor. That person is responsible for your performance and for taking care of any problems that might arise. The supervisor will also see to it that survey personnel are rotated among the various assignments and that all personnel receive scheduled breaks.

Prior to each scheduled shift you will meet your supervisor at a pre-arranged location. At that time, carpools will be arranged for the trip to the actual survey location. Upon arrival at the survey location, the supervisor will distribute all necessary materials (forms, clipboards, pencils, etc.) and, if the traffic control devices have been set up, will

EXHIBIT 1

ARIZONA DEPARTMENT OF TRANSPORTATION

206 South Seventeenth Avenue Phoenix, Arizona 85007

BRUCE BABBITT
Governor

April-May, 1985

Dear Driver:

The Arizona Department of Transportation and the Maricopa Association of Governments are in the process of updating the computer tools that we use to project future traffic volumes in the Phoenix metropolitan area. One important element of this effort concerns external travel --- that is, trips that pass into, out of, or through the Phoenix area.

Your vehicle has been randomly selected to provide information regarding such things as trip origin, trip destination, trip purpose, and vehicle occupancy. The information that you provide, when combined with the results of the other interviews performed here and at the other survey stations, will be used to improve our ability to accurately predict future travel in and around Phoenix. Doing so becomes increasingly more important as Phoenix continues to grow.

We apologize for any delay or inconvenience we may have caused you.

P.S. We assure you that your responses to our questions will be kept strictly confidential.

assign you to a specific job. He/she will then instruct you as to when to begin.

Every hour during the survey period the supervisor will collect completed interview forms and place them in clearly marked envelopes. The envelopes should indicate the survey location, the time of day, and the supervisor's name.

At the end of the survey period, the supervisor will collect all materials and the survey crew will be transported back to their cars.

In addition, the supervisor will have certain other equipment available for your use. This equipment includes:

- Ice chest/cold drinks
- First Aid kit
- Sunscreen
- Salt tablets
- Pencil sharpener

TIME REPORTING

It will be your responsibility to keep accurate records of the time that you work. You should fill out the time card provided by your employment agency on a daily basis. At the end of the pay period established by the agency (whether weekly or bi-weekly), have your card signed by your supervisor.

You will be paid in accordance with the policy established by your employment agency.

SURVEY POSITIONS

The successful performance of the survey effort involves four separate positions working together as a team. These positions will be described below. Remember that during the survey period you might be assigned to any of the positions, so it is important that you be familiar with each of them.

SUPERVISOR

The role of the supervisor has been described in the previous section. Generally, the supervisor is responsible for the following items:

- Assigning members of the survey crew to positions.
- Rotating crew members and assigning break times.
- Providing equipment needed to carry out the survey.
- Assigning meeting times and places and arranging transportation to each day's survey location.
- Working with flagger to establish procedures for selecting the survey sample and avoiding traffic congestion.
- Resolving any questions or problems that arise at a survey location.
- Signing time cards for survey personnel.

INTERVIEWERS

In many respects the interviewers represent the most important element of the total survey process. More than any other position, the interviewers will make direct contact with the drivers passing through the survey station. It is their responsibility to accurately complete the interview form shown as Exhibit 2. The information at the top of the form (station number, etc.) should be filled in prior to beginning the day's surveys. The use of the survey form will be described in greater detail later.

It is essential that the interviewer get complete and accurate information for each of the questions. This will be most difficult for the first two questions, regarding trip origin and destination. Note also that each survey must be completed in the shortest time possible. A maximum of 90 seconds has been established for this procedure.

CLASSIFICATION COUNTER

The classification counter is responsible for recording the types of vehicles passing by the survey station during the shift. All vehicles must be recorded, including those bypassing the survey station. The classification form is shown as Exhibit 3. The use of this form will be described in greater detail later.

FLAGGER

The flagger will, with the assistance of an off-duty police officer, be responsible for directing traffic at the survey location. At some locations, virtually every car arriving at the station will be interviewed.

ARIZONA DEPARTMENT OF TRANSPORTATION
EXTERNAL TRIP STUDY

Station ID. _____ (Col. 1-4) Station Location _____ Date _____ (Col. 5-7) Hour Beg Interview _____ (Col. 8-9) AM PM

Interviewer _____ (Col. 10-11) 1. Inbound/2. Outbound _____ (Col. 12)

