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ACQUISITIONS

FINAL REPORT
ATLANTA - IMPACT HELICOPTER PROJECT -
(January 1974 - March 1975)

36535

Prepared by

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I. PREFACE

This report presents the findings of the helicopter project undertaken by the Atlanta Bureau of Police Services, covering the period from January 1, 1974 to March 31, 1975. The prime purpose of this report is to provide a comprehensive analysis of the operational activity of the helicopter project.

The report consists of seven sections beginning with a summary of the project's operational effectiveness and its impact on criminal activity. This is followed by a discussion of the geographical areas under helicopter patrol and how the data related to these areas was provided. Then the analysis regarding the achievement of the project's goals and objectives, and a cost-effectiveness study are presented. Finally the conclusions regarding the success of the project and recommendations for the future helicopter operation are discussed.

II. PROJECT RESULTS SUMMARY

GOAL: The revised goal which is the basis for this report requires a 15% reduction in burglaries and robberies in Zones 1, 2, 3, and 4, twenty-four months after the expanded helicopter patrol became operational. However, since this report reflects only the first 15 months of the project's operation a 9.375% reduction is used to represent the interim goal for this project. Crime data for burglaries one year before and for 15 months after the beginning of the helicopter project indicated that the goal was not achieved. In fact there has been an increase in these crimes over the 15 months following the initiation of the project.

OBJECTIVES:

- i) The first objective of this project required that no more than 50% of the responses be to nontarget crime calls. This objective was established to assure that the helicopter patrol would focus its efforts on the reduction of target crimes. Progress towards this objective was to be monitored quarterly. A small but steady increase was shown in the ratio of helicopter responses to target and nontarget crimes. The ratio eventually achieved the target level in the fourth and fifth quarters. Subsequently it was decided that better indicators of how the helicopters are allocating their effort between target and nontarget crime could be devised. Thus additional measures were developed to measure the helicopter activity. This ratio and additional measures indicate that this objective was achieved for all intents and purposes.
- ii) The second objective of the project was to affect more on-site arrests, by having a helicopter respond to target crime calls. The assumption was that generally helicopters could respond more rapidly than patrol cars and that quicker response time would lead to an increase in on-site arrests. It was stated that the target crime success rate $\left(\frac{\text{target crime arrests}}{\text{target crime calls}}\right)$ for helicopters be 10% greater for

the second year of the project when compared to its first year. Because the data for the second year of this project will not be available until after January 1, 1976, measurement of this objective is not presently feasible.

To examine if there was any increase in the arrest rate for the entire Atlanta Bureau of Police Services and after the project became operational a different objective was developed. For this objective the area success rate for the last half of 1973 (first six months of 1973 not available by helicopter zones) was compared to the area success rate realized for 1974. This comparison indicates the change in arrest rates that was experienced by all police units with and without the expanded helicopter patrol. Consideration of these statistics was undertaken because it was hypothesized that the extensive use of helicopters would enable other units, especially the car and foot patrols, to increase their apprehension rate. Although definite conclusions can not be reached because of lack of statistical significance, it appears helicopters did help improve the overall arrest rate for all police units.

Another approach used to investigate the ability of the helicopter patrol to improve its arrest rate is to examine the trend of the helicopter success rate for each of the five quarters following the initiation of the project. This analysis assumes that as the helicopter patrol becomes more familiar with their job their effectiveness will increase.

To see how this improvement or lack of improvement compares to that for the entire police force a comparison is made between the helicopter success rate and the area success rate for each quarter since the project became operational. Since the area success rate includes the arrest rate for helicopters it must be realized that this is not strictly a comparison of the helicopter unit to all other units. However, because of the large number of crimes involved in this analysis, and the small differences between the helicopter success rate and the area success rate, removal of the helicopter arrests from the area success rate would affect

only minor changes in that rate. Therefore, this comparison could, for practical purposes, be considered a crude measure of helicopter effectiveness vs. the effectiveness of other police units. While the helicopter success rate, 4.7%, was less than the area success rate, 6.89%, the difference is so small, it seems appropriate to conclude that there is little measured difference between the arrest rate for helicopters and other patrol units.

- iii) The third objective of the project was to increase the visibility of the patrol force to the public by providing city-wide aerial patrol on a 24-hour/day, seven day per week basis. This operational effectiveness was to be monitored on a quarterly basis. The evaluation indicated that the achievement of 100% operational effectiveness is unrealistic due to significant maintenance problems and weather conditions. In general, the maintenance hours normally required by the helicopters have shown a decreasing trend quarter by quarter. The first 15 months' operational effectiveness of the project was measured at an average of 63.0%. In terms of the pre-defined project objective, this objective was not satisfied.
- iv) The fourth objective of this project was to discourage target crimes in advance and to provide a sense of security to the public through the use of helicopter patrol. In conjunction with this objective, the first citizen attitude survey concerning the helicopter project was taken in the Spring of 1974 by a criminal justice class at Georgia State University. In this survey 70% of the total responses were favorable to the project. However investigation of changes in public attitudes about the project was precluded because a second survey was not conducted.

In summary, with regard to the revised project goal and objectives, burglary was not significantly reduced since the helicopter project was initiated. However, of the four operational objectives of this project,

two of these were essentially achieved. The two objectives achieved dealt with the emphasis on target crime by the helicopter force and the public's positive view of the helicopter project. Partial success was realized for the other two objectives. These included the helicopter's role in apprehension of criminals at the scene of the crime and the amount of flying time achieved by the helicopter patrol. Even though the initial project goal and some of those objectives were not accomplished during the first 15 months of the project's operation, information regarding the operational effectiveness, the rate of apprehension and the public's view of the helicopter project were developed. It is believed that this information will be invaluable in determining the overall usefulness of this approach to crime control.

III. PROJECT DESCRIPTION

1. OVERVIEW

The impact helicopter project provided an additional four helicopters to the existing two helicopters in the helicopter unit. It was anticipated that these additions would significantly increase aerial patrol time. This, in turn, was expected to make the patrol capability of the police more effective by increasing their observation ability, increasing the visibility of police on ground patrol, and providing rapid response time to the scene of a crime. The proposed size of the helicopter section was 42 men, all of whom were supposed to dedicate 100% of their time to the project. The 42-man helicopter squad consisted of three levels of organization-- one lieutenant, 5 sergeants and 36 patrolmen. The operational crew composed of patrolmen were pilots and observers. To operate a patrol helicopter it is necessary that a pilot have a crewman to observe the activity on the ground as well as the surrounding air space in order to fulfill the mission of the squad.

The grant award was for 26 months at a total project cost of \$2,016,298. The federal share provided by the Law Enforcement Assistance Administration (LEAA) of the U. S. Department of Justice was \$1,504,461.

2. BASIC DATA ELEMENTS

This report relies on the data provided by the helicopter patrol group and the Atlanta Bureau of Police Services data system. In order to obtain consistent data for evaluating project performance and for performing statistical analysis, the following special stipulations were made a part of the grant.

- (1) The offense report for each target crime should be noted as to whether or not a helicopter was used in reporting to the crime.
- (2) The case number for offense and arrest reports is to be included on the police information computer system for correlating arrest reports with offense reports. These stipulations were not met. However, the basic data required and listed below was supplied by the Atlanta Bureau of Police Services.

Data Elements

- i) Number of residential burglaries occurring city-wide each quarter and the previous year
- ii) Number of target and non-target crimes responded to by the helicopters
- iii) Number of arrests for target crimes when a helicopter was used

- iv) Time spent on target and non-target crimes by the helicopters
- v) Number of false calls for target crimes
- vi) Helicopter operating statistics
- vii) Number of unfounded target crimes for City for each period.

3. AREA ASSIGNED TO HELICOPTER PATROL

The helicopter force is responsible for all the area defined by police zones 1, 2, 3, and 4. Zone 5 is not considered to be part of the helicopter project because of the flying difficulty with the buildings in the downtown area and the other anti-crime projects being implemented in that area of the city. Each zone was to be patrolled at least 5 hours for each of the three 8-hour shifts that divided a day.

a. Initial Patrolling Strategy

For the first three months of the project the areas flown are presented in Appendices A1, A2, and A3. Because of the frequency of crimes committed at varying times of day the following emphasis was placed on preventing particular types of crimes by each helicopter 8-hour shift or watch. This strategy meant that during the watch indicated the helicopters would be assigned a zone to patrol but it would concentrate on those segments of the defined areas that had a high incidence of that type of crime. Therefore, the defined areas did not receive 100% coverage during each watch. In some instances the helicopter flew outside of the defined areas so that adjacent high crime areas could be covered.

