committee report

RECOMMENDED DIRECTION FOR IMPLEMENTATION OF 911 SERVICE IN MARICOPA COUNTY, ARIZONA

911

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RECOMMENDED DIRECTION FOR IMPLEMENTATION OF 911 SERVICE IN MARICOPA COUNTY, ARIZONA

Prepared for:

The Maricopa Association of Governments

911 Technical Advisory Committee

September 30, 1979

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SECTION I

INTRODUCTION

A. PROJECT OVERVIEW

911 is a three digit telephone number that has been reserved for calling public safety agencies when the presence of public safety personnel is required. Use of 911 can shorten the time between occurrence of a problem and the arrival of public safety personnel to locations where they can provide law enforcement, firefighting and medical assistance. By mid-1979, 911 service was available to approximately 40% of all persons living in the United States and Canada. It appears that 911 will eventually be the universal telephone number used to request the assistance of public safety personnel everywhere in the United States and Canada.

This report is the output product of a project intended to suggest how 911 universal emergency telephone service might best be implemented in Maricopa County, Arizona.

Ways to implement 911 in the county have been discussed by various groups for some time. During that time, there has been widespread support for the concept of a single, easy to use emergency number. All telephone company central office switching equipment throughout the county has been modified to accept and outswitch calls when the number 911 is dialed. Pay telephones have been adjusted to dial tone first operation in preparation for 911. It is clear that 911 is technically ready for implementation in Maricopa County.

It is hoped that the approach and implementation procedure recommended in this report will be adopted so that this valuable service will finally come to be in Maricopa County.

B. PROJECT OBJECTIVE

The overall goal of the project is the recommendation of a direction to proceed to achieve implementation of 911 service in Maricopa County. To achieve this goal, the Maricopa Association of Governments established a 911 Technical Advisory Committee in 1978 and asked that committee to make 911 implementation recommendations.

C. MARICOPA COUNTY 911 TECHNICAL ADVISORY COMMITTEE

The Committee has 15 members, representing public safety agencies throughout the county. The committee has three advisory members and nine liaison members.

Following is a list of the committee members and their representation.

Bobby Harris	Lieutenant Chandler Police Department
Bob Gilbreath	Assistant Chief Glendale Fire Department
John Rose	Captain, Technical Service Glendale Police Department
Kent McKinney	Lieutenant Maricopa County Sheriff's Office
Jim Wortham	Communications System Manager Maricopa County Sheriff's Office
Ed Matteson	Battalion Chief Mesa Fire Department
Bruce Reynolds	Mesa Police Department

W.C. McComas	Chief Peoria Fire Department
Fred Irwin	Division Chief Phoenix Fire Department
Tom Sawyer	Division Chief Phoenix Fire Department
Robert Judd	Captain, Communications Division Phoenix Police Department
Bob Kornegay	Technical Services Phoenix Police Department
Ralph Stayner	Battalion Chief Tempe Fire Department
John Greco	Technical Services Director Tempe Police Department
Wayne Watson	Chief Tolleson Police Department
Robert Edwards	Administrative Offices Scottsdale Rural Metro Fire Dept.
Bill Jordan	Communications Supervisor Scottsdale Police Department

Advisory Members are:

Peter Franklin	Arizona Department of Public Safety Emergency Medical Services Division
Michael P. Rodolico	Arizona Emergency Medical Systems, Inc.
Art Elliott	Market Administrator Mountain Bell Telephone Company

Liaison Members are:

Ernie Jahnke	Federal Funds Coordinator
Mike Hutchinson	Management Assistant
Ray Morse	Program Development Coordinator
Dick Bryce	Maricopa County
Marilyn Leuck	Intergovernmental Coordinator

Andrea Tevlin	Management Assistant
Elaine Arena	Management Assistant
Tom Burgess	Criminal Justice Planner
Lin Hallickson Wurbs	Intergovernmental Coordinator

Chief Tom Sawyer serves as the committee chairman and Captain Jack Rose is vice-chairman.

Many other persons attended meetings of the Committee and contributed many valuable comments.

D. PROCEDURE

The MAG 911 Committee studied many 911 issued including implementation options, features and costs. The result of that study effort is a report entitled, The 911 Emergency Telephone Number, A Guide for Local Officials, published by the Maricopa Association of Governments, February, 1979. Among the major 911 call delivery system options considered by the committee and described in the February report were:

1. An electronic selective routed system which involves the ability of a computer to identify the address of the calling party and automatically route each call to the proper jurisdiction.

2. Central public safety answering point at which all 911 calls from any part of the County would be answered at one location. At that location, an incident taker would determine the nature and jurisdiction of the need for assistance and either transfer the call or relay the information to the proper agency for response.

3. Multiple answering points in which call handling is similar to central answering but much less transferring or relaying is required.

There is a clear and complete discussion of these options and other 911 issues in the February report. After studying the options, the Committee concluded that "selective routing is clearly the most acceptable, desirable and efficient way to operate 911."

During the course of the study, the committee members were exposed to the complexities of the issues involved in implementing a selective routed form of 911 service in Maricopa County. As a result, the Committee decided that a consultant should be engaged to assist the committee in this task. The Maricopa Association of Governments and the Arizona Emergency Medical Systems, Inc. (AEMS), agreed with this conclusion and agreed to provide funding for a consultant.

In May, 1979, the Committee interviewed prospective consultants to assist with this planning work. The Committee recommended that the firm of Michaud, Cooley, Hallberg, Erickson & Associates, Inc., be engaged. MAG and AEMS concurred and that firm was contracted with in June.

The consultant gathered base line data useful for the planning work. Much of the baseline data gathered is included in this report in Appendix D.C.

The Committee met with the consultant six times to review and discuss many 911 issues and to reach the conclusions and recommendations transmitted in this report.

E. ABOUT THE REPORT

This report contains the recommendations for implementing 911 Universal Emergency Telephone Service in Maricopa County, Arizona.

Section II of the report contains a summary of the Findings and a summary of the Recommendations of the Committee. Sections III through X are a discussion providing more details to the Findings and Recommendations.

Section IX is a recommended Schedule for 911 Implementation. There are also three Appendices which contain additional pertinent data.

The Committee noted that the number of communities that provide public safety dispatching service changes from time to time. In addition, the boundaries of telephone company central office service areas also are subject to change. Therefore, the Committee concluded that THE MARICOPA COUNTY 911 TELEPHONE CALL DELIVERY SYSTEM AND THE NUMBER OF PARTICIPATING AGENCIES WILL CHANGE FROM TIME TO TIME.

(Find. I.E.1)

It is important to note that the Recommendations reflect a strong consensus opinion of the fifteen members of the Committee.

SECTION II

SUMMARY OF REPORT

A. GENERAL FINDINGS

During the Committee's work, a number of conclusions were reached. These conclusions are summarized in this section. The symbols listed with each conclusion refer to the subsection of the report where the reader can find a more detailed discussion of information which led to the Committee's conclusion.

III.1. There are special events, called critical events, in which a one-minute reduction in the response time of public safety personnel can lead to significant impact on the amount of property damage in a fire, the rate of criminal apprehension and the saving of life.

III.2. If 911 service is implemented, it is likely to shorten by an average of one minute or more the time required by the citizen to reach a public safety agency personnel that can provide assistance.

III.3. Approximately 574 critical events occur each day in Maricopa County in 1979.

VII.C.1 The recurring cost estimate for the system recommended is $895,386 in 1979 dollars. This figure does not include the incremental additional cost for added personnel needed at answering points.

VII.C.2 The average recurring cost for the form of 911 telephone call delivery system recommended is $4.27 per critical event.

IV.A.1. Substantial time savings will be achieved by automatically routing calls to the proper agencies. In addition, automatic selective routing will greatly reduce frustration and confusion to the caller which results when the caller is forced to repeat his message two or more times or is asked to wait until the proper agency is contacted.

IV.A.2. A selective routed 911 telephone system is technically feasible in Maricopa County at this time.

IV.C.1. A 911 telephone system should be implemented in Maricopa County that includes electronic selective routing for every telephone company central office area that crosses the boundaries of two or more 911 service areas.

IX.D.1 It is presently technically feasible to order a selective routed form of 911 telephone call delivery system in Maricopa County but implementation will require at least 24 months after 911 service is ordered.

V.A.1. The ANI feature is extremely useful in many public safety emergency situations. ANI is Automatic Number Identification, a feature which displays the number of the telephone from which the 911 call is originated.

V.B.1 The Committee concludes that ALI is a useful feature in many emergency situations. ALI is Automatic Location Identification, a feature which displays the location from which the 911 call originated.

VII.B.1 The estimated initial cost of the recommended system is $1,716,170.

VIII.1 A single party must be authorized to act as the contracting agent responsible for implementing and managing the system.

I.E.1 The Committee noted that the number of communities that provide public safety dispatching service changes from time to time. In addition, the boundaries of telephone company central office service areas also are subject to change. Therefore, the Committee concluded that the Maricopa County 911 telephone call delivery system and the number of participating agencies will change from time to time.

B. RECOMMENDATIONS

This section of the report is a summary of the recommendations which, along with the project schedule of Section IX, describe the Committee's decision in regard to the direction to proceed for implementation of 911 service in Maricopa County. The symbols listed with each recommendation refer to the subsection of the report where the reader can find a more detailed discussion of information which supports the recommendation.

VIII.1. The Committee recommends that a decision be made during Phase II of this project that will authorize one governmental unit to be the contracting agent responsible for implementing and managing the countywide system. Personnel and equipment required at answering points should be implemented and managed by public officials administering those answering point activities.