Where did this trip begin?	Where will this trip end?	What is the purpose for making this trip?	Where is this vehicle kept overnight?	Vehicle Occupancy	Vehicle Classification	State of Registration
Address/Intersection City/State Zip Code	Address/Intersection City/State Zip Code	1. To Home 4. Personal 2. To Work 5. Shopping 3. Business 6. Social/Rec. 7. Other	1. Trip Begin 2. Trip End 3. In Maricopa 4. Outside Maricopa		1. Automobile 2. Pickup/Van 3. Rec. Veh. 4. Motorcycle 5. 6 Tire Truck 6. >6 Tire Truck	1. Ariz. 5. Colo. 2. Calif. 6. Utah 3. Nev. 7. Oregon 4. N. Mex. 8. Texas 9. Other
Address/Intersection City/State Zip Code	Address/Intersection City/State Zip Code	1. To Home 4. Personal 2. To Work 5. Shopping 3. Business 6. Social/Rec. 7. Other	1. Trip Begin 2. Trip End 3. In Maricopa 4. Outside Maricopa		1. Automobile 2. Pickup/Van 3. Rec. Veh. 4. Motorcycle 5. 6 Tire Truck 6. >6 Tire Truck	1. Ariz. 5. Colo. 2. Calif. 6. Utah 3. Nev. 7. Oregon 4. N. Mex. 8. Texas 9. Other
Address/Intersection City/State Zip Code	Address/Intersection City/State Zip Code	1. To Home 4. Personal 2. To Work 5. Shopping 3. Business 6. Social/Rec. 7. Other	1. Trip Begin 2. Trip End 3. In Maricopa 4. Outside Maricopa		1. Automobile 2. Pickup/Van 3. Rec. Veh. 4. Motorcycle 5. 6 Tire Truck 6. >6 Tire Truck	1. Ariz. 5. Colo. 2. Calif. 6. Utah 3. Nev. 7. Oregon 4. N. Mex. 8. Texas 9. Other
Address/Intersection City/State Zip Code	Address/Intersection City/State Zip Code	1. To Home 4. Personal 2. To Work 5. Shopping 3. Business 6. Social/Rec. 7. Other	1. Trip Begin 2. Trip End 3. In Maricopa 4. Outside Maricopa		1. Automobile 2. Pickup/Van 3. Rec. Veh. 4. Motorcycle 5. 6 Tire Truck 6. >6 Tire Truck	1. Ariz. 5. Colo. 2. Calif. 6. Utah 3. Nev. 7. Oregon 4. N. Mex. 8. Texas 9. Other
Address/Intersection City/State Zip Code	Address/Intersection City/State Zip Code	1. To Home 4. Personal 2. To Work 5. Shopping 3. Business 6. Social/Rec. 7. Other	1. Trip Begin 2. Trip End 3. In Maricopa 4. Outside Maricopa		1. Automobile 2. Pickup/Van 3. Rec. Veh. 4. Motorcycle 5. 6 Tire Truck 6. >6 Tire Truck	1. Ariz. 5. Colo. 2. Calif. 6. Utah 3. Nev. 7. Oregon 4. N. Mex. 8. Texas 9. Other
(Col. 13-16)	(Col. 17-20)	(Col. 21)	(Col. 22)	(Col. 23)	(Col. 24)	(Col. 25)

INTERVIEW FORM

BARTON-ASCHMAN ASSOCIATES, INC.

EXHIBIT 2

VEHICLE CLASSIFICATION FIELD SHEET

STATION NO. _____ STATION LOCATION _____

DATE _____ NAME _____ INBOUND _____
OUTBOUND _____

TIME	AUTOMOBILE	PICKUP/VAN	REC.VEH.	BUS	MOTOR-CYCLE	6 TIRE TRUCK	>6 TIRE TRUCK	TOTAL
6:00 - 7:00 AM								
7:00 - 8:00 AM								
8:00 - 9:00 AM								
9:00 - 10:00AM								
10:00 - 11:00 AM								
11:00 - NOON								
NOON- 1:00 PM								
1:00 - 2:00 PM								
2:00 - 3:00 PM								
3:00 - 4:00 PM								
4:00 - 5:00 PM								
5:00 - 6:00 PM								
6:00 - 7:00 PM								
7:00 - 8:00 PM								
TOTAL								

VEHICLE CLASSIFICATION FIELD SHEET

BARTON-ASCHMAN ASSOCIATES, INC.

EXHIBIT 3

In such a case, the flagger will ensure that the driver has slowed sufficiently so as to be able to stop at the interview position. At locations having higher traffic volumes, the flagger will select (using pre-established rules) the vehicles that must be interviewed and those that will be allowed to bypass. The flagger must also be aware of potential traffic congestion problems. With the direction of the supervisor, the flagger will adjust the survey sample to reduce traffic backups.

SURVEY EQUIPMENT

Each day you will be provided with a kit of materials needed to conduct the survey. These materials fall into three categories, corresponding to the three positions previously described.

INTERVIEWER'S KIT

The interviewer will receive the following equipment:

- Survey forms
- Clipboard
- 2 pencils
- Orange safety vest

Your supervisor will maintain a supply of extra survey forms and pencils. Also, a pencil sharpener will be available.

CLASSIFICATION COUNTER'S KIT

The classification counter will use the following equipment:

- Vehicle classification field sheets
- Clipboard
- 2 pencils
- Orange safety vest

Your supervisor has additional field sheets, pencils, and a pencil sharpener. Note, however, that only one field sheet should be needed per shift.

FLAGGER'S KIT

The flagger will be provided with the following items:

- Orange flag (approximately 24 inches square)
- Orange safety vest

Finally, note that each crew member will be provided with an orange safety vest. This vest *must be worn at all times* at the survey location. While it is important that we receive valid results from the surveys, nothing is more important than maintaining a safe environment at the survey location. Any crew member found not wearing his/her vest while at the survey location will be dismissed.

SURVEY PROCEDURES

This section describes a typical survey shift. It includes information concerning how the survey will be carried out on a daily basis.

A. MEET SUPERVISOR

Each day you will meet your supervisor at a prearranged location. At that location the survey crew will consolidate into one or two vehicles for the trip to the actual survey location.

The supervisor will make the initial crew assignments for the day and will distribute necessary materials (forms, clipboards, etc.).

B. PREPARE FORMS

Both the interview form and the vehicle classification form require certain descriptive information at the top of the sheet. This information should be filled in prior to beginning the day's surveys. Your supervisor can tell you the station number. Also, each crew member will be assigned a 2-digit number to be used for identification purposes on the interview forms. "Station location" simply refers to the name of the road on which the survey is being held. Also, be sure to mark (either with "X" or by circling) whether a particular sheet is for inbound or outbound traffic. Inbound and outbound traffic <u>must</u> <u>not</u> be mixed on the same sheet. In this case, inbound refers to vehicles traveling toward the center of Phoenix and outbound means vehicles traveling away from Phoenix. If you have questions regarding any of these items, ask your supervisor.