Watch	Time	Crime
Morning Watch	Midnight to 8:00 a.m.	Commercial Burglary
Day Watch	8:00 a.m. to 4:00 p.m.	Residential Burglary
Evening Watch	4:00 p.m. to Midnight	Robberies

b. Changes in Patrolling Strategy

The initial patrol strategy seemed to limit the flexibility of the helicopter force and reduce its effectiveness. Therefore, it was decided by all those involved that it would be better to expand the areas covered to include all areas of Atlanta except Zone 5. On April 1, 1974, the helicopters became responsible for crime reduction in the newly defined areas. The new areas are also presented in Appendix A4. Coverage of these areas and flying schedules is left to the judgment of the police officer in charge of the helicopter project. These areas are the same for each watch.

IV. PROJECT EVALUATION

1. GOAL

The Atlanta Police Department initially stated that the primary goal of the expanded helicopter unit would be a 30% reduction city-wide in residential burglaries within 24 months from the time the project became operational. This goal was selected because it represented a statistically significant change in residential burglaries. After three months of operation it became evident that it was not practical to restrict the focus of the helicopter activities to residential burglaries. The result was a redefinition of the primary project goal which required a 15% reduction in residential and commercial burglaries over 24 months. In addition, robberies were to be reduced by 15% within 24 months. Since the helicopters were responsible for patrolling zones 1, 2, 3 and 4, the decrease in the number of residential and commercial burglaries and robberies was analyzed only for those zones.

As this project was to be operational for two years the project goal is stated in terms of a 15% reduction over these two years. With only 15 months' data available, an interim goal of 9.375% reduction in burglaries and robberies is used to measure the project's progress toward its two-year goal.

Revised Goal: Reduce residential and commercial burglaries and robberies by 9.375% within 15 months for those zones being patrolled by helicopters.

Interim Performance Measures

GOAL 1

Let b_0 = Number of residential and commercial burglaries during 1973 for the zones patrolled by helicopters.

b_1 = Number of residential and commercial burglaries after 15 months of project initiation for the zones patrolled by helicopters.

Let r_0 = Number of robberies during 1973 for the zones patrolled by helicopters.

r_1 = Number of robberies after 15 months of project initiation for the zones patrolled by helicopters.

If $b_1 \leq .90625 b_0$, and $r_1 \leq .90625 r_0$, then, the goal will be met.

Since data for the 15 months of project operations are being used it is necessary to convert the 1973 crime data to an equivalent 15 month base for comparison purposes. This was accomplished by multiplying the 1973 crime data by 15/12.

The total burglary and robbery statistics for 1973 and the first 15 months after project initiation are summarized in Table 1. The burglary data for May 1973 was not available; thus, the missing value was replaced with an average number of burglaries taken over January, February, March, April and June of 1973. These months were selected because they included a period during which the helicopters were flying. In addition, seasonal variations are reflected by those months adjacent to May.

Table 1. Burglary and Robbery Statistics
(for Zone 1, 2, 3 and 4)

	BURGLARIES			Robberies
	Commercial	Residential	Total	
Jan.-Dec. 1973	3,644	10,336	13,980	2,898
Jan.-Dec. 1974	4,158	10,164	14,322	3,018
Jan-Mar. 1975	1,116	2,666	3,782	796

From the table above, for burglary case,

$$b_0 = (3644 + 10,336)15/12 = 17,475$$

$$b_1 = 14,322 + 3,782 = 18,104 \text{ (15 months)}$$

(i) Percentage change in burglary crimes

$$\frac{b_0 - b_1}{b_0} (100) = \frac{17,475 - 18,104}{17,475} (100) = -3.6\%$$

(ii) $b_0 (.90625) = 15,837$

$$b_1 \neq b_0 (.90625)$$

Thus, the goal was not achieved. In fact, there was a 3.6% increase in the number of burglaries since the project initiation.

For the robbery case, the project performance can be measured as:

$$\begin{aligned}r_0 &= 2898 \text{ (15/12)} \quad 3622 \\r_1 &= 3018 + 796 = 3814 \text{ (15 months).} \\r_0 (.90625) &= 3282 \\r_1 &\not\leq r_0 (.90625)\end{aligned}$$

Therefore, the goal was not achieved. There has been a 5.3% increase in the number of robberies during the first 15 months of operation.

2. OBJECTIVES

The ultimate objectives of this helicopter project were to increase the effectiveness of the patrol force of the Atlanta Bureau of Public Services, without greatly increasing the manpower required. To do this, several tasks must be accomplished. These tasks were restated in terms of project objectives, and there were four objectives to be satisfied along with achievement of the project goal.

Objective 1

The first objective of this project was to encourage the helicopter patrol to concentrate on target crime activity. Progress towards this objective was to be monitored quarterly.

Statement: The ratio of target crime to non-target crime responses will be no less than .50.

Let c = Total number of crime calls responded to by helicopter

t = Total number of target crime calls responded to by helicopter.

If $c \geq .5 t$ the objective will be met.

Performance Measures

There were 9467 target crime calls and 10,761 non-target crime calls from January 1974 to March 1975.

$$\frac{\text{Target Crime Calls}}{\text{Target + Non-Target Crime Calls}} = \frac{9467}{9467 + 10,761} = .468$$

Objective 1 as stated is not met since the above ratio does not exceed 0.50. If calls initiated by the helicopter crews are considered non-target crime calls (as they usually are) then it appears that the objective is further from being accomplished. There were 4098 calls initiated during the first 15 months of operation.

$$\frac{\text{Target Crime Calls}}{\text{Target + Non-Target Crime Calls + Calls Initiated}} = \frac{9467}{9467 + 10,761 + 4098} = .389$$

The above index is not believed to be a good indicator of how the helicopters are allocating their effort between target and non-target crime. This is because the members of the crew have no control over the target or non-target nature of suspicious activities on which they initiate calls.

Additional Performance Measures

To provide an accurate evaluation of the project performance, an additional index was established to measure Objective 1. This index measures how the helicopter crews spent their time concerned with target crimes as compared to non-target crimes.

It has been estimated from the available data that a helicopter remains an average of 6.64 minutes on each non-target crime. The following calculations confirm that the helicopters spend more than 50% of their time concerned with target crimes.

$$\begin{aligned} \text{No. of hours on non-target crimes} &= \left(\frac{6.64 \text{ min}}{60 \text{ min}} \right) (10,761 \text{ non-target crimes} + 4098 \text{ calls initiated}) \\ &= 1645.4 \text{ hours} \\ \text{Total flying hrs. for 12 months} &= 13,692.8 \text{ hours} \\ \% \text{ Time flying (target crimes)} &= \frac{13,692.8 - 1645.4}{13,692.8} = .880 \end{aligned}$$

Measuring Objective 1 with this index leads to the conclusion that the objective is satisfied. The quarterly accomplishment of Objective 1 since the helicopter project was initiated is summarized in Table 2.

Table 2. Ratio of Target to Non-Target Crime Responses

Criterion	Quarterly Ratio					Total Average (15 months)
	1st	2nd	3rd	4th	5th	
$\frac{\text{Target Crimes}}{\text{Total Crimes}}$.406	.420	.476	.519	.500	.468
$\frac{\text{Time Flying on Target Crime}}{\text{Total Flying Time}}$	* (.800)	.890	.874	.884	.888	.880

* Estimate (Data not available)

Analysis and Comments

A small but steady increase is shown in the ratio of target to non-target crimes. Furthermore, it can be observed that the objective was accomplished in the fourth quarter operation for the first time. The increased attention to target crimes seems to be reflected in the improving percentage of target crime responses compared to non-target crime responses. Because this ratio has been increasing and for particular purposes it never did deviate significantly from the stated goal, it can be said that during the first 15 months of operation, this objective was accomplished.

Objective 2

The second objective of the project was to affect more on-site arrests by having helicopters respond to target crime calls. As mentioned previously, the area success rate for the last 6 months of 1973 (before helicopter squad expanded) is compared to the 1974 area success rate. It was hoped that an improvement of 10% in these area success rates would be achieved.

Statement: The area success rate on target crimes responded by the helicopter will be 10% greater than that for target crimes responded to for the year preceeding the expansion of the helicopter unit.

Performance Measures

Let a_0 = Number of 1973 arrests for target crimes in zones patrolled by helicopters.

t_0 = Total number of 1973 target crimes reported in zones patrolled by helicopters.

ℓ_0 = Total number of 1973 target crimes unfounded in zones patrolled by helicopters.

a_1 = Number of 1974 arrests for target crimes in zones patrolled by helicopters.

t_1 = Number of 1974 target crimes reported in zones patrolled by helicopters.

ℓ_1 = Total number of 1974 target crimes unfounded in zones patrolled by helicopters.

If $\frac{a_1}{t_1 - \ell_1} \geq 1.1 \frac{a_0}{t_0 - \ell_0}$, then the objective will be met.