IX.C.1 The Committee recommends that the contracting agent be responsible for consultant prepared documentation suitable for the solicitation of competitive bids for the implementation of a countywide 911 telephone call delivery system.

VIII.2. The Committee recommends that policy issues involving the Maricopa County 911 system should be coordinated through the present Maricopa Association of Governments 911 planning structure.

IX.D.1 The target date for the start up of 911 service is January 15, 1983.

VII.D.1 The recurring cost of the 911 call delivery system, except for answering point equipment, the operation and maintenance of facilities and personnel, be paid by a tax of a service availability charge on telephone bills. If this is not possible, the Committee recommends that the following sources for recurring funds be considered:

1. Use of the Mountain States Bell Telephone Company Arizona Telephone Overcharge Fund. Presently, approximately $12,000,000.00 is in this fund.

2. Maricopa County Revenue Sharing Funds.

3. The State of Arizona General Fund.

IV.C.1 A 911 telephone system should be implemented in Maricopa County that includes electronic selective routing for every telephone company central office area that crosses the boundaries of two or more 911 service areas.

V.A.1 The Committee recommends that the Automatic Number Identification feature should be ordered as part of the 911 call delivery system.

V.B.1 The Committee recommends that the Automatic Location Identification feature be included in the Maricopa County 911 system.

X.A.1 Use of any telephone number other than 911 for requesting any emergency assistance should be discouraged.

X.A.2 A coordinated public information program designed to announce the availability and the use of 911 should be carefully planned and implemented at the time that 911 is available.

X.A.3 Arizona Emergency Medical Systems, Inc., in conjunction with the PSAP managers and the Maricopa Association of Governments shall prepare and implement a program of public information regarding 911 service prior to system implementation.

SECTION III

THE VALUE OF 911

The direction to the 911 Technical Advisory Committee is to develop recommendations for a 911 emergency telephone system for Maricopa County, under the fundamental assumption that 911 is a valuable and necessary service for the County. Often during the preliminary planning stage of a project, the underlying assumptions are forgotten or they are not readily recognized by all participants.

The purpose of this section of the report is to remind all participants in this project of the fundamental assumption that 911 is, indeed, valuable to Maricopa County and to document that assumption with related facts and reference material.

Total response time is the significant parameter of the public safety response function. Total response time begins at the occurrence of an event and ends when public safety personnel begin providing service at the location of the event. Total response time can be divided into four increments which follow each other in tandem. The four increments are shown in Figure III-1.

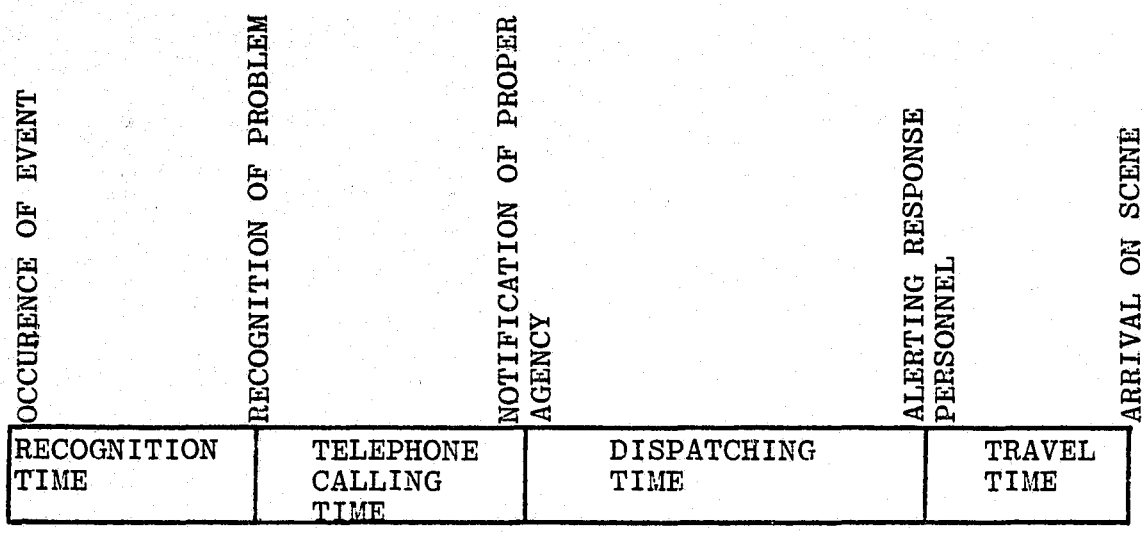


FIGURE III-1 - Total Response Time Divided Into Four Increments.

Information in this subsection of the proposal demonstrates the use of 911 can result in a reduction in total response time of one minute or more by reducing the telephone calling time increment.

Public safety agencies throughout Maricopa County are continuously upgrading equipment and training and generally provide enthusiastic, effective response to calls for emergency assistance. Public officials and public safety officials all over the county are justifiably proud of their record of service. However, the chance for a public safety agency to perform usually occurs after a telephone call request for assistance is received by the right agency to provide response.

From the perspective of a person who needs help, the total process and the time required before help can be available includes the time between recognition of the emergency event

and the connecting of a call to the right agency. This process and this time are invisible to the public safety agency which therefore, considers the start of the event to be the time when the call is received. Studies have shown, however, that a signicant portion of the total response time is that other time between recognition of the emergency and completion of a telephone call for help. While this time is invisible to public safety agencies, it is highly visible to the person calling for help, as his part is normally completed when the telephone call is terminated.

In Maricopa County, there are many emergency telephone numbers in use. For any particular location, there typically are different numbers to call for help from the local police, fire, and sheriff agencies.

Several surveys have shown that less than 20% of all adults have memorized even <u>one</u> of these several emergency telephone numbers in their own local area. One of those surveys was conducted by Dakota County, Minnesota officials in 1975 which showed that just 6% of County residents had memorized one or more public safety emergency numbers. Dakota County is contiguous to the City of St. Paul. Another survey was conducted by Orange County, Florida officials. That survey showed that in 14% of emergency events, the caller knew at least one emergency telephone number. Even this knowledge of one number useful in one area is limited because:

- People frequently work in a different area from that in which they live.
- People visit and shop in different areas from that in which they live.
- People may be traveling a long distance from home; and
- The average person moves several times in his lifetime.

In addition, the boundaries of areas served by public safety agencies change from time to time so that the number to call changes.

Additional complications are:

- If a person is not at home or work, he may not know what town he is in.
- Even at home, he may not know how to contact the correct emergency medical service agency. For example, the following is quoted from a December 26, 1978 issue of the St. Paul Dispatch Newspaper, "A lot of people don't know who to call for emergency help.... Nearly a third of 1,160 Twin Cities area persons interviewed named a service that did not exist or did not directly dispatch ambulances when they were questioned recently."

In many areas, from 20% to 40% of all calls for emergency assistance are placed by dialing 0 for operator. The St. Paul Dispatch Newspaper reported on December 26, 1978 that about 20% of all persons surveyed would dial 0 or directory assistance if confronted by a medical emergency. An Orange County, Florida survey shows that 25% of the persons calling for public safety emergency assistance dialed 0. This can introduce a delay because the operator may be difficult to reach at times and the operator must determine the nature and location of the emergency and then begin a process of trying to locate the right response agency. This is not an easy task when the operator reached may be 40 or more miles away from the emergency location. The operator often must make two or more calls to reach the right agency.

Time can be lost looking up a number because:

- A telephone book must be located.
- The correct number must be found; and
- Sometimes the emergency numbers are on the back of the front cover which may be missing or mutilated.

Other difficulties encountered by persons trying to call for emergency help which result in time loss include:

- Calling the wrong agency (i.e., calling police when emergency medical service is needed because the police number is known).
- Emergencies requiring service from multiple agencies. The Orange County, Florida survey shows that in 12% of all events, assistance from more than one public safety agency is required.
- No coin for a pay telephone.
- Misdialing (either calling the number above or below the correct one, transposing numbers or dialing too fast).
- Light is required to look up and to dial telephone numbers.

With these factors in mind, it is not at all surprising that careful studies have determined that this invisible time which is called the telephone calling time ranged from 1.5 to 4 minutes. It is after that time that response agencies are alerted to go.

If 911 is available, any person confronted with any emergency situation anywhere need only dial 911 to get every kind of assistance available.

911 is easy to use and it is universal.

911 is fast.

911 is always answered.

911 can be dialed from a pay telephone without use of a coin.

911 can be dialed in the dark.

911 can be taught to and used by children who are too young to read.

There will be no charge to the caller for any 911 call.

Response time is not the significant consideration in many police events; however, THERE ARE SPECIAL EVENTS, CALLED CRITICAL EVENTS, IN WHICH A ONE-MINUTE REDUCTION IN THE RESPONSE TIME OF PUBLIC SAFETY PERSONNEL CAN LEAD TO A SIGNIFICANT IMPACT ON THE AMOUNT OF PROPERTY DAMAGE IN A FIRE, THE RATE OF CRIMINAL APPREHENSION AND THE SAVING OF LIFE.