C. CONDUCT SURVEYS

At a time specified by your supervisor (corresponding to the beginning of the appropriate hour), the survey will begin. Just prior to that time the supervisor will instruct the members of the crew to take their positions. These positions may vary slightly depending on the specific layout of each

station. Generally, however, the following rules will apply (these positions are illustrated in the Station Layout chapter):

- Flagger -- The flagger must be visible to oncoming vehicles and should keep an eye on that traffic at all times. On a 2-lane road, two flaggers will be present in the survey area. The flaggers will be stationed at each end of the survey area. Similarly, on multi-lane undivided roadways, the flaggers will be positioned at the "far end" of the survey area. At this location, the flagger can effectively control which vehicles must stop and which will be allowed to pass.

  In cases where a bypass lane is provided (such as on freeway facilities), the flagger should be located at the split in traffic (i.e., in the "V" formed by the cones separating the bypass lane from the interview lane).

- Interviewer — The interviewers will be located within the "survey area" as designated on the station layout drawings. Except while performing an interview, they should remain behind the cones separating them from passing traffic.

- Classification Counter -- This crew member should be located in a position that allows a full view of all passing traffic. He/she should be away from the roadway for safety reasons.

Data Collection Procedures

Flaggers -- Prior to beginning the data collection effort, the flagger(s) will be instructed by the supervisor regarding the required sampling procedure at each station. At stations having low daily volumes, the flagger will be told to stop all traffic passing through the station. At high volume locations, he/she will be told, for example, to stop 3 cars (assuming 3 interviewers are present) and let 27 cars pass before stopping 3 more cars. In the example, a 10 percent sample would be obtained. If necessary, the supervisor will adjust the sample so as to limit traffic congestion at the station. Adjustments of this sort will be communicated to the flagger.

The flagger should face oncoming traffic at all times. To stop a sampled vehicle, hold the orange flag at arm's length across the traffic lane, in front of the vehicle. The free hand should be held aloft, with the palm facing the driver of the car. To reinforce the message, eye contact should be made with each driver.

When waving a vehicle through the station, stand parallel to the roadway, hold the flag at arm's length pointing in the vehicle's direction of travel. Using a waving motion with your free hand, direct the vehicle through the station.

At stations where a bypass lane is provided (on multi-lane roadways) the flagger must separate the sampled vehicles from the stream of traffic. Signs and cones will have slowed traffic to a reasonable level. However, it is important to provide sufficient advance warning to vehicles requiring to change directions (for example, a car pulling into the interview lane). For vehicles that will not be interviewed, simply wave them through as described

above. In order to divert a vehicle into the interview lane: (1) Attempt to make eye contact with driver, (2) point the orange flag (held in your right hand) at the vehicle, and (3) direct the vehicle into the interview lane with your free (left) hand.

Under no circumstances should the flagger step into the moving traffic lane.

All vehicles should be included in the sampling procedures except buses. That is, autos, trucks, and motorcycles will be sampled, but buses will not.

When necessary, the flagger will be assisted by the police officer who will be present at each site.

Interviewers -- The interviewers have responsibility for asking 4 questions and making note of 3 other characteristics of the vehicles surveyed. This process must be performed in 90 seconds or less.

The interviewers should watch as cars approach their positions. They should at all times be aware of vehicular activity around them and should be prepared to react to unexpected actions on the part of drivers. The interviewers should raise their clipboards as a signal to stop. As soon as the vehicle is fully stopped, approach the driver and begin asking questions.

Where did this trip begin? -- In this case, "trip" refers to the specific one-way movement that the driver is engaged in at the time of the survey. If, for example, a family from Des Moines, Iowa is on vacation, visiting the western states, and is in the process of driving from Flagstaff (where they spent the night) to Phoenix, the correct answer to this question would be Flagstaff, not Des Moines, Iowa.

Further, if at all possible, it is important to get as much detail concerning the trip origin as possible. If the street address is known, it should be recorded. If the street address is not known, attempt to obtain the nearest street intersection. At the very least, obtain the name of the building, store, etc. and the city where the trip began.

Where will this trip end? -- The previous discussion generally applies also to this question.

What is the purpose for making this trip? -- Circle the number next to the appropriate choice. Several of the choices (To Home, To Work, Shopping, Social/Recreational) are self-explanatory. "Business," for example, would include a salesman traveling between sales calls. Most truck drivers will have this response as their trip purpose. Typical trips for which "Personal" applies would include medical trips, trips to a barber or beautician, etc. If in doubt, briefly write in the trip purpose, then consult your supervisor at the first opportunity.

Where is this vehicle kept overnight? -- Only one choice should be circled. It is very likely that the answer will be either at the trip origin (circle 1.) or at the trip destination (circle 2.). If the answer is not one of those, it is only necessary to determine whether the vehicle is kept inside (circle 3.) or outside (circle 4.) Maricopa County.

At this point, you should thank the driver and allow him/her to leave (or instruct him/her to leave when the forward survey area clears).

Before the vehicle actually leaves, however, count the number of occupants and write that number in the appropriate space.

Similarly, note the type of vehicle for notation in the "Vehicle Classification" column. Finally, as the vehicle drives away, check the license plate to determine in what state the vehicle is registered. If the state of registration is listed on the survey form, simply circle the appropriate number. If the correct state is not listed, circle "9." to show that the vehicle is from some other state. It is not necessary to write in the name of the state.

As soon as this is complete, immediately redirect your attention to incoming vehicles.

Each survey form has room for five interviews. When the form is full (i.e., five interviews have been completed), remove the form from the clipboard and replace it at the bottom of the stack of forms. At the same time, turn the form sideways or mark it in some other way that will make it easy to remove at the end of the hour (along with the other forms completed during that hour).

Each hour your supervisor will collect all completed and partially completed survey forms and place them in a specially-marked envelope. When this occurs be sure that the next form has the correct hour marked at the top of the sheet.

Exhibit 4 illustrates an example of a completed interview form.