Since on July 1, 1973 the Atlanta Bureau of Police Services changed their data system to accumulate statistics by census tracts, it was possible to identify target offenses by helicopter zones. Because Zone 5 was not patrolled by helicopters it was necessary to remove Zone 5 data from the city wide statistics. Unfortunately, because old police patrol beats overlapped Zone 5 it became very difficult to accurately identify the target crimes committed in Zone 5.

Thus for Objective 2 the comparison of areas success rates is based on the rate for the last six months of 1973 compared to the rate for all of 1974.

Let $a_0 = 411$ (last six months 1973)

$t_0 - \ell_0 = 10517$ (last six months 1973)

$a_1 = 1495$ (full year 1974)

$t_1 = 22144$ (full year 1974)

$\ell_1 = 461$ (full year 1974)

Therefore,

$$\frac{a_1}{t_1 - \ell_1} = \frac{1495}{22144 - 461} = .0689$$

$$1.1 \left(\frac{a_0}{t_0 - \ell_0} \right) = \frac{411(1.1)}{10517} = (.039)(1.1) = .043$$

Since $\frac{a_1}{t_1 - \ell_1} > (1.1) \frac{a_0}{t_0 - \ell_0}$, the objective was achieved.

Because of the effort required to assemble the data necessary to include the first three months of 1975 in this calculation, agreement was reached with the Crime Analysis Team that the final report would include only 1974 data in the area success rate. An analysis of quarterly area success rates indicated small variation from quarter to quarter and the addition of one additional quarter's results would have had negligible effect on the overall area success rate.

Comparison of the Helicopter Success Rate with the Area Success Rate

Using the 1974 data supplied by the helicopter group, the helicopter success rate defined as the number of target crime arrests where a helicopter was involved divided by the legitimate target crime calls is computed as follows:

No. of arrests for target crimes where helicopter involved =	266
Total target crimes responded by helicopter	= 7688
False calls for target crimes	= 2024
Success rate =	$\frac{266}{7688 - 2024} = .047$

Similar calculations were made for the quarterly data for 1974 so that changes in quarterly success rates could be observed.

To find the area success rate the number of arrests for target crimes in zones patrolled is divided by the total number of target crimes less unfounded target crimes for the areas being patrolled. For 1974 the area success rate is calculated as follows:

No. of arrests for target crimes in zones patrolled =	1495
Total number of target crimes reported to police	= 22144
Unfounded target crimes	= 461

Therefore, the area success rate will be

$$\text{Area success rate} = \frac{\text{No. of arrests for target crimes in zones patrolled}}{\text{Total target crimes in zones patrolled less unfounded target crimes}}$$
$$= \frac{1495}{22144 - 461} = .0689$$

Similar calculations are made for each quarter of 1974 and Table 3 shows the quarter by quarter helicopter success rate compared to the quarterly area success rates for 1974.

Table 3. Success Rates .

Quarter Measure	Quarter					1974 Average (year)	Average 15 Month
	1st	2nd	3rd	4th	5th		
Helicopter Success Rate (%)	5.5	5.4	4.85	3.8	7.4	4.70	5.39
Area Success Rate (%)	** 4.86	** 7.35	9.57	6.08	*	6.89	--

* Data not available

** No split quarterly data for unfounded target crimes is available, thus the cumulative 6-month's data for the unfounded target crimes was averaged out.

Analysis and Comments

The success rate of the helicopter patrol has shown a steady decrease quarter by quarter during the first 12 months. However, in the fifth quarter, this success rate was substantially improved when compared to those of the previous 4 quarters. However, a statistical test confirmed that the quarterly variations in the success rate for the five quarters in 1974-1975 are not statistically significant. The test for significance is presented in Appendix C.

On the other hand, the area success rate has maintained at an average level of 6% throughout the year. Although this area success rate is greater than the success rate achieved by the helicopter patrol, there is no known reason for this rate difference. With reference to Objective 2, the first year performance of the project shows a 76% improvement in area success rates when the last 6 months of 1973 are compared to 1974.

Objective 3

The third objective of the project was to increase the visibility to the public of the patrol force by providing city wide aerial patrol on a 24 hour/day seven days per week basis. This operational effectiveness was to be monitored on a quarterly basis by measuring full shifts and hours flown as compared to the prescheduled shifts and hours.

Statement: Provide city-wide aerial patrol on a 24-hour/day, seven days per week basis. Aerial service will be considered provided to a district if a 5-hour of flight time within each 8 hour shift is provided at all times when visibility is not below one mile and ceiling not below 1000 feet.

Performance Measures

Since crews had no control over the weather conditions and they were allowed to fly when visibility is not hazardous, time lost due to weather was deducted from these measures.

$$\% \text{ hours flown of hours scheduled} = \frac{\text{Hours Flown}}{\text{Total Hours Scheduled} - \text{Total Hours Lost to Weather}}$$

$$\% \text{ complete shifts flown of shifts scheduled} = \frac{\text{Full Shifts Flown}}{\text{Total Shifts Scheduled} - \text{Shifts Not Completed Due to Weather}}$$

To determine the operational effectiveness of the helicopter project, a measure of the percent of scheduled flying time actually flown is computed. A normal level of operational activity would have this index at 100%. These percentages should increase through the duration of the project. The operational effectiveness of the helicopter project for the first 15 months of operation is summarized in Table 4.

Table 4. Operational Effectiveness of Helicopter Project

Month	% Hours Flown of hours scheduled less weather losses	Hours Scheduled	Hours Flown	Hours lost to weather	Hours lost for maintenance
Jan 1974	55.0	1860	593.0	719.6	507.8
Feb	68.12	1680	849.7	432.7	400.5
Mar	82.0	1860	1252.7	325.3	298.3
Apr	50.0	1800	752.2	296.7	667.1
May	36.2	1860	638.6	93.7	1108.8
June	63.4	1800	1036.4	164.8	449.8
July	61.30	1860	1032.5	175.7	243.5
Aug	63.61	1860	974.5	328.2	364.3
Sept	72.10	1800	1037.5	361.0	249.7
Oct	70.34	1860	1283.5	35.2	395.4
Nov	64.82	1800	995.3	264.4	270.2
Dec	60.20	1860	750.6	554.1	98.8
Jan 1975	66.94	1860	882.4	541.9	126.9
Feb	68.83	1680	830.6	473.3	112.6
<u>Mar</u>	<u>72.63</u>	<u>1860</u>	<u>783.3</u>	<u>781.5</u>	<u>184.4</u>
Total	63.00%	27300	13692.8	5548.2	5478.0

Analysis and Comments

Hours lost for maintenance is a major factor in preventing the normal operation of the helicopters. In general, the maintenance hours normally required by helicopters are showing a decreasing trend, but it is becoming evident that the achievement of 100% of the scheduled hours being flown is unrealistic. Because of the unusual maintenance problems encountered during the first two quarters the figure for the last two quarters is more representative of a reasonable expectation of time flown compared to scheduled time.

Objective 4

The fourth objective of this project was to discourage target crimes in advance and to provide a sense of security to the public through the use of the helicopter project. Although it is all but impossible to measure the number of crimes discouraged, it is possible to assess the public's view of the helicopter's patrol. This assessment was developed through the use of a questionnaire in a citywide survey. The questionnaire is in Appendix B.

Statement: On a random citywide survey conducted before and during the the project is operational, there will be a 20% increase in favorable or positive responses to the following questions:

Q1: During the last week, have you seen or been aware of helicopter police patrols?

Q2: Do you believe the use of helicopter police patrols will help the police do a better job? Why?

Performance Measures

Let n_0 = Number of people surveyed on the initial survey.

x_0 = Number of yes answers to Question A on the first survey.

y_0 = Number of yes answers to Question B on the first survey.

n_1 = Number of people surveyed on the second survey.

x_1 = Number of yes answers to Question A on the second survey.

y_1 = Number of yes answers to Question B on the second survey.

If $\frac{x_1}{n_1} \geq 1.2 \frac{x_0}{n_0}$ and

$\frac{y_1}{n_1} \geq 1.2 \frac{y_0}{n_0}$ the objective will be met.

During the spring of 1974, a criminal justice class at Georgia State University designed and conducted a citizen attitude survey with specific questions concerning the helicopter patrol in the Atlanta area.

Because of a misunderstanding between the Georgia State group and the Atlanta Bureau of Police Services, Question 1 was not included on the questionnaire. An attempt was made to analyze the responses to the various questions so that some conclusion could be reached about the public awareness of police helicopter patrols. Unfortunately because the wording of the questions implied such an awareness no meaningful conclusions were developed.

The survey contained the responses of 271 separate individuals regarding seven specific questions with four possible responses for each inquiry. The actual questionnaire is shown in Appendix B, pages B1 and B2. A summary of the questions and responses pertinent to the helicopter project are shown in Appendix B, pages B3 and B4. The presentation of results question by question appears in the remainder of Appendix B.