(Find. III.1)

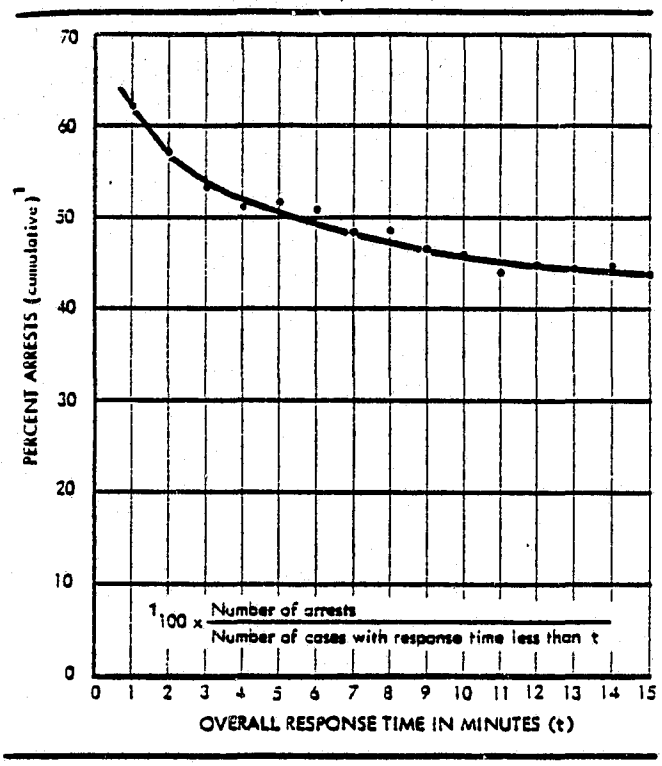
Critical events are:

- Medical emergencies involving cardiac arrest, electric shock, choking and drowning where permanent brain damage can occur in about four minutes and death can result in seven to ten minutes, and cut artery, broken back and other severe trauma where death or permanent effects are more likely to result if the correct action is not applied quickly.

- Fires in which the danger of life and the value of property loss increases by large increments for each extra minute of response time by fire fighting personnel.

- Law enforcement emergencies including crimes in progress and fights in which criminal apprehensions, the protection of property and the safety of persons can be significantly affected by reducing response time by one minute or more. For example, the following figure shows how apprehension rates in all events relate to response time by law enforcement officers. It should be noted that this figure includes all events including cold calls. If data used for this curve did not include cold calls, the curve would be much steeper indicating a significant reduction in apprehension rate for each additional minute of response time for crime in progress events. This figure is reproduced from Task Force Report: Science and Technology, prepared by the Institute for Defense Analysis for the President's Commission on Law Enforcement and Administration of Justice.

FIGURE 8-2. PERCENT OF ARRESTS IN RELATION TO OVERALL RESPONSE TIME
(Code Six Responses Only)



(Find. III.2) APPROXIMATELY 574 CRITICAL EVENTS OCCUR EACH DAY IN MARICOPA COUNTY IN 1979. (See Appendix D.C for further information).

(Find. III.3) IF 911 SERVICE IS IMPLEMENTED, IT IS LIKELY TO SHORTEN BY AN AVERAGE OF ONE MINUTE OR MORE THE TIME REQUIRED BY THE CITIZEN TO REACH PUBLIC SAFETY AGENCY PERSONNEL THAT CAN PROVIDE ASSISTANCE.

As explained in Section VII.C., the average recurring cost for the form of 911 telephone call delivery system recommended is $4.27 per critical event.

SECTION IV
SELECTIVE ROUTING

Selective Routing is a method of providing 911 service. It is the method that the committee unanimously supports as a workable system for Maricopa County.

This section of the report presents a summary of the background information reviewed by the committee regarding selective routing and to review the process through which the committee came to make its recommendation regarding selective routing.

A. WHY CONSIDER SELECTIVE ROUTING?

To fully appreciate the value of the concept of selective routing, it is first necessary to remember the primary objective for implementing 911. That is to obtain a more timely method to route emergency calls to the agency that can provide assistance to a caller who needs help immediately. A call to one police department when another police department is needed or a call to the Tempe Fire Department when the caller resides in Phoenix will be delayed while the proper agency is contacted. In addition, the caller will become frustrated because he may have to repeat the message or wait for the correct agency to be contacted.

To complicate the process of contacting the proper agency, County and City boundaries and their service area boundaries are not identical to telephone central office boundaries in most cases. Figure IV-1 shows the discrepancies between the telephone exchange boundaries and service area boundaries within the Phoenix metropolitan

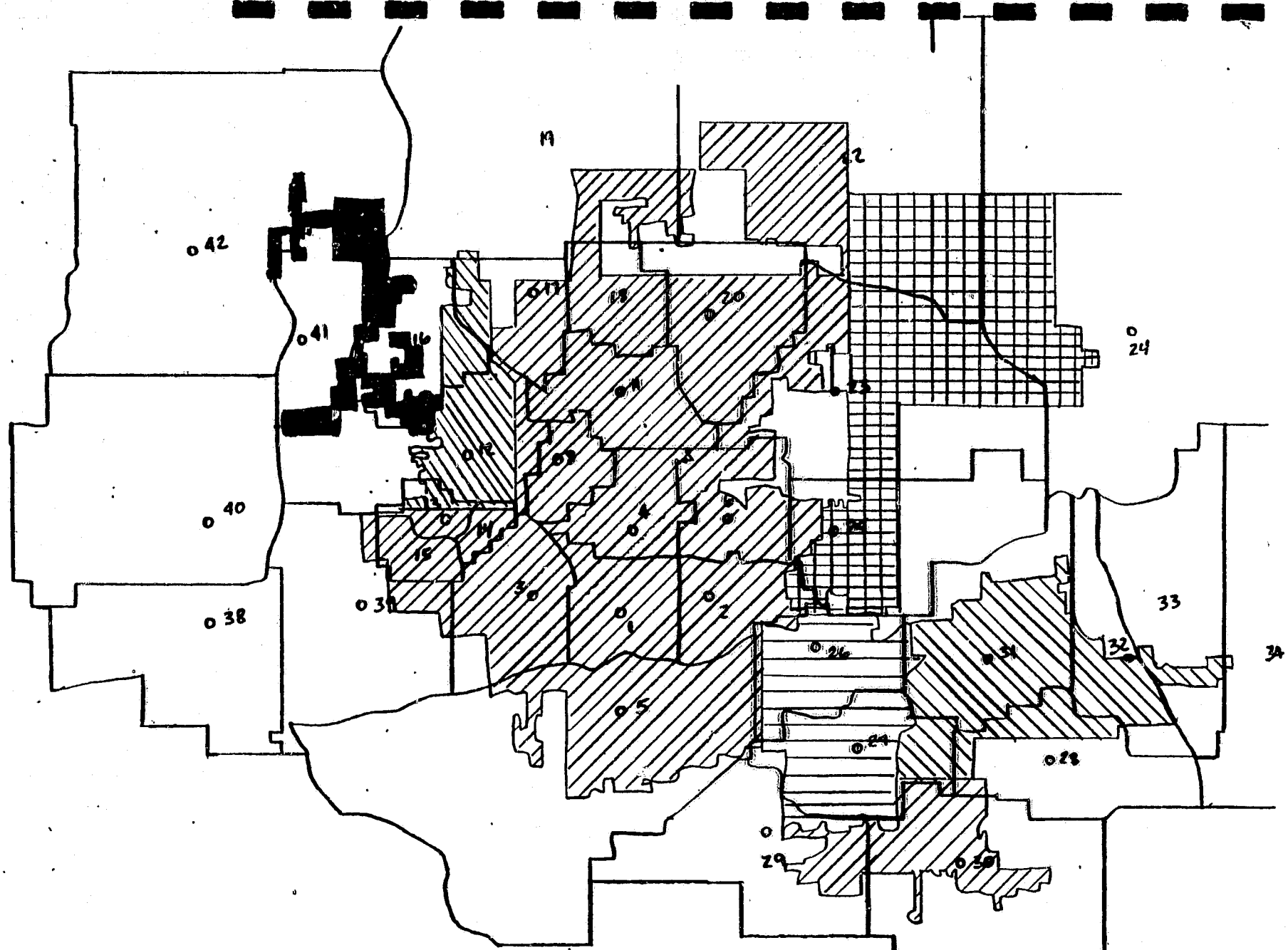


FIGURE IV-1 PHOENIX METRO AREA POLITICAL SUBDIVISION BOUNDARIES

TELCO CENTRAL OFFICE EXCHANGE BOUNDARIES

area alone. Central Office Service Area Number 23, for example, serves parts of Phoenix, Scottsdale and the Maricopa County Sheriff's Office service area. Without selective routing, all 911 calls originating within that Number 23 Area must be routed to one and only one of the three agencies serving parts of the Central Office Area. Therefore, many of the calls originating within that exchange will have to be manually redirected to the proper agency if selective routing is not available. With selective routing, the calls would automatically be routed to the proper agency.

The selective routing process is described in Study for Alameda County 911, October 1974, National Institute of Law Enforcement and Criminal Justice, Grant 73-NI-99-0059-6 as follows:

1. The telephone central office servicing the 911 caller recognizes a 911 call as such and requiring special handling.

2. It captures the calling number, as if for long distance billing, and forwards both the number and the call to an advanced programmable electronic telephone switch.

3. The electronic switch holds the call long enough to retrieve from a data file the proper 911 destination for that calling number.

4. The call is then connected to the designated public safety answering point.

The selective routing process is fully electronic and will eliminate manual transfer or relay of calls to proper agencies. The committee concludes that SUBSTANTIAL TIME SAVINGS WILL BE ACHIEVED BY AUTOMATICALLY ROUTING CALLS TO THE PROPER AGENCIES. IN ADDITION, AUTOMATIC SELECTIVE ROUTING WILL GREATLY REDUCE FRUSTRATION AND CONFUSION TO THE CALLER WHICH RESULTS WHEN THE CALLER IS FORCED TO REPEAT HIS MESSAGE TWO OR MORE TIMES OR IS ASKED TO WAIT WHILE THE PROPER AGENCY IS CONTACTED.