Classification Counter -- The primary responsibility of the classification counter is to record the types of vehicles that pass by the survey station. This count will include all vehicles passing the site, not just those being interviewed. Exhibit 3 illustrated the form to be used for classifying vehicles. Prior to beginning the day's count, the information at the top of

ARIZONA DEPARTMENT OF TRANSPORTATION
EXTERNAL TRIP STUDY

Station No. 1209 (Col. 1-4) Station Location I-10 South Date 5/14/85 (Col. 5-7) Hour Beginning 7:00 (Col. 8-9)

Interviewer: Fred Jones (Col. 10-11) (1) Inbound/2. Outbound (Col. 12)

Where did this trip begin?	Where will this trip end?	What is the purpose for making this trip?	Where is this vehicle kept overnight?	Vehicle Occupancy	Vehicle Classification	State of Registration
1234 Broadway Address/Intersection Tucson, Arizona City/State Zip Code	24th / Camelback Address/Intersection Phoenix Ariz. City/State 85016 Zip Code	1. To Home 4. Personal 2. To Work 5. Shopping (3) Business 6. Social/Rec. 7. Other	(1) Trip Begin 2. Trip End 3. In Maricopa 4. Outside Maricopa	2	(1) Automobile 2. Pickup/Van 3. Rec. Veh. 4. Motorcycle 5. 6 Tire Truck 6. >6 Tire Truck	(1) Ariz. 5. Colo. 2. Calif. 6. Utah 3. Nev. 7. Oregon 4. N. Mex. 8. Texas 9. Other
Main / Elm Address/Intersection Yuma Ariz City/State Zip Code	3020 E. Camelback Address/Intersection Phoenix Ariz. City/State 85016 Zip Code	1. To Home (4) Personal 2. To Work 5. Shopping 3. Business 6. Social/Rec. 7. Other	1. Trip Begin 2. Trip End 3. In Maricopa (4) Outside Maricopa	1	(1) Automobile 2. Pickup/Van 3. Rec. Veh. 4. Motorcycle 5. 6 Tire Truck 6. >6 Tire Truck	(1) Ariz. 5. Colo. 2. Calif. 6. Utah 3. Nev. 7. Oregon 4. N. Mex. 8. Texas 9. Other
6789 Oak Dr. Address/Intersection San Diego, CA City/State 92110 Zip Code	16th / Northern Address/Intersection Phoenix, Ariz. City/State Zip Code	1. To Home 4. Personal 2. To Work 5. Shopping 3. Business (6) Social/Rec. 7. Other	1. Trip Begin 2. Trip End 3. In Maricopa (4) Outside Maricopa	4	1. Automobile 2. Pickup/Van (3) Rec. Veh. 4. Motorcycle 5. 6 Tire Truck 6. >6 Tire Truck	1. Ariz. 5. Colo. (2) Calif. 6. Utah 3. Nev. 7. Oregon 4. N. Mex. 8. Texas 9. Other
Central / Lake St. Address/Intersection Tucson Arizona City/State Zip Code	— Address/Intersection Flagstaff Ariz. City/State Zip Code	1. To Home 4. Personal 2. To Work 5. Shopping 3. Business 6. Social/Rec. (7) Other	(1) Trip Begin 2. Trip End 3. In Maricopa 4. Outside Maricopa	1	1. Automobile (2) Pickup/Van 3. Rec. Veh. 4. Motorcycle 5. 6 Tire Truck 6. >6 Tire Truck	(1) Ariz. 5. Colo. 2. Calif. 6. Utah 3. Nev. 7. Oregon 4. N. Mex. 8. Texas 9. Other
Address/Intersection City/State Zip Code	Address/Intersection City/State Zip Code	1. To Home 4. Personal 2. To Work 5. Shopping 3. Business 6. Social/Rec. 7. Other	1. Trip Begin 2. Trip End 3. In Maricopa 4. Outside Maricopa		1. Automobile 2. Pickup/Van 3. Rec. Veh. 4. Motorcycle 5. 6 Tire Truck 6. >6 Tire Truck	1. Ariz. 5. Colo. 2. Calif. 6. Utah 3. Nev. 7. Oregon 4. N. Mex. 8. Texas 9. Other
(Col. 13-16)	(Col. 17-20)	(Col. 21)	(Col. 22)	(Col. 23)	(Col. 24)	(Col. 25)

SAMPLE INTERVIEW FORM

BARTON-ASCHMAN ASSOCIATES, INC.

EXHIBIT 4

the sheet should be filled in. If you are unsure as to the station number or any other piece of information, check with your supervisor.

Note that the form is divided into one hour segments beginning at 6:00 AM and going until 8:00 PM. It is important that the classification information be recorded in the proper time slot. If you do not have a wristwatch, check with your supervisor. At some locations, not all time periods will be filled in. For example, at low volume locations, surveys will not begin until 10:00 AM. The first four rows will be left blank at those stations, with the first set of entries in the row labeled "10:00 - 11:00 AM."

Vehicles are classified by placing tick marks in the appropriate box. An example of a partially-completed classification form is shown in Exhibit 5. At high volume locations, the classification counters will be provided with mechanical counters to keep track of the most common vehicle types (for example, automobiles and pickups/vans).

It is not necessary to complete the "Total" boxes in the field, though you can do so if traffic volumes are light.

At the end of the survey shift, give the completed form to your supervisor.

