TEMPORAL PATTERNS FOR BURGLAR ALARMS AND POLICE-CODED BURGLARIES

by

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DEDICATION

This dissertation is dedicated to my wife, Peggy A. Rothstein, without whose love and support I could never have completed this process, and to my high school teacher, Mr. Chester Plummer, Jr., who saw something in me as a teenager and who helped me develop a lifelong love of learning.

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ABSTRACT

Burglary is one of the most feared crimes. In addition to the cost of the stolen property, burglary may be viewed by the victim as an invasion of their personal space. This causes more emotional trauma for the victim than the value of the items stolen can represent. Criminologists and police officers study burglaries to help reduce the number and their impact. Research has revealed several factors that can affect the odds of being burglarized.

No one knows exactly when burglaries occur. The best current method for estimating when burglaries occur is to use the aoristic signature of a series of burglaries, imputing more specific times from time ranges. This allows a researcher to estimate when burglaries are actually occurring.

Burglar alarms are also important as manifestations of the fear of crime and as attempts to reduce crime. As the fear of crime has increased the number of burglar alarms has increased also. Along with the increase in alarms came an increase in alarm calls to police, a significantly high number of which are probable false alarms. Some estimates state that 98% of the calls to police for burglar alarms were for false alarms.

Police often know exactly when alarms occur even though they do not know exactly when the burglaries themselves occur. This dissertation considers that the timing patterns for alarm occurrence might provide a window into the timing patterns by which burglaries themselves occur. The researcher examines and compares detailed patterns for alarms as well as other evidence of burglary timing, including burglary events coded by

police as having occurred. Our central goal is to learn the similarity or dissimilarity between temporal patterns in burglar alarms and coded burglaries.

I: INTRODUCTION

Burglary is a problem in the United States. In 2018, there were approximately 1.2 million burglaries reported to the police (Federal Bureau of Investigation, 2018). The FBI estimated that these burglaries resulted in approximately $3,400,000,000 in property loss to the victims and that over two-thirds of the reported burglaries involved residential properties.

In addition to the economic loss, the victims of burglaries suffer emotional trauma. This trauma is better understood using territoriality theory (Brown & Harris, 1989). Territoriality theory says that a person identifies more strongly with some places, such as at one's home, compared to places away from home. The closer a person identifies with the territory invaded and the property stolen, the stronger the emotional impact felt by the victim. Emotional impact included anger, sadness, anxiety, fear, and a later distrust of police.

Studying Burglary

With burglary this large a problem, police and scholars are interested in finding ways to reduce it. Sun Tzu (1994), the Chinese military philosopher, said that you must understand your enemies to be able to defeat them. Applying this concept to fighting crime helps explain the academic and police research into burglary. Among other things, people who want to fight burglary need to understand when and where burglaries occur, and what factors might influence its timing.

Burglary researchers find several factors that contribute to burglary occurrence. We discuss these findings in the next few pages. Unfortunately, we know very little about whether these factors also affect whether or not alarms occur. There is also very little research on the factors that affect what time burglaries occur and almost no research on factors affecting when alarms occur. This dissertation cannot fill this gap in full, but we can (in the spirit of the Brantinghams) describe major temporal patterns in both burglaries and alarms, and then examine the similarity or dissimilarity among these patterns.

In this dissertation, we will describe the temporal patterns of burglaries and alarms and compare these patterns as they vary based on several different classifications that are known to effect whether or not burglaries occur. This will help us determine if these factors also affect when the crimes occur and the similarity of burglary and alarm patterns under the various conditions.

The timing of burglary is quite difficult to study. By its very nature, most burglaries occur without witnesses to say when it happened. The police taking the report usually obtain a date and time *range* beginning before the burglary was known to occur and ending when it was discovered (Andresen & Jenion, 2004).

Fear of Crime

As noted above, one of the reasons that burglary is such a severe crime is the emotional impact it has on its victims. Burglary contributes to a general fear of crime. Although fear of crime is not the research focus for this dissertation, it does provide a rationale for taking burglary seriously.

The National Crime Surveys from 1975 onwards show that almost half of the respondents felt unsafe in some degree if they were alone in their neighborhood at night (Garofalo, 1979). The fear of home intrusion is an important part of the home security issue, reflecting territoriality theory noted above.

Fear of Crime Exists. In a review of found more than 200 published works on fear of crime over a 30-year period, Hale (1996) found differences in the definition of fear of crime and in its measurement but he noted that all of the papers had found that the fear exists. One problem that Hale found was that the fear of crime is usually measured by asking people how safe they feel in their neighborhood. There is a difference, however, between fear and knowledge of risk. Asking if a person is feels unsafe in their neighborhood may not indicate a fear as much as an awareness of the risk of being victimized (Ferraro & LaGrange, 1987).