(Find. IV.A.1)

After establishing the potential value of a selectively routed 911 system, the Committee set out to evaluate the feasibility of such a system in the Maricopa County area. The Committee recognized that both Automatic Number Identification (ANI) equipment at all telephone central offices in the County and an advanced programmable electronic telephone switch is needed to selectively route 911 calls. Mountain Bell Telephone Company, which serves the County, was consulted for availability of ANI equipment and for locations of Electronic Switching Systems (ESS) in the County. It was determined that ANI is available throughout the County and that a number of ESS offices are operating in the County and that two within the Phoenix area would be adequate to perform the selective routing for the County. Therefore, the Committee concludes that, A SELECTIVE ROUTED 911 TELEPHONE SYSTEM IS TECHNICALLY FEASIBLE IN MARICOPA COUNTY AT THIS TIME. (Find. IV.A.2)

B. HOW MUCH SELECTIVE ROUTING?

Referring to Figure IV-1, it is apparent that some central office exchange areas would not be selectively routed. They are "pure" exchanges located entirely within one Public Safety Answering Point (PSAP) service area. In addition, some exchange boundaries match service area boundaries very closely but not exactly. Should these exchanges be selectively routed? In dealing with the issues, the Committee was faced with the dilemma of determining how much selective routing is cost justified. The Committee recognizes the need for cost data to use for analysis.

The consultant presented cost data to the committee useful for comparison of partial versus full selective routing. The cost of selective routing was computed for each telephone exchange. Some criteria was needed to determine which exchanges would not be selective routed in a partially selective routed system. Therefore, the Committee agreed to use the number of expected 911 calls generated from each exchange per day that would have to be redirected to the proper agency as the criteria. The consultant presented costs for partial selective routing of two types: (1) selective routing of those exchanges generating 10 or more redirected calls per day, (2) selective routing of those exchanges generating 5 or more redirected calls per day. Recurring cost data is presented in Appendix B of this report. The costs are estimated for each technical approach considered by the Committee. The technical approaches considered are: no selective routing, two forms of partial selective routing and full selective routing.

C. RECOMMENDATION

The Committee reviewed and discussed the cost data presented by the consultant for each technical approach. Although the recurring costs are highest for a selective routed system, the Committee determined that the advantages of a selective routed system outweigh the incremental added cost. Furthermore, the difference in cost for partial or full selective routing and for different grades of service are small and the full selective routing was determined to be significantly better. It is the recommendation of the Committee, then, that a 911 TELEPHONE SYSTEM SHOULD BE IMPLEMENTED IN MARICOPA COUNTY THAT INCLUDES ELECTRONIC SELECTIVE ROUTING FOR EVERY TELEPHONE COMPANY CENTRAL OFFICE AREA THAT CROSSES THE BOUNDARIES OF TWO OR MORE 911 SERVICE AREAS.

(Rec. IV.C.1)

SECTION V

SPECIAL FEATURES

This section of the report is a discussion of special features available with 911 along with the committee's evaluation of their usefulness and recommendation whether or not to incorporate them.

A. AUTOMATIC NUMBER IDENTIFICATION (ANI)

Automatic Number Identification (ANI) is the process of electronically identifying and displaying on a viewing screen the telephone number of the calling party's telephone to a 911 answering person at the time that the call is answered. THE ANI FEATURE IS EXTREMELY USEFUL IN MANY PUBLIC SAFETY EMERGENCY SITUATIONS. Therefore, THE COMMITTEE RECOMMENDS THAT THE ANI FEATURE SHOULD BE ORDERED AS PART OF THE 911 CALL DELIVERY SYSTEM.

(Find. V.A.1.)

(Rec. V.A.1.)

B. AUTOMATIC LOCATION IDENTIFICATION (ALI)

Automatic Location Identification is the process of electronically identifying and displaying on a viewing screen the address of the calling party's telephone to a 911 answering person at the time that the call is answered. The ALI feature is important when persons report an event and hang up before giving the event location or when callers are unable, for a variety of reasons, to tell answering personnel where they are. Some callers under stress give incorrect location information.

ALI would provide the data needed to develop a program to substantially reduce the number of false alarms since the caller's address would be known.

The committee was concerned with how the ALI feature would be viewed by people with unlisted telephone numbers.

A survey has been conducted by Pacific Telephone and Telegraph in the Alemeda County, California area on this specific topic. The conclusion of the survey is that there is no difference of opinion between those with published telephone numbers and those with non-published numbers. The majority of each group reacts favorably to having the address and number automatically displayed.[1]

(Find. V.B.1.)
(Rec. V.B.1.)

THEREFORE, THE COMMITTEE CONCLUDES THAT ALI IS A USEFUL FEATURE IN MANY EMERGENCY SITUATIONS AND RECOMMENDS THAT ALI BE INCLUDED IN THE MARICOPA COUNTY 911 SYSTEM.

Footnote:

1. Survey results are presented in Study For Alemeda County 911, October, 1974, National Institute of Law Enforcement and Criminal Justice Grant 73-NI-99-0059-6 Appendix A - Automated 911 Privacy Survey. The results are summarized as follows:

   A sample group of people was asked if their reaction would be favorable or not to having their telephone number and address displayed for a 911 operator automatically upon answering a call.

	Those with non-published numbers	Those with published numbers
Favorable	88%	89%
Non-favorable	6%	3%
Didn't know	6%	8%

Those who responded unfavorably above were asked what their reaction would be if the address was released to a governmental agency by the telephone company only in an emergency situation.

	Those with non-published numbers	Those with published numbers
Favorable	82%	80%
Non-favorable	10%	14%
Didn't know	8%	6%

SECTION VI

PUBLIC SAFETY ANSWERING POINT DATA

A. OVERVIEW

As described in Section III, it is recommended that 911 telephone calls from each of nine specific areas of Maricopa County are to be routed to one location for answering. 911 telephone calls from all other cities and rural areas of the county will be routed to the Maricopa County Sheriff's Office Communications Center for answering. This section of the report contains data related to the ten answering points recommended for Maricopa County.

B. DEFINITIONS FOR TERMS USED IN THIS SECTION

Public Safety Answering Point - (PSAP)	The agency responsible for initial answering of the 911 call.
911 Service Area -	The geographic area from which 911 calls will be routed to the Public Safety Answering Point.
Number of 911 Calls During Busy Hour -	The estimated number of 911 telephone calls that will originate from the 911 Service Area during the busy hour of the busy month of 1983 under normal conditions. This includes an estimated 10% greater volume of calls when 911 is implemented.
Number of Incoming 911 Lines -	The total number of 911 lines entering the Public Safety Answering Point.
Number of Answering Positions -	The total number of answering positions with telephone instruments capable of answering the incoming 911 lines. This number includes positions which will only be manned during extraordinary conditions by overload personnel.

Number of ANI and ALI Equipped Positions - The total number of answering positions to be manned under normal conditions. These positions are to be equipped with ANI and ALI displays.

Procedures - The procedures to be followed to result in dispatching the appropriate response personnel to the location of the event.

Incremental Additional Personnel Required - The net additional persons required to answer and serve the 911 calls with the call answering method recommended by the public safety personnel representing the Public Safety Answering Point.

C. PUBLIC SAFETY ANSWERING POINT DATA

1. Phoenix

Public Safety Answering Point:	Phoenix 911 Answering Personnel Group
911 Service Area:	City of Phoenix and unincorporated area surrounded by the City.
Number of 911 Calls During Busy Hours:	314
Number of Incoming 911 Lines:	46
Number of Answering Positions:	23
Number of ANI and ALI Equipped Positions:	19
Procedures:	Screen and transfer callers to the Police and Fire Departments for dispatch of personnel.
Incremental Additional Persons Required:	25

2. Scottsdale

Public Safety Answering Area:	Scottsdale Rural Fire Department
911 Service Area:	Scottsdale
Number of 911 Calls During Busy Hour:	37
Number of Incoming 911 Lines:	8
Number of Answering Positions:	6
Number of ANI and ALI Equipped Positions:	3
Procedures:	Direct Dispatch Fire and Medical Events, Transfer Police Events
Incremental Additional Persons Required:	One per shift (five (5) total).

3. Glendale

Public Safety Answering Point:	Glendale Fire Department
911 Service Area:	Glendale
Number of 911 Calls During Busy Hours:	35
Number of Incoming 911 Lines:	7
Number of Answering Positions:	6
Number of ANI and ALI Equipped Positions:	3
Procedures:	Direct Dispatch Fire and Medical Events, Transfer Police Events
Incremental Additional Persons Required:	One per shift (five (5) total).

4. Mesa

Public Safety Answering Point:	Mesa Public Safety Communications
911 Service Area:	Mesa
Number of 911 Calls During Busy Hour:	35
Number of Incoming 911 Lines:	6
Number of Answering Positions:	5
Number of ANI and ALI Equipped Positions:	3
Procedures:	Direct Dispatch Police, Fire and Medical Events
Incremental Additional Persons Required:	None

5. Chandler

Public Safety Answering Point:	Chandler Public Safety Communications
911 Service Area:	Chandler
Number of 911 Calls During Busy Hour:	13
Number of Incoming 911 Lines:	4
Number of Answering Positions:	3
Number of ANI and ALI Equipped Positions:	2
Procedures:	Direct Dispatch Police, Fire and Medical Events
Incremental Additional Persons Required:	None

6. Peoria

Public Safety Answering Point: Peoria Public Safety Communications

911 Service Area: Peoria

Number of 911 Calls During Busy Hour: 6

Number of Incoming 911 Lines: 3

Number of Answering Positions: 3

Number of ANI and ALI Equipped Positions: 1

Procedures: Direct Dispatch Police, Fire and Medical Events

Incremental Additional Persons Required: None

7. Tempe

Public Safety Answering Point: Tempe Police Call Answering Group

911 Service Area: Tempe

Number of 911 Calls During Busy Hour: 52

Number of Incoming 911 Lines: 9

Number of Answering Positions: 7

Number of ANI and ALI Equipped Positions: 1

Procedures: Screen and transfer callers to the Police and Fire Departments for dispatch of personnel.