VEHICLE CLASSIFICATION FIELD SHEET

STATION NO. 1209 STATION LOCATION I-10 South

DATE May 14, 1985 NAME Ted Jones INBOUND ✓ OUTBOUND

TIME	AUTOMOBILE	PICKUP/VAN	REC.VEH.	BUS	MOTOR-CYCLE	6 TIRE TRUCK	>6 TIRE TRUCK	TOTAL
6:00 - 7:00 AM	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸	𝍸 𝍸 𝍸 𝍸 |||	𝍸 ||	||	𝍸 𝍸 |||	|||	𝍸 𝍸 |||	
7:00 - 8:00 AM	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 |||	𝍸 𝍸 𝍸 ||	||||	|	𝍸	||	𝍸 𝍸 𝍸 |||	
8:00 - 9:00 AM								
9:00 - 10:00AM								
10:00 - 11:00 AM								
11:00 - NOON								
NOON- 1:00 PM								
1:00 - 2:00 PM								
2:00 - 3:00 PM								
3:00 - 4:00 PM								
4:00 - 5:00 PM								
5:00 - 6:00 PM								
6:00 - 7:00 PM								
7:00 - 8:00 PM								
TOTAL								

SAMPLE VEHICLE CLASSIFICATION FORM

BARTON-ASCHMAN ASSOCIATES, INC.

EXHIBIT 5

3.

SURVEY STATION LAYOUTS

Safety is a major concern in any project that involves work in or near the road right-of-way. This is particularly true in a situation, such as this one, where a significant portion of the total effort occurs on high-volume, multi-lane roadways, including interstate highways. For that reason, careful consideration must be given to the layout of the survey stations themselves. Sufficient advance warning must be provided to allow drivers to adjust their speed and position on the roadway. That advance warning generally takes the form of signs and orange traffic cones (Note that, in the event of nighttime operations, various forms of lighted devices would also be required). The arrangement of the signs and cones on the roadway approaching the survey station should be in conformance with the requirements of the Manual on Uniform Traffic Control Devices (MUTCD).

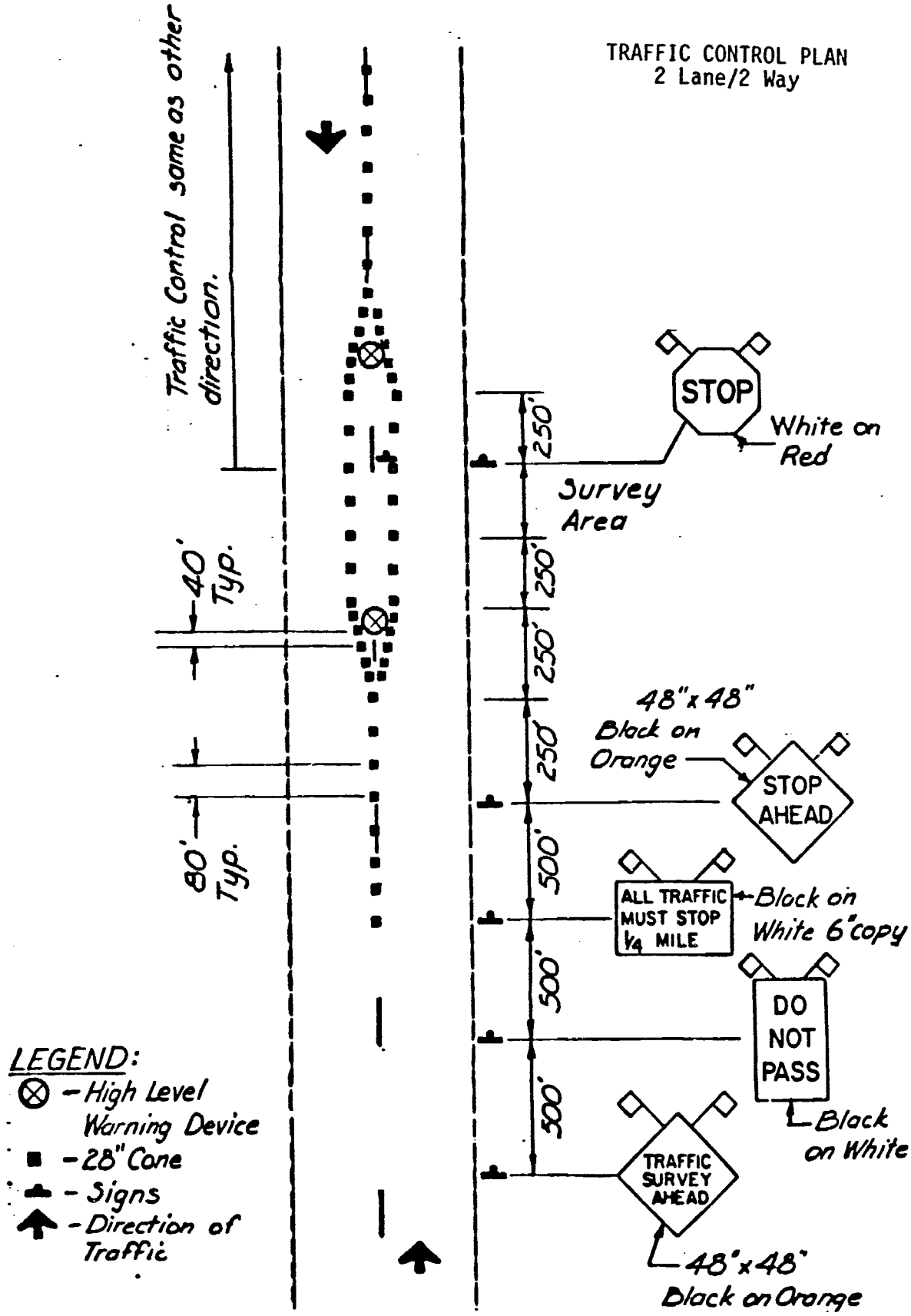
For the External Trip Study, station layouts were devised in cooperation with traffic engineers at the Arizona Department of Transportation. These layouts are illustrated as Exhibits 6 through 9.

Four categories of roadways are covered by those illustrations. Exhibit 6 shows the arrangement of signs and cones for a two-lane facility. A buffer zone is created in the center of the roadway for the safety of interviewers. Flagmen would be stationed at each end of this buffer zone. Note also that a police officer and patrol vehicle with flashing lights would be stationed at the survey location.