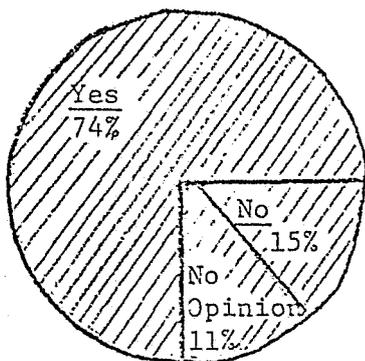


Figure 1. Responses to Question #2

The responses given represent the first survey of citizen attitudes toward the helicopter project. Since no other survey has been undertaken, no attempt was made to investigate changes in public attitudes about the project.

V. COST ANALYSES

This section provides a cost analyses for the B.P.S. helicopter project. The project is divided into two phases, a start up phase lasting from June, 1973 through December, 1973, and an operational phase lasting from January, 1974 through March, 1975. Although the operational phase was to continue through August, 1975, data for the last five months was not available at the time of this analyses, and so data from those months were not included.

Cost allocations were made to several mutually exclusive groups: salaries, operating expenses, short lived equipment, helicopter maintenance, and long lived equipment. Travel costs were also considered; although, since these had the same amortization period, they were included with the short lived equipment.

The following table represents the cost allocation for the various groups between the start up period (Phase I) and the operational period (Phase II).

Table of Cost Allocation		
Start up Period (Phase I) June 1973 - December 1973		Operational Period (Phase II) January 1974 - March 1975
Helicopter Maintenance	\$30,400	\$330,000
Salaries	58,900	656,000
Operating Expenses	500	2,550
Sub Totals	89,800	988,550
Short Lived Equipment		26,700*
Long Lived Equipment		280,000*
Totals	89,800	\$1,295,250*

* See Text - Artificial Allocation

The total cost of the start up period is amortized over the expected life of the operational period (20 months) as is the cost of the short lived equipment. The cost of the long-lived equipment is amortized over a five year period.

The following table illustrates the cost/month associated with the operational phase of the project for each contributing item.

Operational Phase Average Cost/Month Allocations

Item	Allocation to Phase II
Start up Period Total (Phase I)	\$ 4,490. / mo.
Helicopter Maintenance (Phase II)	\$22,000. / mo.
Salaries (Phase II)	\$43,700. / mo.
Short Lived Equipment	\$ 1,340. / mo.
Long Lived Equipment	\$ 4,670. / mo.
<u>Operating Expenses</u> (Phase II)	<u>\$ 170. / mo.</u>
Total Phase II Cost / mo.	\$76,400

The following table illustrates some ratios which will be useful for comparing the helicopter project with other projects. Total allocated project cost equals \$76,400. mo. x 15. operational months = \$1,146,000.

Ratio	Amount
Cost/Operational Month	\$76,400. / mo.
Cost/Flying Hour (Average of 912.9 hrs./mo.)	\$83.70 / hr.
Revised Cost/Flying Hour	\$72.44 / hr.
Cost/Target Crime Arrest (494 Arrests)	\$2,320. / Arrest
Cost/All Arrests (2620 Arrests)	\$437. / Arrest

These ratios are based on the information obtained from the monthly Helicopter Squad Activity Report, some of which is summarized in Table 4.

An explanation of how the costs were allocated, and how the ratios were calculated follows.

Initial cost figures were obtained through the CAT from the Fiscal Division of the Atlanta Bureau of Police Services. These reports made possible the attribution of expenses to a particular month. The salaries, helicopter maintenance, and operating expenses shown for both phases are simply the sum of those expenses incurred during the months of the appropriate phase. All equipment expenses were arbitrarily allocated to Phase II, and then the sum of these expenses were amortized over appropriate periods and the actual cost per month for equipment was then allocated to Phase II of the project. All calculations were then performed on a cost/month basis.

Equipment was allocated either to the short lived category, or to the long lived category, based on the characteristics of the equipment. Equipment which was expected to have no salvage value at the end of the project, such as a flight suit, was allocated to the short lived category, and amortized over 20 months. Equipment which was expected to retain value at the end of the project, such as the helicopter was amortized over 60 months. The cost of travel was considered to have no salvage value, and was included in the short-lived equipment group.

The total cost of the start-up period was amortized over 20 months, and allocated to the operational period cost per month.

Along with these expenses, the average monthly allocations for salaries, helicopter maintenance, and operating expenses from Phase II give the Average Total Cost per Month for the Operational period.

The presented ratios were then calculated, based on information contained in the monthly Helicopter Squad Activity Report. The revised cost

per Flying Hour was calculated by deducting from the Average Total Cost per Month an amount corresponding to the salary and auto requirements for the patrolmen when patrolling in the cars. This was based on the assumption that the patrolmen were using the autos when the helicopter was down for maintenance or for weather. (11,026.2 Team hours). The amount deducted was equal to what an average non-flight patrolman would make during this number of hours, at \$5.528/hr. per man, plus the allocated expense of the autos required, \$12,702.80.

It is felt that this gives a better representation of the cost/flying hour by recognizing that the public receives service from the men while on auto patrol, and deducting that cost strictly associated with ordinary auto patrol from the cost allocated to flying time.

The cost per arrest ratios include all arrests made under the project, from the helicopter and from the automobiles. Hence, it is the total project cost which is used in calculating these ratios, rather than the revised cost just described.

In conclusion, it is not possible to make a cost-effectiveness decision based on the examination of one project. What has been done to develop some ratios which may be compared to similar ratios for other projects, in order to reach an effectiveness decision. In making such a comparison, however, it must be remembered that the helicopter performs services in addition to crime control. For example, the helicopter may be used for traffic control or emergency rescue. Although the cost of these services is included in this report, no measure of these benefits was made.

VI. CONCLUSIONS

The ultimate goal of the helicopter project was to reduce residential and commercial burglaries and robberies in the areas patrolled. The interim measure of this goal showed that the goal was not achieved. During the first 15 months operation, there has been 3.6% increase in the number of burglaries. The rate of increase in the number of robberies amounted to 5.3%.

An analysis of the quarterly results obtained for each of the objectives have shown very little variation. However, a small but steady increase in the ratio of target to non-target crimes has occurred. In the 4th and 5th quarters of operation, Objective 1 was accomplished. To augment the measuring of helicopter response in terms of number of calls, additional performance measures were designed to consider time spent on target crime activities. With the measure, based on flying time rather than number of crimes, the objective has been satisfied for all five quarters. The increased attention to target crimes seems to be reflected in improving percentage of target crime responses compared to non-target crime responses.

The helicopter success rate, on the contrary, has shown a slow but steady decrease during the first four quarters with an improvement in the 5th quarter. A statistical test confirms that no statistically significant trend can be ascribed to the results observed. When the helicopter success rate is compared to the area success rate, the area success rate is greater than that of the success rate achieved by the helicopter patrol. This situation might be interpreted to mean that helicopters are less effective in apprehending target offenders than the other police patrol units. However, because the difference in the success rate and the area success rate is small in absolute terms (i.e. 4.7% to 6.89%) it is more appropriate to say that there seems to be little measured difference between the arrest rate for helicopters and other patrol units. In fact, the method of attributing arrests to a particular unit could probably account for much of the difference that is observed.

In terms of a predefined objective, the achievement of Objective 2 required a 10% increase in the area success rate as compared to the previous

year's area success rate. By using the last 6 months ' statistics of 1973 as a crude estimate of the success rate of the total police effectiveness in the year of 1973, this measure resulted in the achievement of the of the predefined objective. Although definite conclusions cannot be reached because of the lack of statistical significant, this trend seems to indicate that it might be possible that helicopters did help improve the overall arrest rate for all police units.

Hours lost for maintenance is a major factor in preventing the normal operation of helicopters. In general, the maintenance hours normally required by the helicopters have shown a decreasing trend, but it is becoming evident that the achievement of 100% of the scheduled hours being flown is unrealistic. Because of the unusual maintenance problems encountered during the first two quarters, the figure for the last three quarters is more representative of a reasonable expectation of time flown compared to scheduled time. The operational effectiveness of the helicopter project showed an average of 63% through the year. Under normal conditions it would be reasonable to expect the helicopters to actually fly from 65% to 75% of the scheduled time.

As an initial step to measure Objective 4, a citizen attitude survey concerning the helicopter patrol was taken in the early spring of 1974. The results of the survey indicated that 70% of the total responses were favorable toward the project. In summary, the project goals concerned with target crime reduction were not achieved whereas most operational objectives were realized. In addition, information that may provide a better understanding of the operation and effectiveness of a helicopter patrol was accomplished. This information should be of assistance in developing improved strategies for crime reduction through helicopter patrols.