Incremental Additional Persons Required: Two per shift (Ten (10) total).

8. Buckeye

Public Safety Answering Point:	Buckeye Public Safety Communications
911 Service Area:	Buckeye Telco Central Office Service Area
Number of 911 Calls During Busy Hour:	3
Number of Incoming 911 Lines:	3
Number of Answering Positions:	3
Number of ANI and ALI Equipped Positions:	1
Procedures:	Direct Dispatch Police, Fire and Medical
Incremental Additional Persons Required:	None

9. Gila Bend

Public Safety Answering Point:	Gila Bend Public Safety Communications
911 Service Area:	Gila Bend Telco Central Office Service Area
Number of 911 Calls During Busy Hour:	1
Number of Incoming 911 Lines:	2
Number of Answering Positions:	2
Number of ANI and ALI Equipped Positions:	1
Procedures:	Direct Dispatch Police, Fire and Medical
Incremental Additional Persons Required:	None

10. Maricopa County

Public Safety Answering Point:	Maricopa County Sheriff's Office
911 Service Area:	All other areas within those Telco Central Office Service Areas in which a Majority of the Main Stations are in the County.
Number of 911 Calls During Busy Hour:	117
Number of Incoming 911 Lines:	37
Number of Answering Positions:	10
Number of ANI and ALI Equipped Positions:	4
Procedures:	Direct Dispatch Police and Transfer calls to Fire and EMS and relay event information to Public Safety Agencies in Surrounding Counties.
Incremental Additional Persons Required:	The Maricopa County Sheriff's Office has identified need for separating the 911 call answering function from the present complaint taking activity when 911 is implemented. If this happens, additional personnel will be required.

D. LIAISON REQUIRED WITH PERSONNEL OF OTHER COUNTIES

There are parts of Maricopa County that will not be in any of the 911 service areas listed in this section because those areas are part of the area of telephone company central office service areas in which a majority of the telephones are in another county. When a Maricopa County resident in one of those areas dials 911, his call may someday be routed to that other county (if and when that county implements 911). At that time, contact should be made with personnel in those

counties to arrange for the handling of emergency requests for assistance on 911 that originate in Maricopa County but are routed out of the county.

In addition, there are areas outside Maricopa County that traditionally have received at least some emergency assistance from within the county (example: Apache Junction). Consideration should be given to routing 911 calls from those areas into Maricopa County. Consideration of this possibility will require contact with and concurrence of personnel in other counties.

SECTION VII

FINANCIAL ISSUES

A. SOURCE OF COST ESTIMATES

Estimates of the cost of 911 service with selective routing, ANI and ALI feaures are difficult to obtain. AT & T has not provided cost data on this advanced form of 911 service to the Bell System operating companies including Mountain Bell. The only advanced 911 systems operating are in Chicago and in Alameda County, California. The Chicago 911 system differs substantially from the system that is needed in Maricopa County and there is no cost breakdown data available for that system. The Alameda County system is a research and development project funded by the federal government and no applicable cost data is available which applies to an operating system which is to be ordered in the near future.

Some cost data on selective routing system elements is available from Northwestern Bell Telephone Company that has designed a system to meet the needs of the Minneapolis-St. Paul region. That data along with the cost of tariff items has been used by the consultant acting alone without the involement of Mountain Bell to estimate the cost of a selective routing 911 call delivery system in Maricopa County. These estimates may prove to be incorrect by a substantial margin when AT & T finally decides on a selective routing hardware and software configuration and costs can be estimated accurately.

ANI and ALI feature costs were estimated by the consultant based on estimates made for Monroe County, New York by Rochester Telephone Corporation. Rochester Telephone Corporation is an independant telephone company and may not be using an ANI/ALI equipment configuration that is similar to what AT & T will recommend as a standard to Bell operating companies.

The Committee felt that cost data must be estimated on the basis of the best information available even if those costs may be incorrect by a substantial amount. The cost data was needed so that the relative cost of various system options could be compared. In addition, order of magnitude costs are needed so that elected officials can measure the impact of those system costs.

Therefore, the Committee asked the consultant to make best estimates of the cost for a variety of possible system configurations. Those various estimates are included in this report as Appendix B.

B. ESTIMATED INITIAL COST OF RECOMMENDED SYSTEM.

(Find. VII.B.1) THE ESTIMATED INITIAL COST OF THE RECOMMENDED SYSTEM IS $1,716,170 broken down as follows:

Network Costs:

Installation of Trunks	$ 5,000.
ANI Trunk Equipments:	
Outgoing from 45 Telco central offices	266,900
Incoming to tandem switch	172,700
Outgoing from tandem to PSAPs	81,000.
Permanent Program Store	340,000
Temporary Call Store	64,000
911 Program Development	200,000
Administrative Expense	250,000
	$1,379,600

PSAP Costs:

ANI Display Common Equipment	$ 61,000
Trunk Equipments at 41 Equipped Positions	51,250
ANI Display Device at 41 Equipped Positions	77,900
ALI Display Device at 41 Equipped Positions	97,620
Teletype Interface at 11 PSAPs	9,900
Teletype Installation at 11 PSAPs	4,400
Installation of 69 Answering Instruments	34,500
	$336,570

C. ESTIMATED RECURRING COST OF RECOMMENDED SYSTEM

THE RECURRING COST ESTIMATE FOR THE SYSTEM RECOMMENDED IS $895,386 IN 1979 DOLLARS. THIS FIGURE DOES NOT INCLUDE THE (Find. VII.C.1) INCREMENTAL ADDITIONAL COST FOR ADDED PERSONNEL NEEDED AT ANSWERING POINTS as described in Section VI. This recurring cost is broken down as follows:

Network Costs:

Trunking	$229,584
System Development	324,000
Updating of Selective Routing	100,784
ALI Development	64,800
Updating ALI	36,074
Total	$755,242

PSAP Costs:

41 ANI Trunk Connections at PSAPs	$ 41,984
41 ANI Displays	24,600
41 ALI Displays	24,600
11 Printers	15,840
69 Telephone Call Directors	33,120
Total for 11 PSAPs	$140,144

THE AVERAGE RECURRING COST FOR THE FORM OF 911 TELEPHONE (Find. VII.C.2) CALL DELIVERY SYSTEM RECOMMENDED IS $4.27 PER CRITICAL EVENT.

D. FINANCING INITIAL AND RECURRING COST

Financing of initial and recurring cost is the objective of Phase II of this project. During that phase, the consultant is required to suggest financing alternatives and to explore those alternatives with Maricopa County officials until recommendations can be made.

(Rec. VII.D.1) The Committee, however, recommends that THE RECURRING COST OF THE 911 CALL DELIVERY SYSTEM, EXCEPT FOR ANSWERING POINT EQUIPMENT, THE OPERATION AND MAINTENANCE OF FACILITIES AND PERSONNEL, BE PAID BY A TAX OR A SERVICE AVAILABILITY CHARGE ON TELEPHONE BILLS. IF THIS IS NOT POSSIBLE, THE COMMITTEE RECOMMENDS THAT THE FOLLOWING SOURCES FOR RECURRING FUNDS BE CONSIDERED:

1. USE OF THE MOUNTAIN STATES BELL TELEPHONE COMPANY ARIZONA OVERCHARGE FUND. PRESENTLY, APPROXIMATELY $12,000.000.00 IS IN THIS FUND.

2. MARICOPA COUNTY REVENUE SHARING FUNDS.

3. THE STATE OF ARIZONA GENERAL FUND.

SECTION VIII
CONTRACTING AGENT

The 911 system approach which is recommended involves telephone answering equipment (including ANI/ALI display) at each of 10 PSAP locations and a sophisticated selective routing 911 call delivery network. The PSAP equipment and its cost can be clearly identified for each PSAP. The call delivery network, however, is a single regionwide network that serves all PSAP's. That network cannot be broken down into parts related to individual PSAP's. It is a single network serving all citizens and all PSAP's in the entire area. Therefore,

(Find. VIII.1) A SINGLE PARTY MUST BE AUTHORIZED TO ACT AS THE CONTRACTING AGENT RESPONSIBLE FOR IMPLEMENTING AND MANAGING THE SYSTEM.

Following is a list of functions to be carried on by this party as an agent for all 911 service areas in the region.

1. Apply for federal and/or state grant assistance if appropriate.
2. Receive grant funds.
3. Disburse grant funds.
4. Secure match funds, if necessary
5. With the consultant, prepare bidding documentation which meets all legal requirements.
6. Solicit bids.
7. Evaluate and accept the appropriate bid.
8. Contract for the system.
9. Accept the system and make final payment after installation is complete.
10. Collect any prorated share of recurring cost funds from served parties.
11. Collect funds for special services provided to PSAP managers.
12. Review and coordinate consideration of changes to the system.

The performance of these functions require varied staff expertise including grantsman, legal and purchasing specialists. Some of these specialists may have to devote up to half time for several weeks in performing these functions.

The agent may also be faced with potential liabilities that should be resolved, if possible, in the agency agreement. One of those potential liabilities is that the agent might be contractually liable for system costs that are not paid by a served agency that withdraws from an agreement to pay a prorated share of the total cost of a system which cannot be reduced in size because that agency withdrew.