The traffic control plan for four-lane, undivided roadways is shown on Exhibit 7. In that case, traffic is consolidated into a single lane. A flagger is then responsible for controlling the flow of traffic through the station area. Again, police protection is provided.

The same general approach is used on the freeway facilities, as shown on Exhibits 8 and 9. Traffic is again forced into one lane, with a flagger selecting the survey sample from the passing stream of traffic. As before, a police officer will be present to provide the needed air of authority. Exhibit 8 relates to a typical freeway set-up, while Exhibits 9A and 9B are for a freeway location involving the use of a convenient rest area. When a rest area is used, only the survey sample should pass through the rest area itself. The remainder of the traffic should be allowed to bypass on the freeway mainline. Also, it is necessary to make provisions for continued use of the rest area facilities.

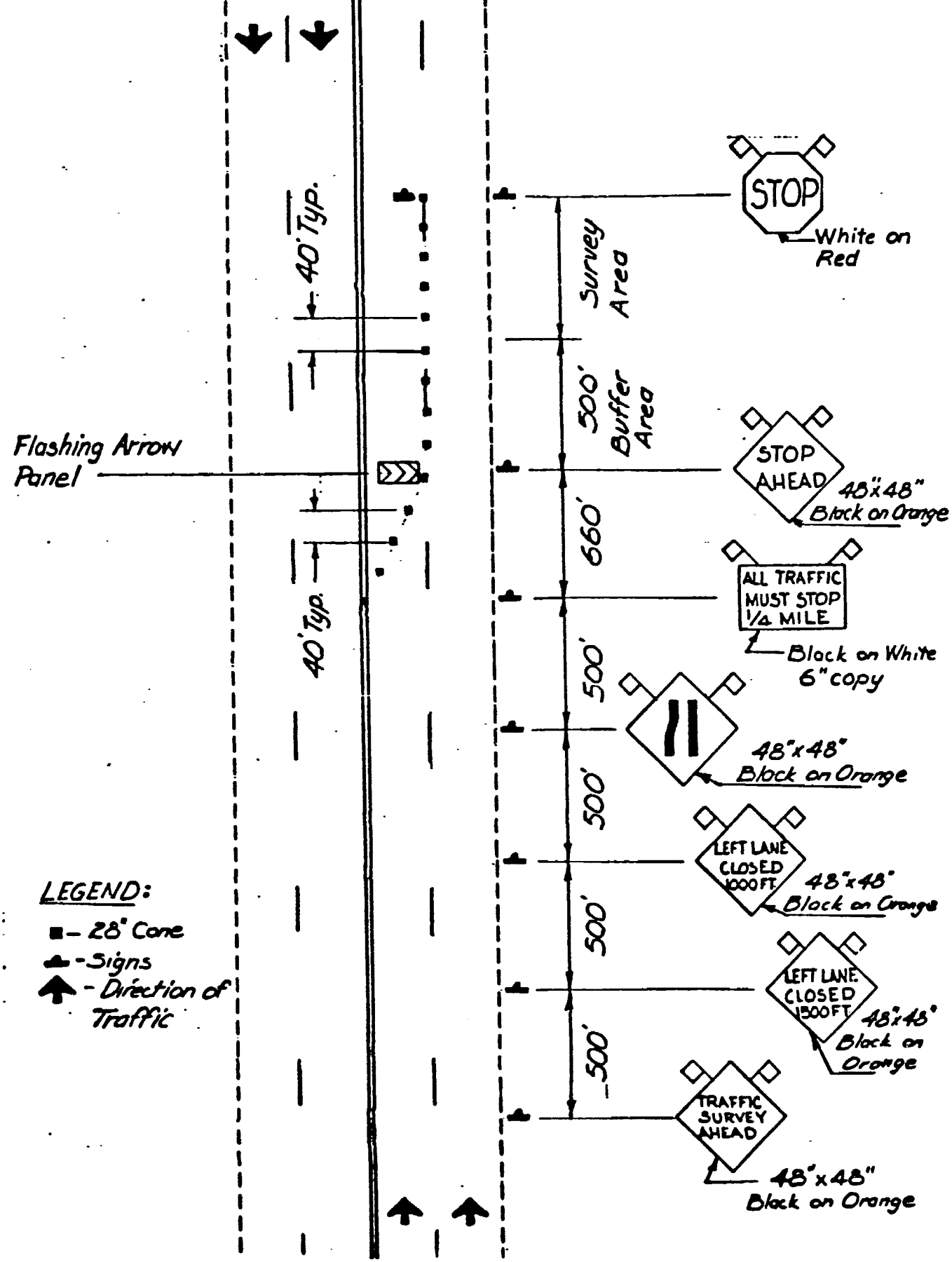
Finally, as with construction area signing, it is important that the traffic control devices be in place only during the actual survey period. The signs and cones should be removed promptly upon completion of the day's survey activity.



2-LANE TRAFFIC CONTROL PLAN

BARTON ASCHMAN ASSOCIATES, INC.