Jackson and Gray (2010) believed that fear of crime was not just based on an awareness of risk. They examined the response to the fear and concluded that in approximately 66% of the people who reported a fear of crime, the fear and precautions taken served to reduce their quality of life. Killias (1990) felt that there fear of crime was based on a person's feelings of vulnerability in addition to the awareness of risk. Killias proposed that vulnerability was based on three factors: the exposure to risk, the seriousness of the consequences, and the loss of control (ability to resist the crime). This confirms that fear of crime is not necessarily just an awareness of the risk of being victimized. Regardless of the ambiguity in defining and measuring fear of crime however, it remains behaviorally important if it impels people to take precautionary measures, including installing burglar alarms.

Fear of Property Crime. The survey question mentioned by Hale would lead to the conclusion that people are afraid of street crime, but several studies suggest that people are actually more afraid of property crime, especially when it breaches their home. Of particular importance to this dissertation, Liska, Lawrence, and Sanchirico also found that the property crime was more directly related to this fear than other types of crime. While studying the fear of crime and gender, Pleggenkuhle and Shafer (2018) surveyed 972 rural residents. The survey had questions on fear of both violent and property crime, including specific types of crime such as burglary and found that both men and women feared property crime more than violent crime.

Fear of Crime Growing. It is almost impossible to study the increase in the fear of crime due to due to the lack of a standard definition and the problems with measuring the fear of crime, but there are indications from other research that the fear of crime is probably increasing. One response to the fear of crime is the installation of a burglary alarm system (Garofalo, 1981). Residential use of alarms increased from 2% of residences in 1980 to 10% by 1990 (Cunningham, Strauch, & Van Meter, 1991). This has continued to grow and one news article on an alarm industry report estimated that 18% of homes in the US had monitored alarm systems in 2010 and predicted that it would grow to 30% by 2020 (Security Sales and Integration, 2011). If the response to the fear of crime is increasing, it can be presumed that the fear itself is also increasing.

If fear of crime is real, any effort to reduce that fear is likely to do societal good. Ideally, the reductions in fear should arise from objective declines in crime. However, a secondary but still important way to reduce fear might be linked to the proper use of burglar alarms, which might in turn help reduce objective crime. The importance of alarms is enhanced by evidence that fear of crime is greater than fear of other hazards.

Fear of Crime Unrealistic. Americans at work are actually more afraid of crime and natural disasters than accidents, despite the fact that accidents are far more likely (Institute of Industrial Engineers (IIE), 2006). The IIE quoted statistics that show that in

2004, 16,137 people were murdered and 230 died in natural disasters, but more than 110,000 were killed in accidents. They also showed that Americans feel safer at home than at work, while far fewer deaths occurred in the workplace than at home (5,000 compared to 44,100).

Fear of Crime and Burglar Alarms. One of the end results of the fear of crime has been a large increase in the number of alarms installed in the US. There were approximately 17 million residential and commercial alarms installed in the US in 1993 (Hakim, Rengert, & Shachmurove, 1995). In 2005, there were approximately 32 million alarms installed in the US (Sampson, 2007). At the time, the growth in installations had averaged 8% per year.

The fear of crime helps us understand this importance of burglar alarms. First, alarms might reduce the fear of crime. People install alarms as one response to their fear or knowledge of crime. In a study proposing a model of fear of crime, Garofalo (1981) noted that respondents seek to redefine the situation and lessen their fear of crime. Alternatively, alarms might enhance the fear of crime. In the 1981 study, Garofalo noted that responses such as installing expensive alarm systems might aggravate a person's fear of crime as a means of justifying the expenses involved. Third, the alarm might mitigate objective risk of home intrusion. Burglars may see the presence of an alarm and choose a different target (Buck, Hakim, & Rengert, 1993). In all three ways, burglar alarms are potentially linked in an important way to fear of crime.

Evaluating the importance of alarms and their link to fear of home intrusion is not a straightforward problem. The problems with defining and measuring the fear of crime discussed above are one example of the difficulties in this evaluation. We can readily see that the role of alarms is more than mechanical. Alarms could, at least conceivably, reduce fear or crime itself and hence help improve society. As we will later see, all too little is known about alarms and their role in society. That shortcoming motivates this dissertation.