THE COMMITTEE RECOMMENDS THAT A DECISION BE MADE DURING PHASE II OF THIS PROJECT THAT WILL AUTHORIZE ONE GOVERNMENTAL UNIT TO BE THE CONTRACTING AGENT RESPONSIBLE FOR IMPLEMENTING AND MANAGING THE COUNTYWIDE SYSTEM. PERSONNEL AND EQUIPMENT REQUIRED AT ANSWERING POINTS SHOULD BE IMPLEMENTED AND MANAGED BY PUBLIC OFFICIALS ADMINISTERING THOSE ANSWERING POINT ACTIVITIES. (Rec. VIII.1)

Over a period of time, there will be changes in the number of public safety agencies performing dispatch functions and there will be changes in telephone company systems. Therefore, the contracting agent must continue to modify agreements with telephone service providers so that the call delivery system is always matched to needs. To assist the contracting agent in this activity, THE COMMITTEE RECOMMENDS THAT POLICY ISSUES INVOLVING THE MARICOPA COUNTY 911 SYSTEM SHOULD BE COORDINATED THROUGH THE PRESENT MARICOPA ASSOCIATION OF GOVERNMENTS 911 PLANNING STRUCTURE. (Rec. VIII.2)

SECTION IX

IMPLEMENTATION SCHEDULE

This document recommends the way to implement 911 in Maricopa County, Arizona. A number of additional tasks must be completed before 911 service can be available. This section describes those additional tasks and includes a schedule for implementation.

A. ADOPTION OF AN IMPLEMENTATION PLAN

These recommendations are from a committee of public safety officials representing many Maricopa County agencies. It is necessary that this recommended plan or another plan be adopted by the Maricopa Association of Governments Regional Council.

B. FINANCING DECISIONS

Phase II of this project is exploration of funding options for both capital and recurring costs and the consultant will assist the committee in determining specific funding recommendations. Those recommendations then must be reviewed, accepted or modified and accepted by the following public bodies in the order listed:

1. The Maricopa Association of Governments Criminal Justice Coordinating Council
2. The Maricopa Association of Governments Regional Council
3. Public officials in the participating cities and the Maricopa County Board of Supervisors.

C. SPECIFICATION, BIDDING AND AWARD

A specification defining all elements and including quantities of all material required must be prepared so that the prices can be obtained for the service to be

provided. Firm prices must be obtained and a contract or contracts must be awarded for the equipment needed. THE COMMITTEE RECOMMENDS THAT THE CONTRACTING AGENT BE RESPONSIBLE FOR CONSULTANT PREPARED DOCUMENTATION SUITABLE FOR THE SOLICITATION OF COMPETITIVE BIDS FOR THE IMPLEMENTATION OF A COUNTYWIDE 911 TELEPHONE CALL DELIVERY SYSTEM. (Rec. V.C.1)

D. IMPLEMENTATION

The system recommended is large and complex. Equipment must be installed in each of forty-five telephone company central offices. Engineering work must be performed and the equipment must be ordered and manufactured before it can be installed. Other equipment and computer programming is required at several sites to perform the selective routing. Data files must be created for selective routing and for the ALI feature.

After reviewing these facts, the Committee concluded that IT IS PRESENTLY TECHNICALLY FEASIBLE TO ORDER A SELECTIVE ROUTED FORM OF 911 TELEPHONE CALL DELIVERY SYSTEM IN MARICOPA COUNTY BUT IMPLEMENTATION WILL REQUIRE AT LEAST 24 MONTHS AFTER 911 SERVICE IS ORDERED. Since the order cannot be placed until the middle of 1980, the recommended 911 service will not begin before the middle of 1982. (Find. IX.D.1)

Based on experience in other areas where 911 service has been implemented, the Committee expects that telephone calls for service will jump as much as 40% for up to three months after service begins. This volume increase phenomena is apparently related to the extra publicity received by public safety agencies when 911 service is announced and to the public's desire to try 911 to see if it really works. After this initial sudden increase,

the volume increase will settle down at about 10% above pre 911 announcement levels. This expected increase in volume of 10% has been included in the committee's planning.

Two of the highest activity level months for public safety agencies in Maricopa County are October and December. The Committee believes that 911 service should not begin on a date that would result in extra volume during these normally high volume periods. Since January and February are slower months, an appropriate start date is one or two weeks after January 1. (The December 31, January 1 period is a time of very high activity for public safety agencies.) This time also corresponds to the issue date of telephone books which may carry a prominent notice of 911 availability. Since 911 service cannot be available until after the middle of 1982, the Committee recommends that THE TARGET DATE FOR THE START UP OF 911 SERVICE IS JANUARY 15, 1983. (Rec. IX.D.1)

C. SCHEDULE

The time relationship of the tasks described in this section is shown in Figure IX.-1.

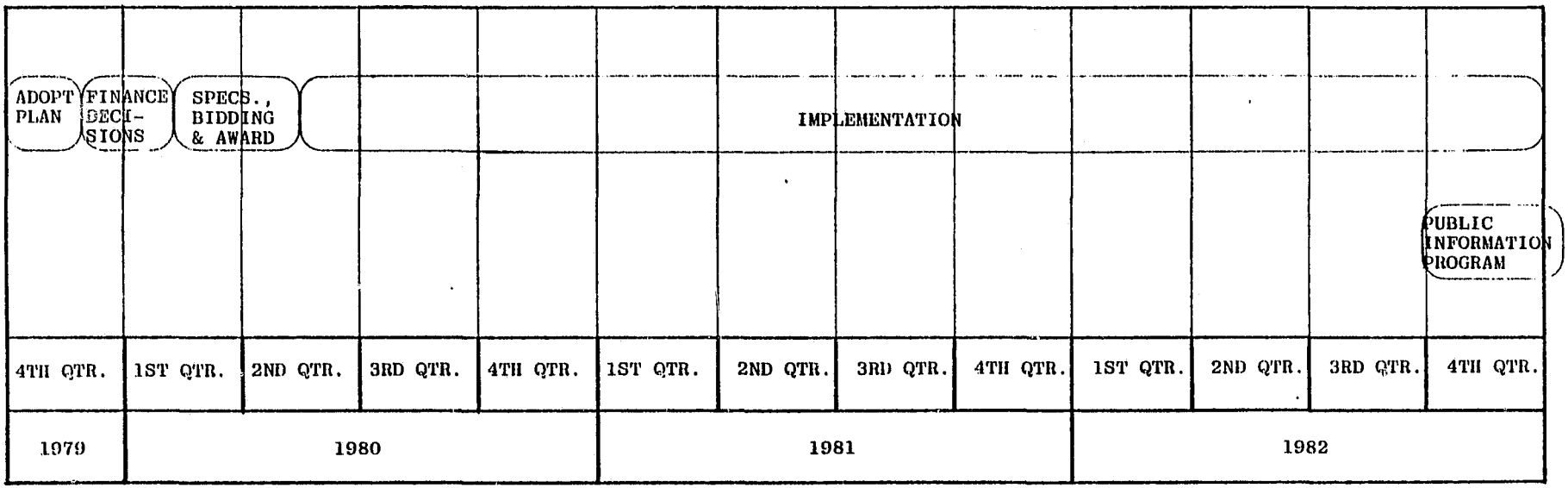


FIGURE IX - 1 IMPLEMENTATION SCHEDULE FOR RECOMMENDED SYSTEM

SECTION X

PUBLIC INFORMATION PROGRAM

A. THE NEED FOR A PUBLIC INFORMATION PROGRAM

If the maximum value of 911 is to be realized, it must be used when there is a need for assistance by public safety agencies. Therefore, the Committee recommends

(Rec. X.A.1) that USE OF ANY TELEPHONE NUMBER OTHER THAN 911 FOR REQUESTING ANY EMERGENCY ASSISTANCE SHOULD BE DISCOURAGED.

In addition, residents and visitors must know of the availability of 911 service and what it is to be used for. To assist residents and visitors to learn about 911 service and its use, the Committee recommends that A COORDINATED PUBLIC INFORMATION PROGRAM DESIGNED TO ANNOUNCE THE AVAILABILITY AND THE USE OF 911 SHOULD BE

(Rec. X.A.2) CAREFULLY PLANNED AND IMPLEMENTED AT THE TIME THAT 911 IS AVAILABLE.

The Committee also recommends that ARIZONA EMERGENCY MEDICAL SYSTEMS, INC., IN CONJUNCTION WITH THE PSAP MANAGERS AND THE MARICOPA ASSOCIATION OF GOVERNMENTS

(Rec. X.A.3) SHALL PREPARE AND IMPLEMENT A PROGRAM OF PUBLIC INFORMATION REGARDING 911 SERVICE PRIOR TO SYSTEM IMPLEMENTATION.

B. PUBLIC INFORMATION PROGRAM OBJECTIVES

There are three objectives of the public information program. They are:

1. Dial 9-1-1 whenever the presence of police, fire or emergency medical personnel is needed.
2. Do not use 911 for any other purpose.

3. 9-1-1 is available in Maricopa and Pima counties and the City of Sierra Vista in Cochise County only.

C. ELEMENTS OF THE PUBLIC INFORMATION PROGRAM

Following is a list of elements that should be included in a coordinated public information program. Additional elements may be added to this list.

1. Telephone book.
2. Telephone bill inserts
3. School packets
   a. Teacher notes
   b. Take home information for students
4. Senior citizen home packets
5. TV and radio public service spot announcements
6. Billboard public service ads
7. Bumper stickers
8. Newspapers

APPENDIX A

Standards for 911 Service in Maricopa County Arizona

APPENDIX A

STANDARDS FOR 911 SERVICE IN MARICOPA COUNTY, ARIZONA

I. GENERAL

A. Application of Standards

1. These standards are intended to define a level of 911 emergency service that is adequate and satisfactory for Maricopa County.