EXHIBIT 6

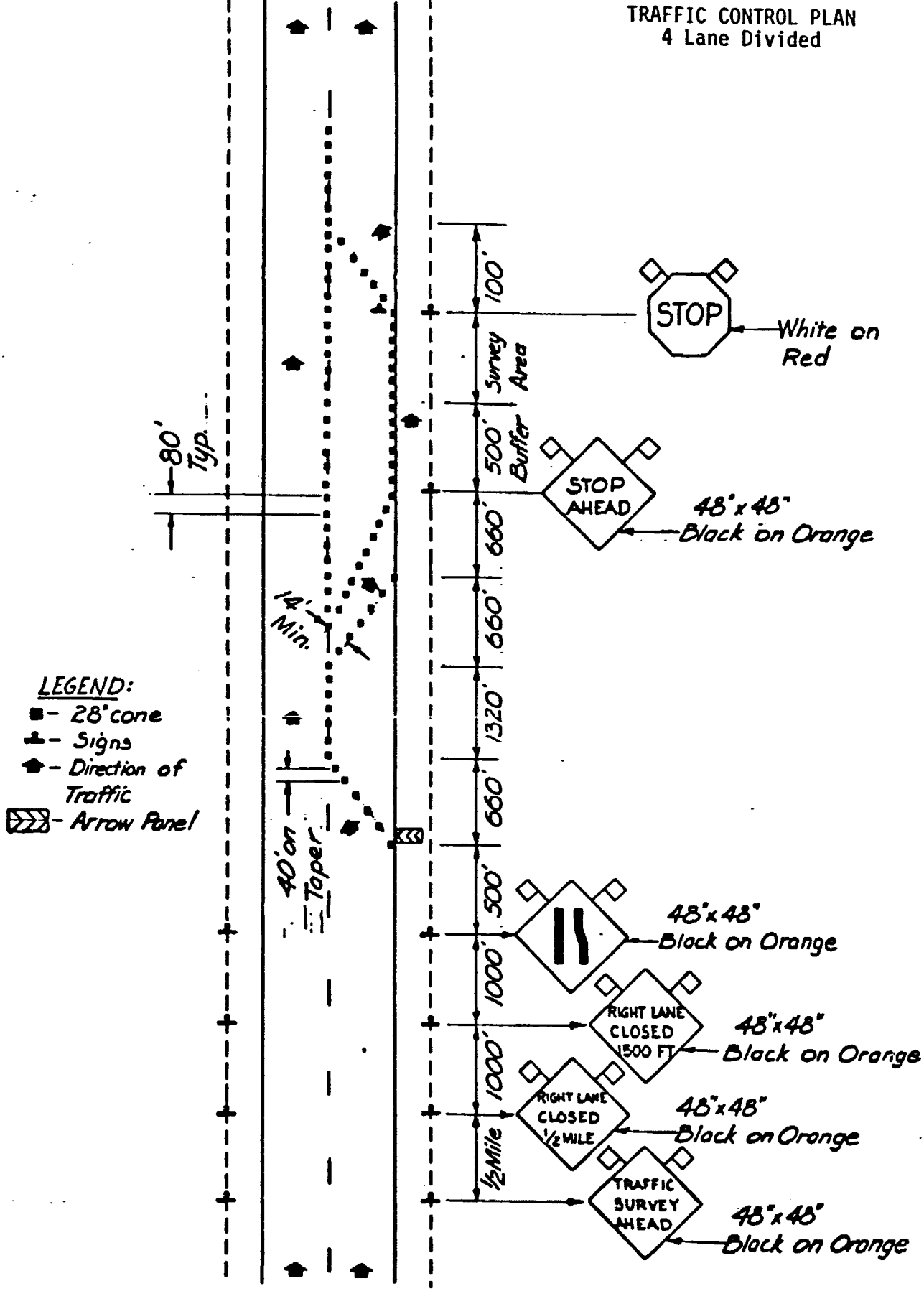


4-LANE UNDIVIDED TRAFFIC CONTROL PLAN

BARTON-ASCHMAN ASSOCIATES, INC.