VII. RECOMMENDATIONS

On the basis of the evaluation of the Atlanta helicopter project there are several observations that should be useful in the operation of future projects of this type. First it is clear from the helicopter logs that the helicopter unit is used more for non-target crimes than for target crimes. Therefore, the effectiveness of helicopters in the reduction of non-target crimes is an important hypothesis to test. In addition, a detailed analysis of the helicopter daily logs and monthly summaries may identify those crimes for which helicopters are most effective. For example, the spotting of abandoned cars and drunk drivers occurs frequently and it may be that these activities are more suited for helicopter work than the prevention of robberies and burglaries.

With the high cost of operating a helicopter unit the concept of continued helicopter patrol should be reexamined. For quick response it may be enough to have only one helicopter flying continuously while the other helicopters would be utilized on short periodic patrols. Another approach might be to station the available helicopters at different points in the city where they would only respond to calls where their special skills would be needed.

It is also important that the mix of helicopters be reexamined. Because of the helicopter's ability to move quickly from one point to another, in spite of traffic congestion, capability of the helicopter unit should be emphasized. Unfortunately the type helicopter presently in use is not designed for rescue type work.

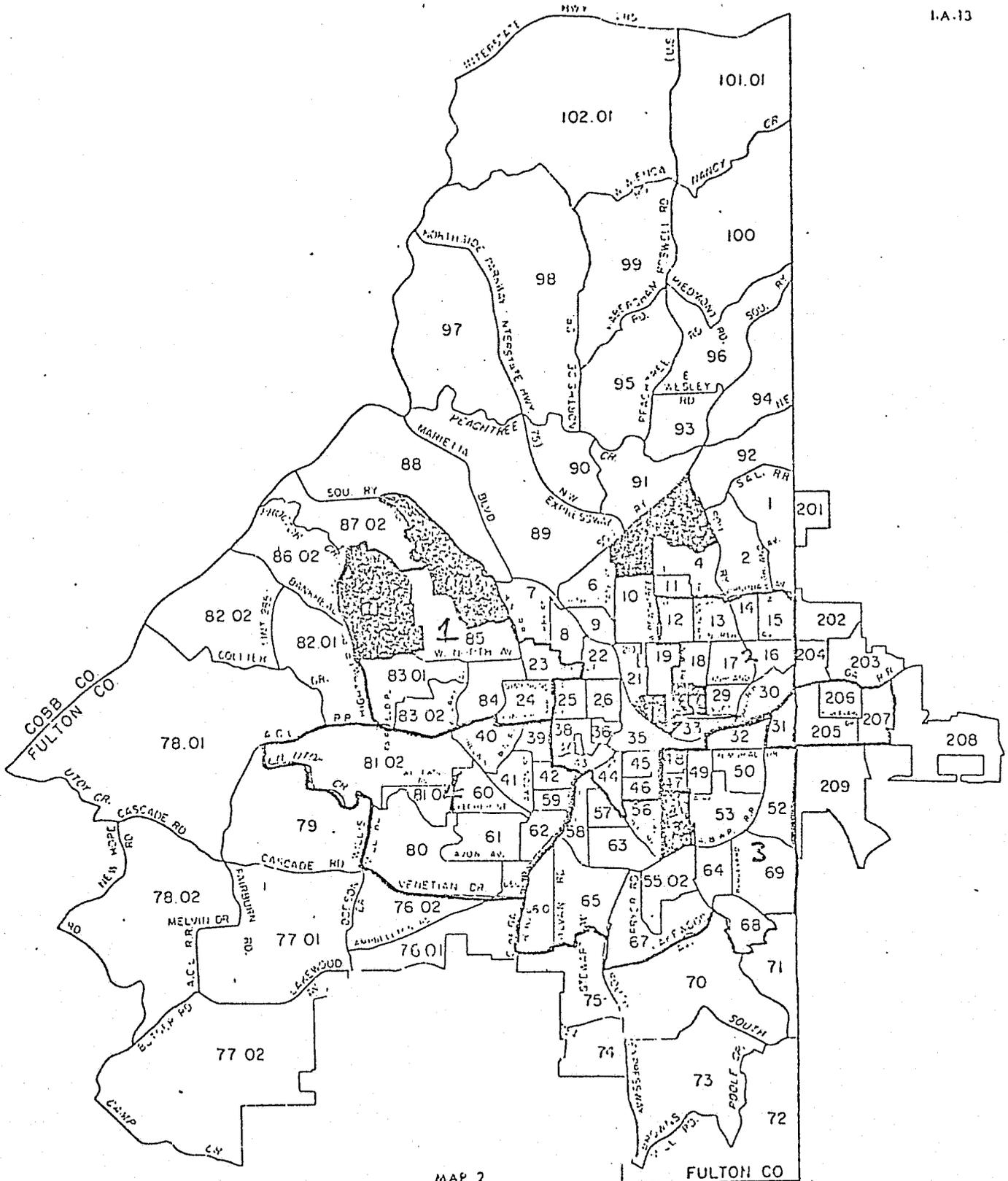
APPENDIX

- A: AREAS FLOWN BY THE HELICOPTERS
- B: CITIZEN ATTITUDE SURVEY SUMMARY
- C: STATISTICAL TEST

APPENDIX A3

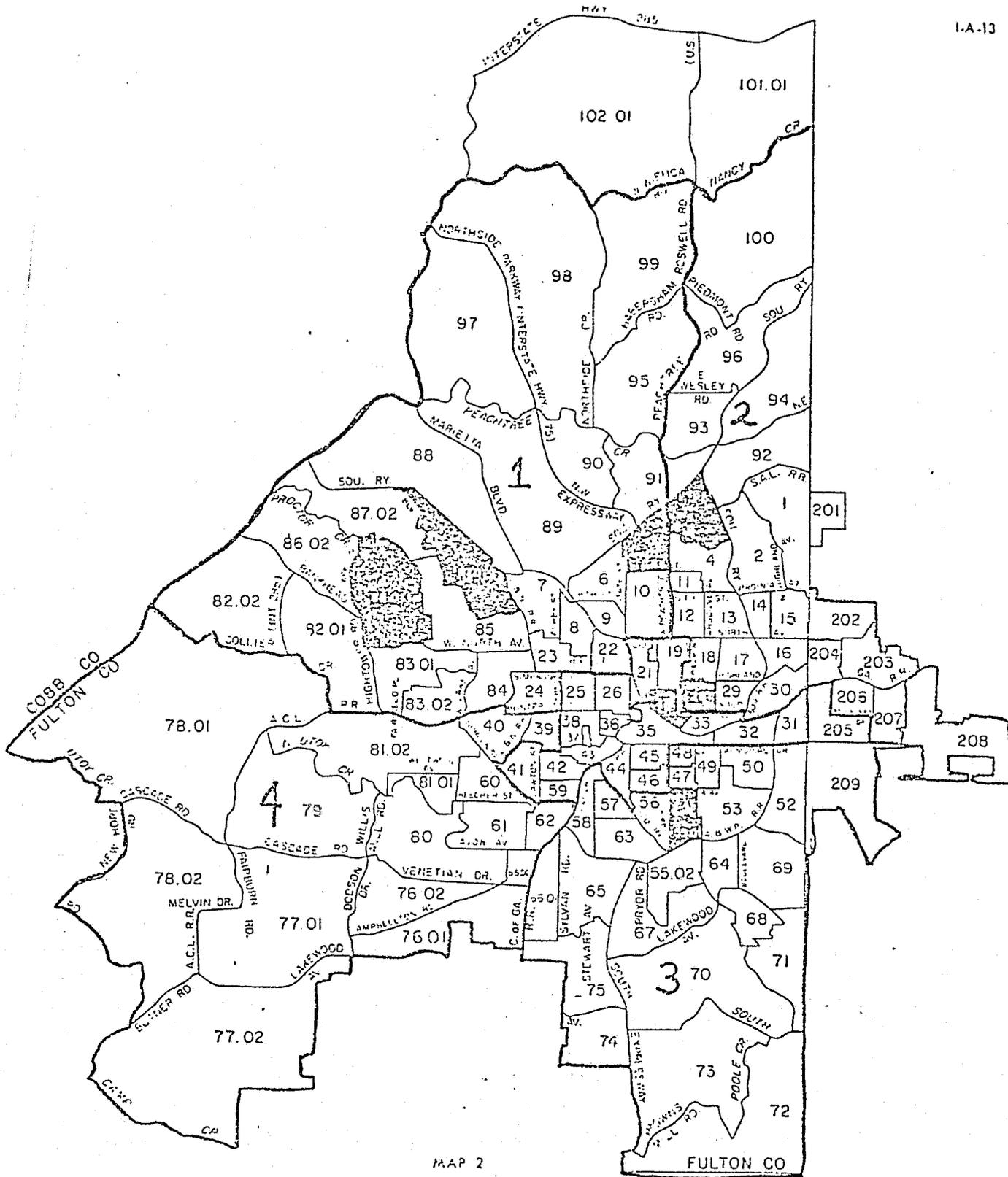
EVENING WATCH

I.A.13



MAP 2

FULTON CO



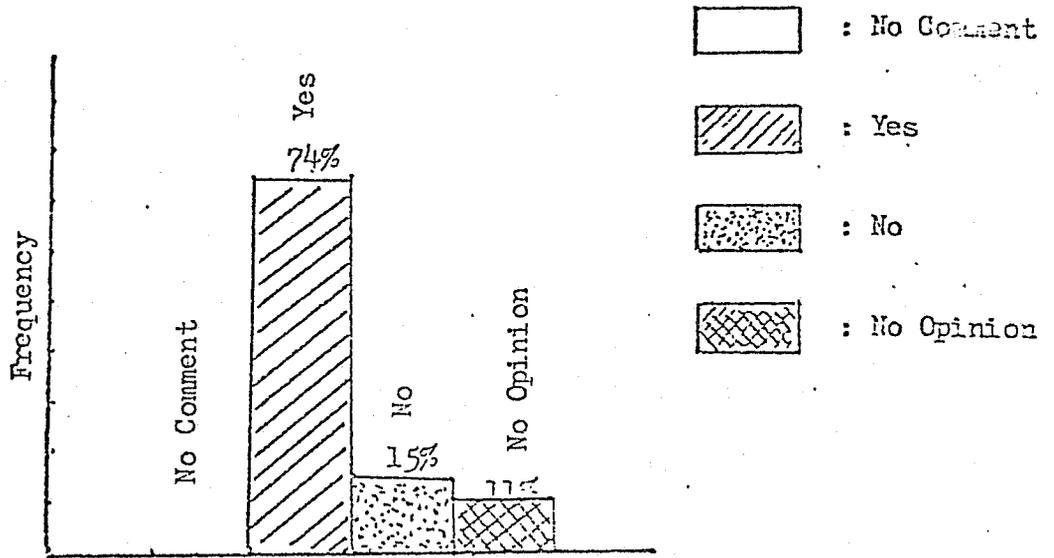
MAP 2

FULTON CO

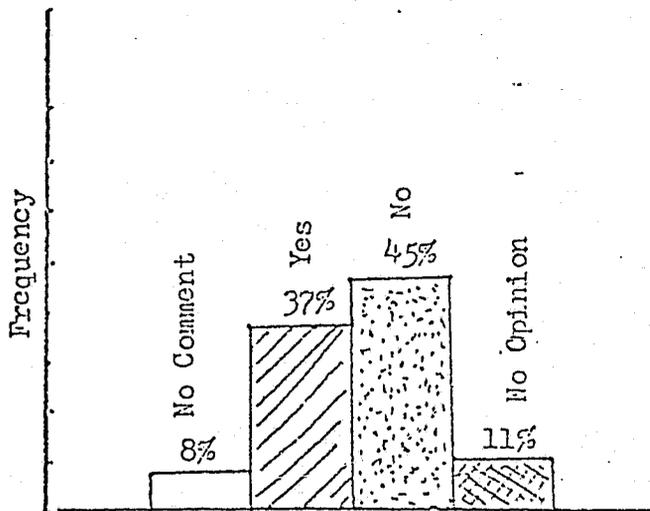
APPENDIX B

CITIZEN ATTITUDE SURVEY

Q1 · Do you believe the use of police helicopter patrols will help the police do a better job ?

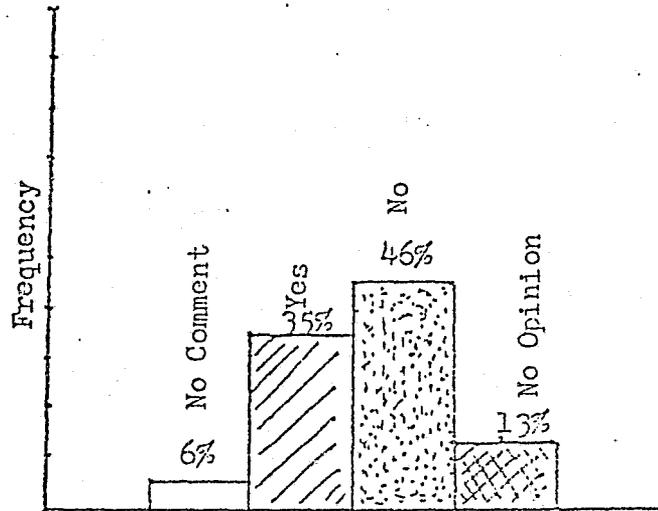


Q2 · Do you believe the helicopter patrol will be more effective than policemen of foot ?

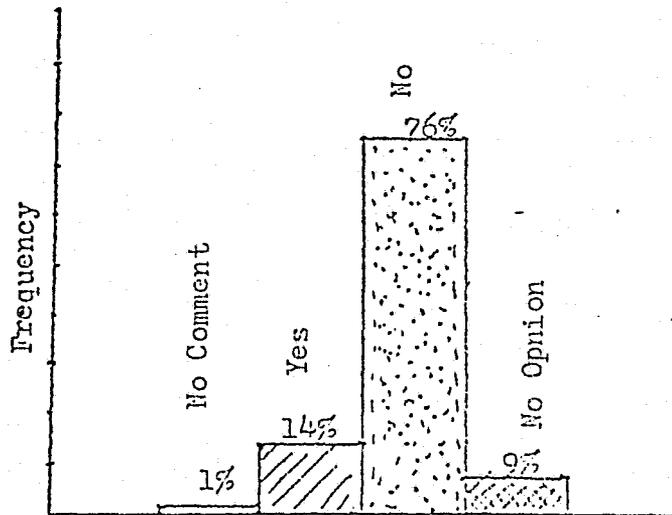


APPENDIX B

Q3. Do you believe the helicopter patrol will be more effective than policemen in patrol cars ?

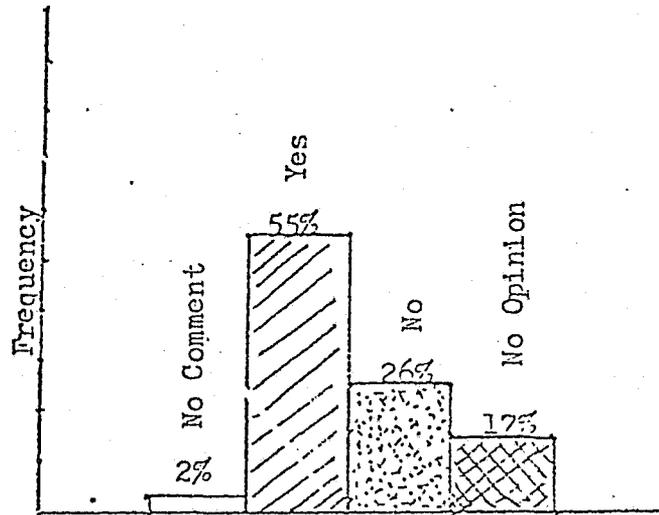


Q4. Do you feel the Atlanta Helicopter patrol is a misuse of the taxpayers' money ?

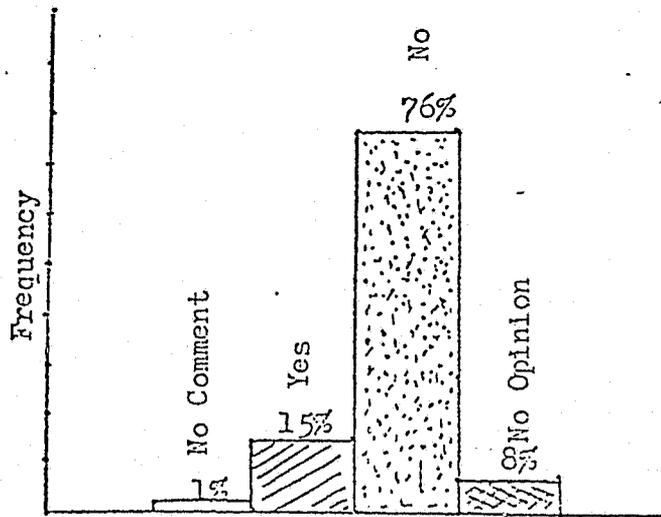


APPENDIX B

Q5. Is a sense of security gained by the public through the use of helicopter patrol ?

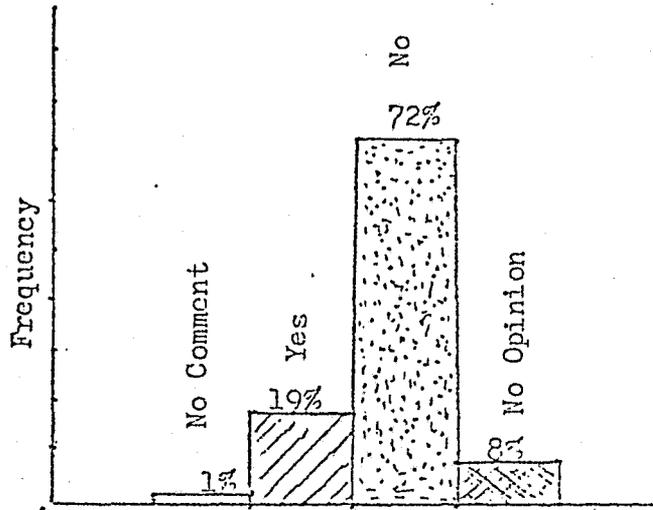


Q6. Do you feel the helicopter patrol distracts the driver of a car ?