2. If unreasonable hardship to a public agency, or to a serving telephone company results from complying with any portion of these standards, application may be made to Maricopa Association of Governments for modification of that section, or for temporary exemption from its requirement.

B. Definitions

For the purpose of these rules, the terms defined in this section shall have the meanings given them.

1. Automatic Call Distributor (ACD) - Equipment used to distribute large volumes of incoming calls in appropriate order of arrival to 911 answering persons not already working on calls and to queue calls until a 911 answering person becomes available.

2. Automatic Location Identification (ALI) - The process of electronically identifying and displaying on a special viewing screen the address of the calling party's telephone to a 911 answering person as the call is being answered.

3. Automatic Number Identification (ANI) - The process of electronically identifying and displaying on a special viewing screen the telephone number of the calling party's telephone to a 911 answering person as the call is being answered.

4. Busy Hour - A one-hour period during a 24-hour day where the number of 911 calls to the Public Safety Answering Point is usually a maximum. Similarly, "Busy Month" is the busiest month during a 12-month period.

5. Call Relay - A service in which a 911 answering person takes the pertinent information from a caller and relays the information to the appropriate public safety agency or other provider of emergency services.

6. Call Transfer - A service in which a 911 answering person receiving a call transfers that call to the appropriate public safety agency or other provider of emergency services.

7. Dedicated 911 Trunk - A telephone circuit which is used exclusively for the purpose of transmitting 911 calls.

8. Forced Disconnect - A telephone service feature which allows the called party to release a telephone connection to avoid caller jamming of the incoming circuits.

9. Public Agency - Any unit of government or special purpose district or private fire fighting service located in whole or part within Maricopa County which provides or has authority to provide fire fighting, police, ambulance, medical or other emergency services.

10. PSAP - Public Safety Answering Point - A communications facility operated on a 24-hour basis which first receives 911 calls from persons in a 911 service area and which may, as appropriate, directly dispatch public safety services or transfer or relay 911 calls to appropriate public safety agencies.

11. PSAP Manager - The person having day-to-day responsibility for the operation of the PSAP.

12. Selective Routing - A process through which a 911 call is routed by means of a special telephone trunking and electronic equipment configuration to a predesignated PSAP.

13. 911 Service Area - The geographic area from which 911 calls are routed to one PSAP.

14. Telephone Exchange Area - A specific geographic area which is served by one or more central offices.

15. Telephone Exchange Area Central Office or simply Central Office - A term which refers to the site of the telephone switching equipment and the switching equipment itself for a specific telephone exchange area.

II. OPERATIONAL REQUIREMENTS

A. 911 shall be the primary published telephone number for reporting emergencies within the Maricopa County 911 Service Area. The PSAP's and each individual Public Agency shall also have at least one published 7-digit telephone number for administrative purposes. The individual Public Agencies may accept emergency calls on their administrative lines.

B. The PSAP manager shall monitor the 911 system grade of service so that the requirements as set forth in this section are met, and shall initiate modifications of the system consistent with the provisions set forth in these rules if they are not met. Telephone companies providing 911 telephone service shall measure and prepare a report regarding the 911 grade of service at the request of PSAP manager. For operational purposes, the telephone companies shall assume an average call duration time of 60 seconds per 911 call.

C. Only those calls which require the dispatch of a public safety service unit when available shall be accepted in the 911 system. Any callers using 911 for purposes not requiring the dispatching of a public safety service unit shall courteously be asked to hang up and redial the appropriate administrative number. The callers shall be informed that 911 is for emergency use only in the future.

D. Any public safety agency with jurisdiction shall be notified immediately of any emergency within its jurisdiction.

E. The PSAP's shall provide continuous service to all callers within its service area 24 hours each day, seven days a week.

F. The PSAP manager may maintain a telephone number other than 911 as a backup number to call should the 911 system fail. If such backup service is provided, the designated number shall be published in the telephone directory as the alternate number to call to receive emergency assistance only when the 911 call cannot be completed.

G. The PSAP managers shall develop and maintain a system for recording 911 calls received. The records shall be retained for a period of at least 31 days from the date of the call and shall include the following information.

1. Date and time the call was received.
2. Nature of the probelm.
3. Action taken by the dispatcher.

A magnetic tape recording will satisfy this requirement.

H. The PSAP managers shall be notified in advance by an authorized telephone company representative of any routine maintenance work to be performed which may affect the 911 system reliability of capacity. Any such work shall be performed during PSAP off-peak hours.

I. The employees shall be instructed to be efficient and courteous in the handling of all calls and to comply with the provisions of all applicable Federal and State laws in maintaining secrecy of communications.

J. The PSAP manager shall insure that all 911 emergency calls are answered and handled without preference to the location of the caller.

K. The PSAP manager shall insure that 95% of all 911 calls shall be answered within 10 seconds. Whenever the answering time falls below 90% on a monthly basis, management shall take corrective action.

III. DESIGN STANDARDS

A. Grade of Service

The 911 system shall be designed and operated to maintain a grade of service such that no more than one call out of 1000 incoming calls will receive a busy signal on the first dialing attempt during the busy hour during the busy month.

B. The 911 system shall include the following services:

1. Police Services. The term includes Police, Sheriff's Office and the Arizona Department of Public Safety.

2. Fire Fighting Services.

3. Emergency Medical Services. This term includes ambulance service and first aid or other immediate service provided directly to the caller.

4. Other public safety and civil defense services may be included in the 911 system at the discretion of the public agency operating the PSAP.

C. Answering equipment shall permit answering personnel to place the 911 call on hold.

D. All 911 circuits shall be arranged for one-way incoming only service to the emergency center. Outbound dialing on 911 circuits is prohibited.

E. Dedicated direct trunking shall be the standard method of providing incoming 911 circuits.

F. PSAP managers shall arrange to conduct traffic studies, as needed, to provide information dealing with the quantity of calls, call holding times, busy hours, and such other information as is necessary and is mutually agreed upon with the serving telephone companies. Where the telephone company provides this service, their charges shall be consistent with such tariffs or customs as have been established for such matters.

G. Call transfer equipment shall be designed to achieve transfers with at least 99.9% completion.

H. Arrangements for the testing of each 911 circuit for adherence to the transmission standards shall occur at least once each six months, or upon notification of a transmission difficulty by PSAP managers. Repairs shall be performed as indicated by those tests to cause the circuit to meet the transmission standards.

I. All tone signals provided to the 911 calling party shall be identical to tones received when working a regular call.

IV. PROCEDURES

A. Call Handling Procedures

1. The management shall insure that the disposition of each 911 emergency call is handled according to the agreements it has negotiated with its participants.

2. The PSAP's shall establish procedures for obtaining emergency advice by the appropriate authority.

3. Once an agency accepts a call and dispatches a unit in response to a 911 critical event, it shall provide emergency service to that event without regard to jurisdictional boundaries until relieved by the agency with jurisdiction.

B. Disaster Procedures

The PSAP managers shall develop procedures providing for the continued operation of a 911 answering point in the event that critical functions of the PSAP are partially or totally disabled due to natural or man-made disasters.

V. FACILITIES

A. Building and Grounds

PSAP managers shall designate an area of adequate size to be used by the serving telephone company for termination of their lines and equipment. This area shall be environmentally conditioned to meet the requirements of the equipment used and shall not be used for storage or housekeeping.

B. Physical Security

Critical areas of the PSAP shall have adequate physical security to prevent malicious disruption of service. Such critical areas shall at least include all answering, dispatching, communications equipment and mechanical equipment rooms.

C. Emergency Power

Each PSAP shall have an emergency power source capable of supplying electric power to serve at least the basic communications requirements and environmental minimum for the system. Such emergency power sources shall assume the load within sixty (60) seconds of detection of the primary power source failure and shall operate under load for at least four (4) hours without need for attention from PSAP personnel. The unit shall be tested according to manufacturer's specifications.

VI. AUTOMATIC DIALERS

Automatic dialing type alarms with recorded messages shall not be adjusted to dial the telephone number 911 since the system is intended for citizen voice input only. This restriction shall not apply to automatic dialing equipment used to assist and hasten dialing for normal use of the telephone.

APPENDIX B

Relative Recurring Cost Estimate for Optional 911 Call Delivery Systems

APPENDIX B

ESTIMATED RECURRING COST FOR 911 SERVICE IN MARICOPA COUNTY

I. Annual Recurring Costs for 911 With No Selective Routing

	P.01*	P.001*
	$ 99,000	$123,000

II. Annual Recurring Costs for 911 With No Selective Routing But With ANI and ALI

	P.01*	P.001*
Trunking	$ 99,549	$127,635
ANI	96,000	96,000
System Development	12,000	12,000
TOTAL	$207,549	$235,635
ALI	64,800	64,800
Updating ALI	118,501	118,501
TOTAL	$390,850	$418,936

III. Annual Recurring Costs for 911 With SElective Routing of Exchanges Generating 10 or More Redirected Calls Per Day

	P.01*	P.001*
Update SR	$ 87,547	$ 87,547
Trunking	171,336	200,404
System Development	324,000	324,000
ANI & Selective Routing TOTAL	$582,883	$631,951
ALI	64,800	64,800
Updating ALI	118,501	118,501
TOTAL	$696,994	$746,062

IV. Annual Recurring Costs for 911 With Selective Routing of Exchanges Generating 5 or More Redirected Calls Per Day

	P.01*	P.001*
Update SR	$ 98,678	$ 98,678
Trunking	177,468	229,608
System Development	324,000	324,000
ANI & SElective Routing TOTAL	$600,146	$652,286
ALI	64,800	64,800
Updating ALI	38,180	38,180
TOTAL	$703,126	$755,266

V. Annual Recurring Costs for 911 With Full Selective Routing

	P.01*	P.001*
Update SR	$100,784	$100,784
Trunking	178,512	229,584
System Development	324,000	324,000
TOTAL	$603,296	$654,368
ALI	64,800	64,800
Updating ALI	36,074	36,074
TOTAL	$704,170	$755,242

* P.01 is a grade of service in which it is predicted that one caller out of each 100 attempts will receive a busy signal on the first attempt.