Yet the installation of alarms does not simply reflect either objective crime trends or fear of crime. Assessing the relationship between alarm installations and fear of crime requires time series data on fear of crime, which has not always been consistently measured. Ideally, that time series could then be compared to trends in installed alarms. Although such data are lacking, we suspect from an early study by Cunningham, Strauch, and Van Meter (1991) that alarm installations can increase greatly during periods in which crime is not increasing or even decreasing.

Burglar Alarms

The growth in the numbers of burglar alarms generates several problems for police departments around the country, including an increase in the number of alarm calls and even more importantly, a major increase in the number of presumed false alarms.

Police Calls for Service. One measure of police activity is the call for service. Calls for service (CFS) are any requests made to the police for any assistance, whether that assistance is crime-related. A subset of calls for service become written cases, but the larger number of calls are not. CFS include disturbances, traffic hazards, crimes, civil law questions, and caring for persons who are unable to care for themselves. By including all activity, CFS are a more accurate indicator of what a police department actually does (Goldstein, 1977).

Calls for service are generally considered to begin when the dispatcher is notified of a request for the police at some location and end when the officers are back in service and available for another call (Brooks, Edwards, Sorrell, Srinivasan, & Diehl, 2011). The dispatcher may be notified in several ways, including receiving a call from a citizen, being told by a police officer on the radio, or an electronic device such as a police-monitored alarm system.

CFS recording policies differ by department. In the San Antonio Police Department (SAPD), CFS are assigned a specific problem type to help inform the officer notified to take the call. A list of the dispatch call problem types for SAPD is included in Appendix A. All calls are coded from the same list. The list has specific types of codes for two call types. Calls located at the San Antonio International Airport are all coded beginning with the letter “Y”. Calls which an officer finds on his own (on-sight activity) are coded with the letter “Z”. This dissertation studies burglar alarm calls which are coded by the police without distinguishing which calls are from police-monitored alarms vs. alarm companies notifying the police department vs. citizens notifying the department after becoming aware of an alarm.

SAPD refers to a CFS as “closed” when an officer does one of three things: writing an offense report specifying the criminal offense that occurred, writing an incident report detailing a non-criminal offense (such as a traffic crash or a civil dispute), or using a computer code (N-Code) to indicate a standardized closure that did not need a report. A list of all N-Codes and their meanings is included in Appendix B, along with a notation on how the call was used in the current study.

Calls for Service Increasing. It is hard to know the number of calls for police service nationally, much less the specific distribution of call types. There is no national reporting database for police CFS, however many local police departments make available at least summary statistics on their calls for service or even allow research access to those files. There has been some research into factors that affect CFS and in those cases the researchers obtained their data from a specific department and for a specific date range (e.g., Kurtz, Koons, & Taylor (1998), in Philadelphia, Pennsylvania; Charkoudian (2005), in Baltimore, Maryland).

Although we cannot be sure whether national CFS are increasing in the United States, older local studies indicate increases. While studying the effect of weather on police calls in Minneapolis, Cohn's (1996) data shows that there was a 19.91% increase in CFS from 1985 through 1988. While not explicitly checking the statistics for CFS, Fleming and Grabosky (2009) point out that the demand for police services has grown to a point where the police can no longer meet the demand. They mention that the new system of using a special number (3-1-1 in the US) for non-emergency police calls has increased the number of requests for police services.

The research in this dissertation is based on data obtained from the San Antonio, Texas, Police Department. While this dataset does show the total calls for service, the department did not have enough data available at the time the data was provided to indicate a long-range trend. The available data is summarized in *Table 1* and indicates that there was a decrease in the number of CFS between 2012 and 2013 but that the number has increased since then. The number of calls shown for 2012 might be artificially inflated by dispatchers learning a new system, as SAPD changed computer systems in 2011. The remaining years match the other indicators that the number of CFS had been increasing.

Alarm Calls Increasing. There are several indications that the number of alarm installations is increasing and will continue to increase. An industry news report estimated that 30% of US homes would have installed burglar alarms by 2020 (Security Sales and Integration, 2011). A more recent market research report expected the global burglar alarm industry to grow at an average rate of 5.8% per year from 2018 through 2023 (Marketwatch, Inc., 2019). ResearchandMarkets.com (2019) estimated that the growth in the industry would continue, though it would slow a little. They estimated the growth rate in industry income as 22.4% annually from 2011 through 2018 but predicted it would continue at 19.7% annually from 2019 through 2024. Two of the trends contributing to the continuing growth are the growth of available technology (Perfect Home Defense, 2018) and the increase in consumer's disposal income (Amir, 2019). If the alarm industry continues to grow, the number of police calls for alarms would also continue to increase. That would indicate the relevance of learning more about burglar alarms and their timing.