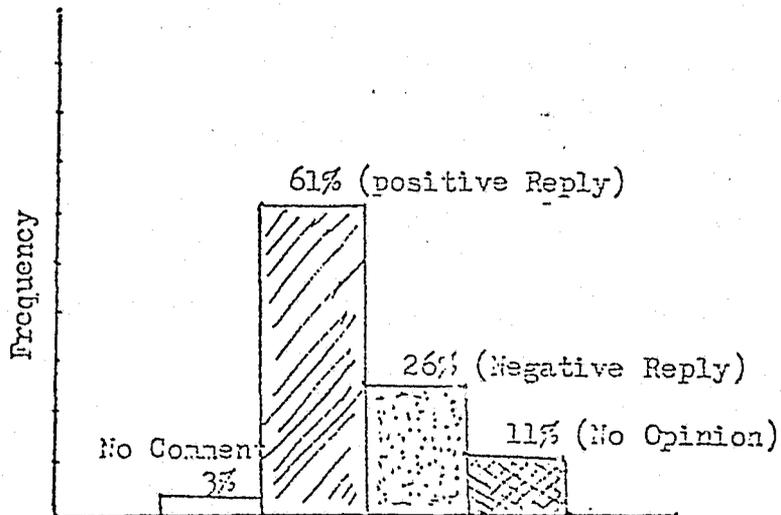


APPENDIX B

37. Do you feel the police helicopter patrol invades the privacy of citizens ?



Over-all Responses to the Helicopter Patrol



APPENDIX B

CITIZEN ATTITUDE SURVEY

		<u>NUMBER</u>	<u>PERCENT</u>
1)	Do you believe the use of police helicopter patrols will help the police do a better job?		
	No Comment	1	0%
	Yes	200	74%
	No	40	15%
	No Opinion	30	11%
2)	Do you believe the helicopter patrol will be more effective than policemen of foot?		
	No Comment	21	8%
	Yes	99	37%
	No	122	45%
	No Opinion	29	11%
3)	Do you believe the helicopter patrol will be more effective than policemen in patrol cars?		
	No Comment	16	6%
	Yes	95	35%
	No	125	46%
	No Opinion	34	13%
4)	Do you feel the Atlanta Helicopter patrol is a misuse of the taxpayers' money?		
	No Comment	2	1%
	Yes	38	14%
	No	206	76%
	No Opinion	25	9%
5)	Is a sense of security gained by the public through the use of helicopter patrol?		
	No Comment	6	2%
	Yes	149	55%
	No	71	26%
	No Opinion	45	17%

APPENDIX B

	<u>NUMBER</u>	<u>PERCENT</u>
Do you feel the helicopter patrol distracts the driver of a car?		
No Comment	3	1%
Yes	41	15%
No	205	76%
No Opinion	21	8%

7) Do you feel the police helicopter patrol invades the privacy of citizens?

No Comment	4	1%
Yes	51	19%
No	195	72%
No Opinion	21	8%

SURVEY SUMMARY

The survey contained the responses of 271 separate individuals on seven specific questions with four possible replies to each inquiry. The total number of responses represents 1397 replies. The following chart summarizes the responses. For the purpose of the summary, a "No" response on questions 4, 6, and 7, were considered a positive reply.

No Comment	53	3%
Positive Reply	1151	61%
Negative Reply	488	26%
No Opinion	205	11%

If the "No Comment" and "No Opinion" responses are deleted from the survey, the following illustration is represented.

Positive Reply	1151	70%
Negative Reply	488	30%

NOTE: Percentages are rounded to the nearest whole number

APPENDIX B

Survey on Atlanta Police Department
Conducted by Students - Criminal Justice Department
School of Urban Life - Georgia State University
Atlanta, Georgia

1. During the past week, have you seen or been aware of increased police helicopter patrol?

Yes _____ No _____ No Opinion _____

2. Do you believe the use of police helicopter patrol will help the police do a better job?

Yes _____ No _____ No Opinion _____

3. Why?

4. Do you believe the helicopter patrol will be more effective than policemen on foot?

Yes _____ No _____ No Opinion _____

Do you believe the helicopter patrol will be more effective than policemen in patrol cars?

Yes _____ No _____ No Opinion _____

6. Do you feel the Atlanta helicopter patrol is a misuse of the taxpayers' money?

Yes _____ No _____ No Opinion _____

7. Is a sense of security gained by the public through the use of helicopter patrol?

Yes _____ No _____ No Opinion _____

8. Should the helicopter patrol hours be decreased?

Yes _____ No _____ No Opinion _____

9. Should the helicopter patrol hours be increased?

Yes _____ No _____ No Opinion _____

10. Do you feel the helicopter patrol distracts the drivers of cars?

Yes _____ No _____ No Opinion _____

11. Do you feel the police helicopter patrol invades the privacy of citizens?

Yes _____ No _____ No Opinion _____

12. Is the crime in your residential area severe?

Yes _____ No _____ No Opinion _____

Is it increasing?

Yes _____ No _____ No Opinion _____

Remaining at same level _____

Is it decreasing?

Yes _____ No _____ No Opinion _____

13. Would you like to see more police in your area?

Yes _____ No _____ No Opinion _____

14. Have you had an occasion to call on the police for aid?

Yes _____ No _____ No Opinion _____

15. Were they helpful and readily available?

Yes _____ No _____ No Opinion _____

16. Do you feel the police are doing their best to combat crime in your area?

Yes _____ No _____ No Opinion _____

17. Is your general impression of the Atlanta Police Department favorable?

Yes _____ No _____ No Opinion _____

18. Do you have any suggestions for the better functioning of the police in your area?

19. Do you feel that the current 12-week police academy course is enough training for police candidates?

Yes _____ No _____ No Opinion _____

20. Race: Black _____ White _____ Other _____

21. Age: _____ 22. Sex: Male _____ Female _____

Education Level: Grade school _____ High school _____ Attended College _____ College Graduate _____

24. Area of residence in city: _____

25. Family Income: To 4,000 _____ 4,001 to 7,500 _____ 7,501 to 10,000 _____ 10,001 to 15,000 _____
15,000 to 20,000 _____ 20,001 to 25,000 _____ Over 25,000 _____

Appendix C

Statistical Test on the Significance of the Success Rate

Data

Quarter (i)	1st	2nd	3rd	4th	5th
Success Rate (%) C_i	5.5	5.4	4.85	3.8	7.4

Significance Test Statistics

Average of the success rate (\bar{c}): 5.39%

$$\begin{aligned} \sum \frac{(C_i - \bar{c})^2}{c} &= \frac{1}{5.39} \{ (5.5 - 5.39)^2 + (5.4 - 5.39)^2 \\ &+ (4.85 - 5.39)^2 + (3.8 - 5.39)^2 + (7.4 - 5.39)^2 \} \\ &= 6.872 \end{aligned}$$

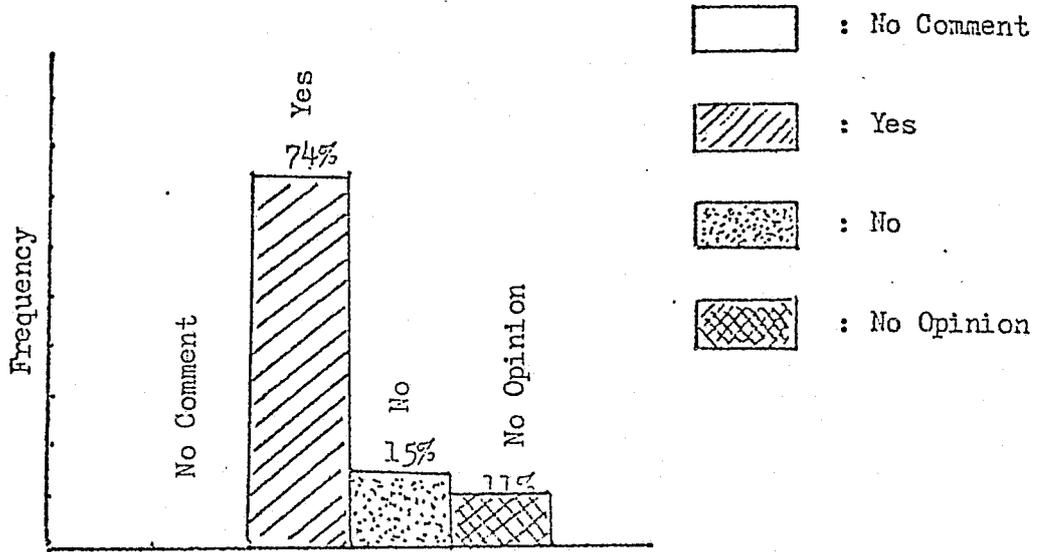
$$\chi^2_{4, .05} = 9.48$$

Thus, at a 95% confidence level, it is not statistically significant.