* P.001 is a grade of service in which it is predicted that one caller out of each 1000 attempts will receive a busy signal on the first attempt.

APPENDIX C

Public Safety Activity Data for Maricopa County

CALL VOLUME

Data supplied by PSAPs was used to obtain the average number of telephone calls for service in each service area per month for 1978. That number was increased by 10% to determine the number of calls for busy month and by 10% again to allow for the estimated greater volume of calls expected when 911 is implemented. This figure is shown as "911 Calls/Day, Busy Month".

The number of calls per 1000 population per day was calculated to use in predicting expected call volume for 1983.

The number of calls during busy hour of busy month was calculated at 10% of the average number of calls per day of busy month.

Population estimates were obtained from the revised population and employment allocations provided by Maricopa Association of Governments. Based on the projected populations and the number of calls per 1000 population per day, the number of calls during busy hour for 1983 was predicted. The Committee realized many cities have population estimates that differ from those listed but we used the MAG figures and applied them on a consistent basis. The Committee also found that small changes in population figures will not significantly affect the recommendations in this report.

	Population 1978	911 Calls/ Day Busy Month	Calls/ 1000/Day	911 Calls Busy Hour	Population 1983	911 Call Busy Hour 1983
Phoenix	741,602	2397	3.23	240	803,420	314
Scottsdale	85,826	274	3.19	28	95,680	37
Tempe	102,365	344	3.36	34	126,680	52
Mesa	138,640	240	1.73	24	116,020	35
Chandler	25,798	81	3.14	8	34,300	13
Glendale	80,117	245	3.06	24	95,540	35
Peoria	15,791	37	2.34	3	19,460	6
MCSO	201,872	502	2.49	51	211,966	64
Buckeye			2*		12,043	3
Gila Bend			2*		2,733	1

* Number of calls per 1000 population per day was estimated due to lack of information and change in service area to include entire telephone central office exchange area.

NUMBER OF CRITICAL EVENTS PER DAY

The number of critical events for each service area was calculated from the data supplied by the PSAPs to compare to the total recurring cost of the 911 system. All figures in parenthesis are the number of critical events per 1000 population.

	Population	Law Enforce.	(/1000)	Fire	(.1000)	EMS	(/1000)	Total	(/1000)
Phoneix	741,602	88	(.12)	60	(.08)	120	(.16)	268	(.36)
Scottsdale	85,826	13	(.15)	14	(.16)	13	(.15)	40	(.35)
Tempe	102.365	21	(.21)	14	(.14)	17	(.17)	52	(.51)
Mesa	138,640	17	(.12)	22	(.16)	27	(.19)	66	(.48)
Chandler	25,798	3.2	(.12)	3	(.12)	3.5	(.14)	9.7	(.38)
Glendale	80,117	15	(.19)	23	(.29)*	12	(.15)*	50	(.62)*
Totals	1,174,348	157.4	(.13)	136	(.12)	192.5	(.16)	485.7	(.41)

Assume total County Population of 1,400,000:

574 Critical Events Per Day

182 Law Enforcement

168 Fire

224 EMS

*Due to statistical recording methods, this figure reflects some fire events within the City of Phoenix, and therefore, is inflated.

TELEPHONE EQUIPMENT REQUIRED

	Number of Incoming Trunks	Number of Answering Instruments		Number of ANI, ALI Equipped Positions	
		Police	Fire	Police	Fire
Phoenix	46	12	+ 11	8	+ 11
Scottsdale	8	4	+ 2	2	+ 1
Tempe	9	5	+ 2	3	+ 1
Mesa	6	5		3	
Chandler	4	3		2	
Glendale		4	+ 2	2	+ 1
Peoria	3	3		1	
MCSO	37	10		4	
Buckeye	3	3		1	
Gila Bend	2	3		1	

BUSY HOUR ACTIVITY

In calculating the number of calls during busy hour during normal operations, we assumed that 10% of the average number of daily calls during busy month would occur during the busy hour. This data supports that assumption and is typical of what has been found in several other areas of the country.

Year	Busy Month	% Calls During Busiest Hour	Day	Time
1975	July	9.6	Saturday	4:00 P.M.
1977	May	7.2	Sunday	3:00 P.M.
1978	January	7.5	Saturday	1:00 P.M.
1979	May	9.5	Sunday	5:00 P.M.

This data was obtained from the Maricopa County Sheriff's Office.

The call data was presented in monthly summaries by day of the week and hour of the day; therefore, individual days were not presented.

BUSY MONTH ACTIVITY

In calculating the number of calls per day for busy month, a 10% increase in the average number of calls was estimated. This data supports the figure of 10% used in the calculations and is typical of what has been discovered at other PSAPs in Maricopa County.

Data supplied by the Scottsdale Police Department was analyzed to obtain the following information.

Average number of events by month and day 1974 - 1978:

	Per Month	Per Day		Per Month	Per Day
January	3521	113.6	July	3413	110.1
February	3330	118.0	August	3427	110.5
March	3740	120.6	September	3380	112.7
April	3832	127.7	October	3728	120.9
May	3838	123.8	November	3439	114.6
June	3472	115.7	December	3650	117.7

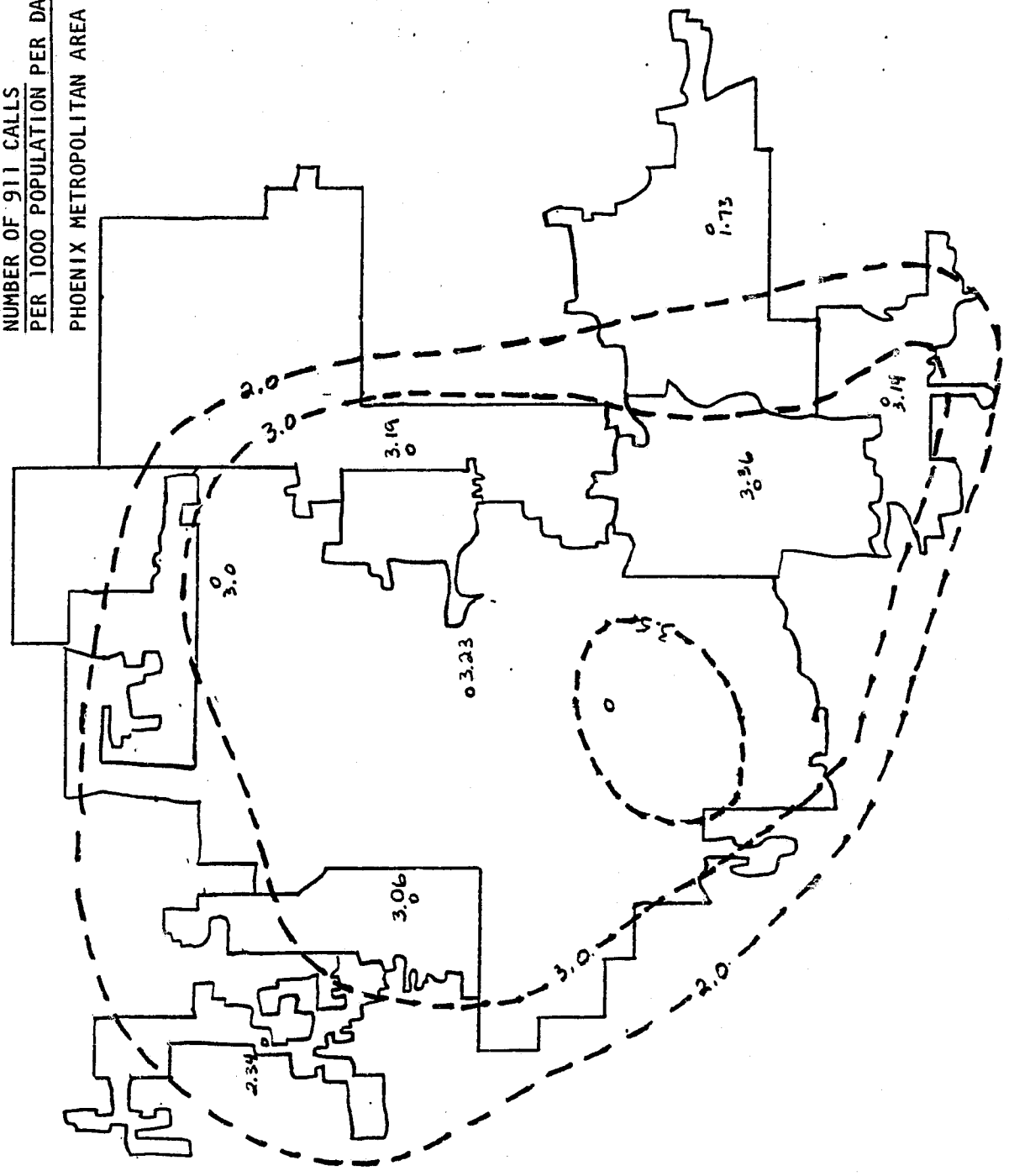
Average number of events per day is 117.2

Busiest month is April with 127.7 events per day.

Busy month shows 9% increase from average.

NUMBER OF 911 CALLS
PER 1000 POPULATION PER DAY

PHOENIX METROPOLITAN AREA



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		CHECKED BY RGV	DATE 9-23-79	OF SHEETS

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