While there is no single source for all calls to police, some estimates for specific types of calls may be derived from other sources. For example, Sampson (2007, p. 2) used industry data to estimate that there were approximately 36 million police calls related to burglar alarms in 2002. This is a sharp increase from an estimate in an earlier FBI report (Moslow, 1994) of only 13.7 million calls for alarms each year.

News reports also indicate that the number of police CFS for burglar alarms is growing. The news media from comparatively small cities such as Victoria, Texas, (Crowe, 2013) to larger cities such as Detroit, Michigan, (Kaffer, 2011), Austin, Texas, (Dexheimer, 2014), and San Jose, California, (Miller, 2012) have all noted that there are problems for the police based on the volume of calls for burglar alarms. The articles all discussed how police sought to cope with the problem.

Most Alarms Presumed to be False. The problem with the increase in the numbers of police calls for burglar alarms is that an extremely high number of the calls are determined by the police to be false alarms. Even before the recent growth of alarms, in one department studied the police answered 28,164 calls for burglar alarms, which was more than three times the number of calls for "actual offenses" they listed in their annual report for that year (Webster, 1970). If every single "actual offense" came from a police response to a burglary alarm (a highly improbable scenario), this would mean that at least 75% of the calls for burglar alarms were for what we shall call "presumed false alarms."

In her study, Sampson (2007) further estimated that between 94 and 98% of all alarm calls are for false alarms, with an even higher presumed false alarm rate in a few jurisdictions. Webster (1970) also said that over 90% of the alarm calls in his study were presumed false alarms.

A study of the costs of police operations also found that most alarm calls to the police were false activations (Hakim, Rengert, & Shachmurove, 1995). It cited an average of 1.1 to 1.4 false alarm calls per alarm installed. These are average numbers that can only give us a partial measure of the false alarm problem. Not every alarm system installed will result in a call to the police. Another study by some of the same authors found that between 94 and 98% of all alarm calls to the police are presumed to be false alarms (Hakim & Shachmurove, 1996).

A preliminary analysis of the data from SAPD used in this dissertation also shows that most alarms are presumed false alarms, that is, not related to crime. Less than 2% of the calls for alarms resulted in reports for criminal offenses. The dispatch system for SAPD allows officers to specifically mark a call for an alarm as a false alarm, to indicate that an offense occurred and a report was written, or that the call was not for a crime for some other crime-related reason. Officers may indicate another reason for filling out no further report without deeming the alarm to be false. The primary reasons for not writing a report on an alarm call, other than marking it as a false alarm are:

1. The officer was cancelled by dispatch while en route to the call;
2. the officer was given an incorrect address;
3. the officer arrived and was told by the occupant that there was no alarm; or
4. the call was handled by a different agency.

This system creates a measurement problem for estimating numbers of false alarms. It creates risks of both over-estimating under-estimating the number of false alarms, compounding our difficulties in estimating the percent of alarms that might be false.

Table 1 shows a preliminary analysis of the data by year. The first column of data shows the number of calls for service received by SAPD by year. The second column shows the number of calls for service that related to burglar alarms for buildings. The percentage of calls that were for alarms may be obtained by dividing the number of alarms by the number of calls. The third data column shows the number of calls that were coded as false. The fourth data column shows the percentage range of alarm calls that were false. The lower limit on the range is the percentage of calls that the police recorded as false alarms while the upper limit is the number of calls where the police did not write criminal offense reports. Both the minimum and maximum percentages show a slight but steady increase during this period during this period, indicating that the percentage of false alarms increased over this four-year period. The last data column shows the number of calls where an offense was found to have occurred, whether or not the offense was related to the alarm. An example of an offense possibly not related to the alarm is if an officer responded and found someone had been assaulted in the street outside the building. There is no way to determine if the assault caused the alarm or if it was a coincidence that they occurred at the same approximate time and location.

Table 1: San Antonio Police Department Alarm Calls, 2012 - 2015

Year	Calls for Service	Alarm Calls	Recorded False Alarms	Estimated Percentage False	Coded as Offenses
2012	1,261,962	78,899	57,029	72.2 – 98.3%	1,339
2013	1,203,988	74,477	54,441	73.1 – 98.6%	1,071
2014	1,222,787	89,769	57,693	64.3 – 99.0%	897
2015	1,241,954	91,267	57,740	63.2 – 99.1%	853
Total	4,930,691	334,412	226,903	67.9 – 98.8%	4,160

The last row shows over 300,000 alarm calls and that more than 6% of all the calls the San Antonio Police answered during this time period were related to alarms. Of these calls, fewer than 1.5% resulted in any criminal offense being discovered, that is, coded by the police as offenses.