EXHIBIT 7

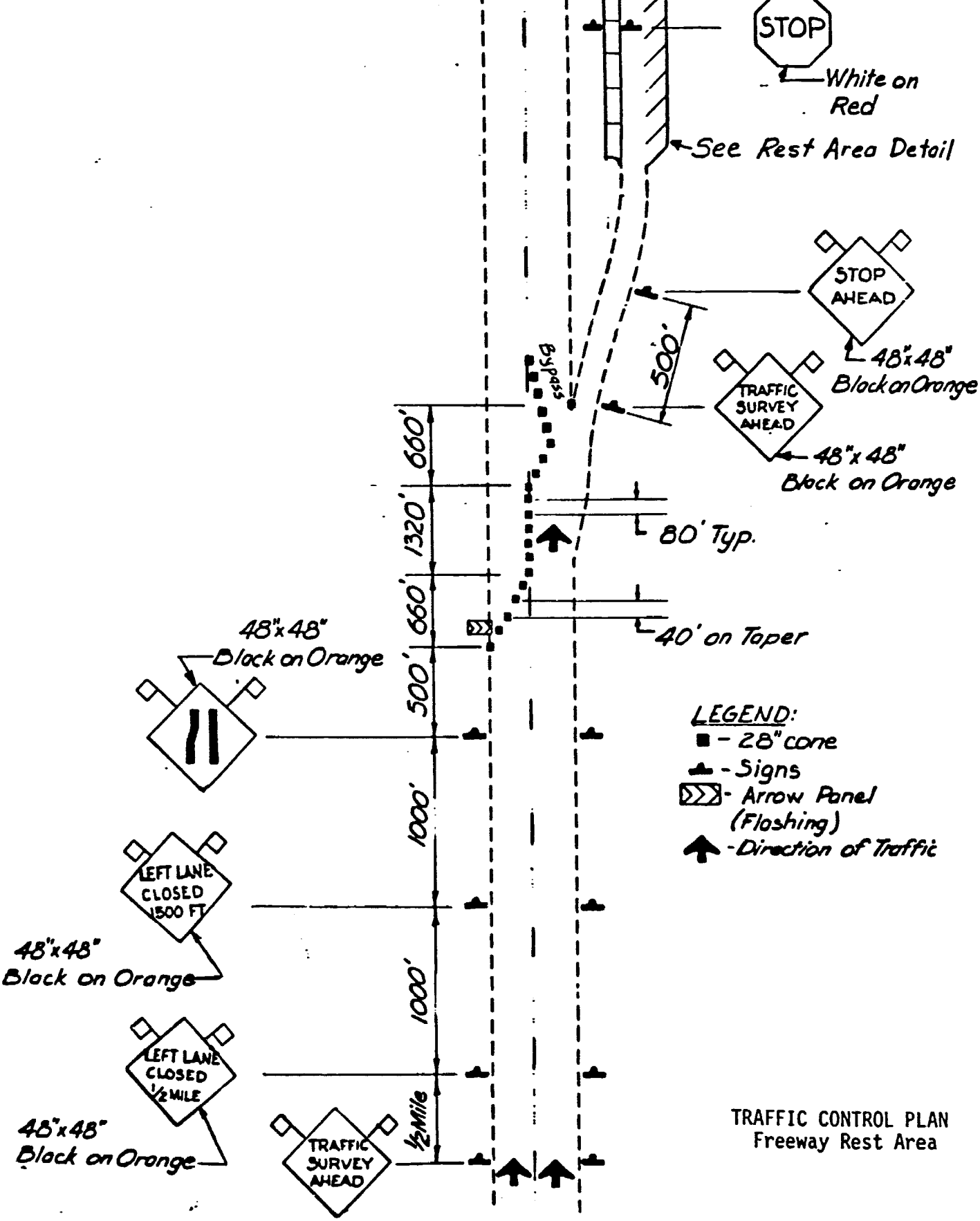
TRAFFIC CONTROL PLAN
4 Lane Divided



MULTI-LANE DIVIDED TRAFFIC CONTROL PLAN

BARTON ASCHMAN ASSOCIATES, INC.

EXHIBIT 8

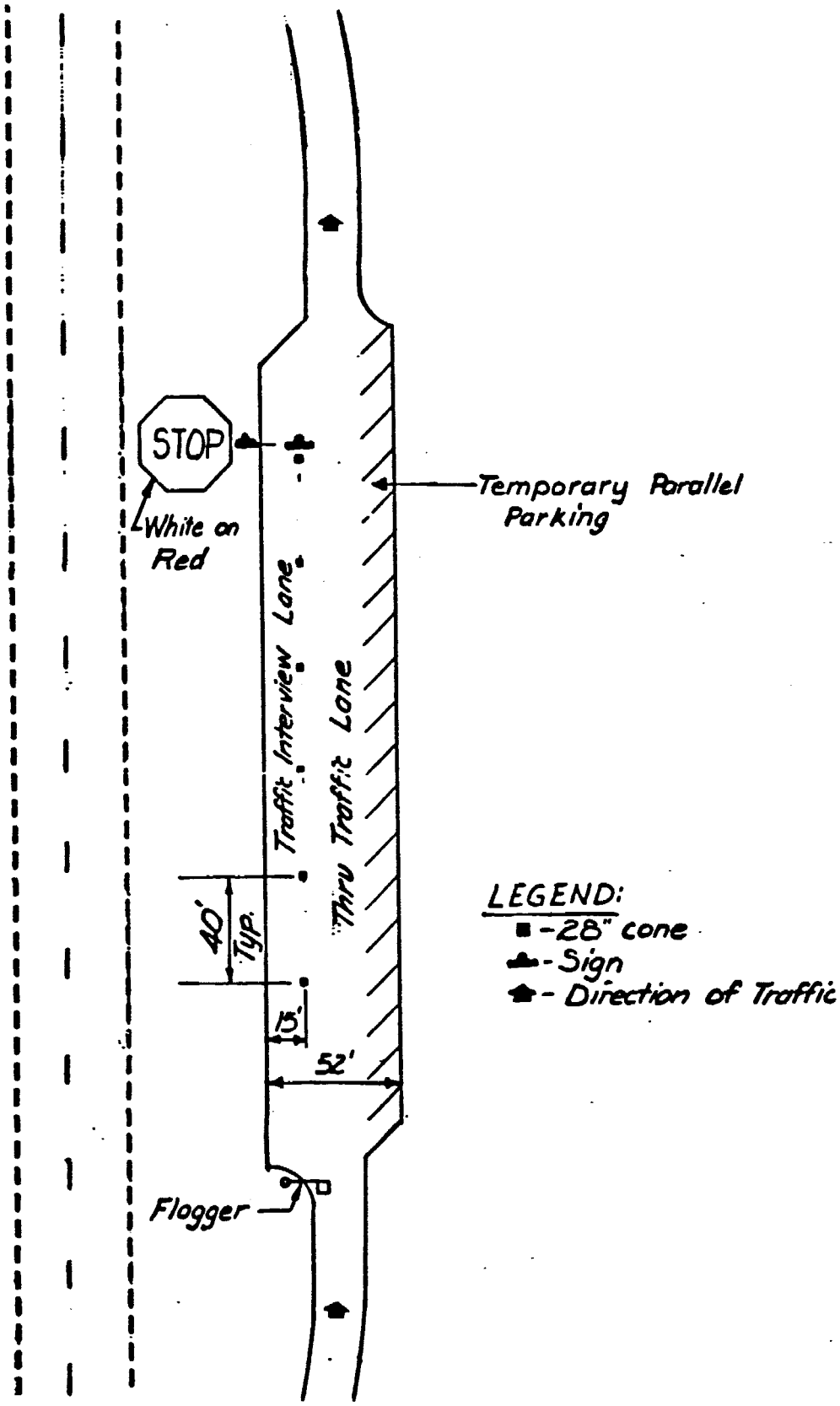


TRAFFIC CONTROL PLAN
Freeway Rest Area

FREEWAY REST AREA TRAFFIC CONTROL PLAN

BARTON ASCHMAN ASSOCIATES, INC.

EXHIBIT 9A



REST AREA DETAIL

BARTON-ASCHMAN ASSOCIATES, INC.

EXHIBIT 9B