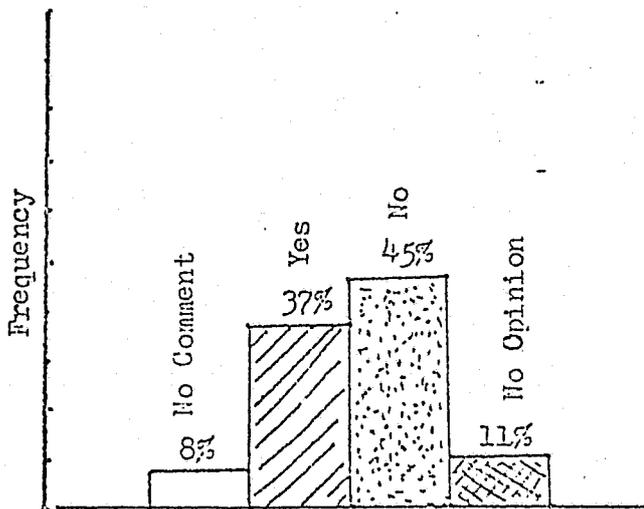
REFERENCE: Duncan, A. J., "Quality Control and Industrial Statistics",
Revised Edition. pp. 511-512.

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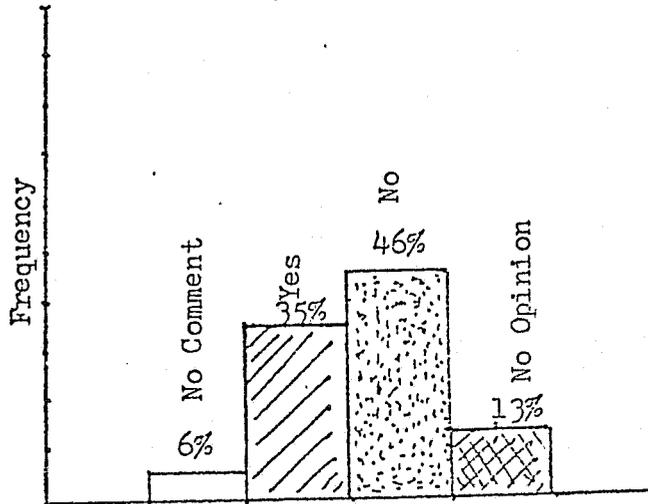


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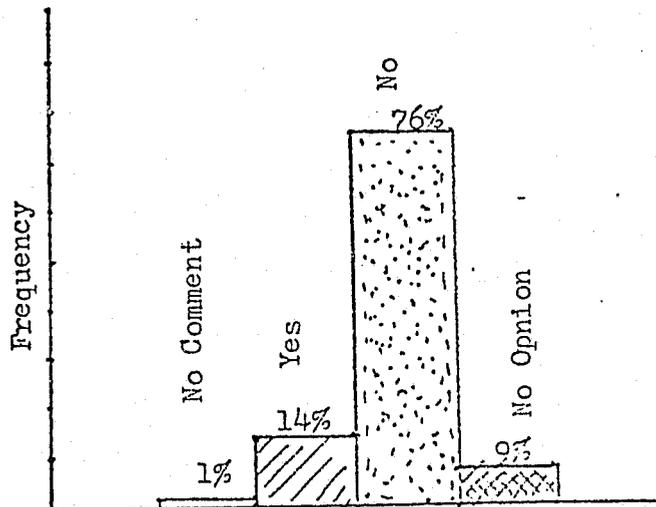


APPENDIX B

Q3. Do you believe the helicopter patrol will be more effective than policemen in patrol cars ?

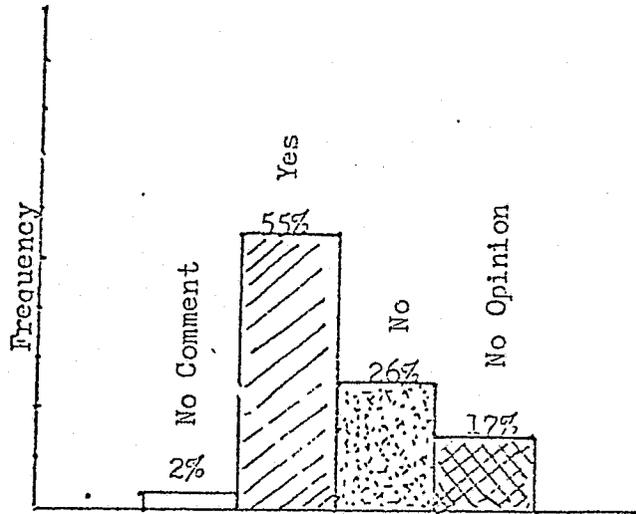


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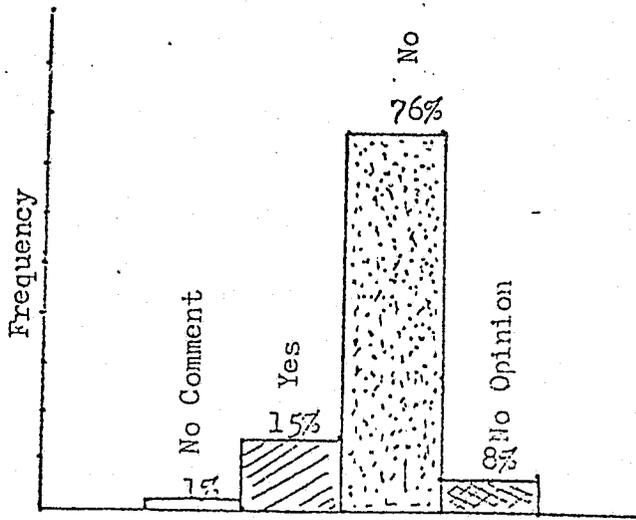


APPENDIX B

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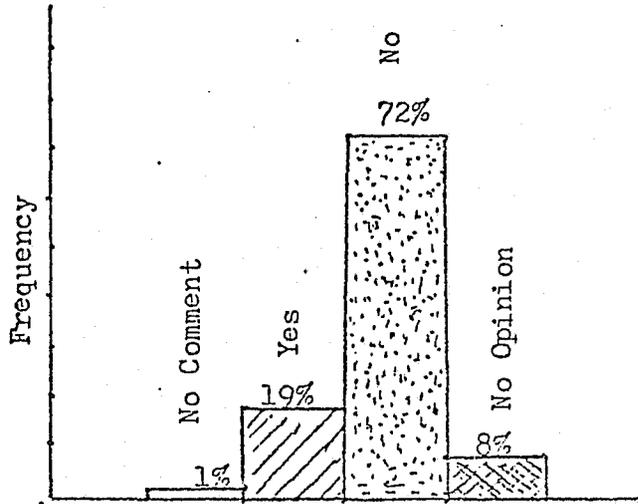


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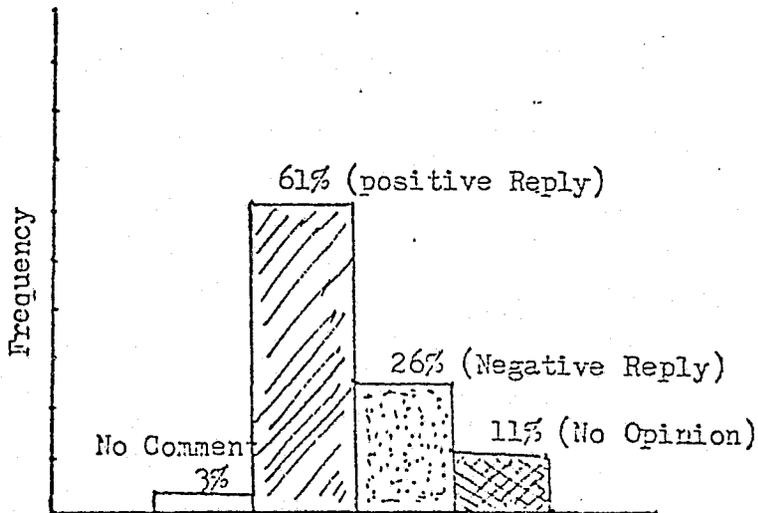


APPENDIX B

Q7. Do you feel the police helicopter patrol invades the privacy of citizens ?



Over-all Responses to the Helicopter Patrol



END

7 11/15/1941