Cost of Alarms for Police. Much of the research on alarms has been motivated by the cost to the police of answering alarm calls, which is seen as a problem by police administrators trying to manage budgets (Gascon & Foglesong, 2010).

The cost estimates for each police call will vary depending on what cost factors are considered and local cost factors. Cost estimates also vary on whether they focus on average costs for overall police activity, versus marginal cost increases for each call. Marginal costs are often the focus of cost estimates. Even here, complexity arises for several reasons. The labor costs depend on which officers handled the call and on local pay and benefit rates. Vehicle costs would vary based on how far the officers drove to get to that call. One method for estimating the cost for an alarm call is to calculate an hourly cost for each officer based on the departmental budget and how long each alarm call lasted. Based on an estimate of two officers for 54 minutes per alarm, Hakim and Shachmurove (1996) estimated a cost of $69.68 per call for their case study in a suburb of Philadelphia in 1990. This was after the agency had taken steps to reduce the number of false alarm calls. This study concluded that more than 6.17% of the department's budget was spent on false alarm calls.

While Sampson (2007) does not come to an absolute figure, she believes that the costs are usually higher than most departments calculate. She estimated that the alarm would only take 20 minutes for two officers, but she listed other costs that should be included in the figure, such as dispatcher time, equipment costs, the cost of programs to educate the public, and the overhead for programs to analyze or regulate alarms. It should be noted that Hakim and Shachmurove's method took all of these costs into account by using the entire department budget for its hourly cost. Sampson also pointed out that there was a risk of accidents causing injury while responding and that there was a loss of opportunity for officers to work on other crimes while responding to alarms. These costs are not easily quantified and are not often included in other studies that include cost estimates.

The International Association of Chiefs of Police (IACP) does not try to estimate the cost of responding to an alarm but recognizes the growing problem of false alarms. In one report (Ohlhausen Research Inc., 1993), they stated:

> Unnecessary calls for police service due to false burglar alarms have grown into a tremendous problem. Burglar alarms serve as useful deterrents to crime, but the amount of time and money police spend responding to the 7 million to 15 million or more false alarm calls every year has become intolerable to many law enforcement agencies. Projected growth in the use of alarms portends a worsening problem.

Although that study was made more than 25 years ago, the cost of responding to alarms, including false alarms, remains a serious issue.

Chapter Conclusion

This chapter has shown that burglary is a problem worth studying but that knowing when burglaries occur is a problem for those studying burglary. The importance of burglary goes beyond monetary costs, including emotional impact and emotional impact contributes to the fear of crime.

This chapter has also reviewed the fear of crime and whether the fear is reasonable. One of the ramifications of the fear of crime is the installation of even more burglar alarms. The increasing number of burglar alarms contributes to demands for police services. Burglar alarm calls are an increasing problem for police, justifying the study of alarms and their relationship with burglary.

II: PATTERNS IN BURGLARY

The current dissertation builds upon the perspective of Patricia and Paul Brantingham (1984) as “patterns in crime.” They are especially articulate in explaining why time patterns and descriptions are of central importance.

> The purpose of studying crime patterns over time is to discover regularities that aid one in understanding the phenomena of crime. . . The analysis of temporal patterns begins with simple visual inspection. Sometimes it is possible to look at a series of numbers representing criminal justice statistics and immediately see regularities. (p. 93)

Describing burglary and its temporal patterns is not an easy or straightforward task. This dissertation focuses on patterns in burglary and patterns in burglar alarms, and seeks to relate one to the other.

While scholars have extensively studied burglary and its impacts on people, they have been less likely to study when burglaries occur. A significant portion of the research on burglary timing has been on how to calculate when it occurs instead of factors affecting when it occurs. Knowing the time range when a burglary may have occurred offers some but it would be even better (if possible) to zero in on the time of occurrence.

Burglary Occurrence Times

There are several methods for using the time range to estimate when burglaries occur. The researcher may use the midpoint of the known range, the starting point of the range, the ending point of the range, some random point during the range, or the aoristic signature.

The aoristic signature is a calculated value derived by dividing the range into values over the number of time periods where it might have occurred (Ratcliffe, 2000). As an example, if a burglary occurred between 8:00 a.m. and 1:00 p.m., there is a five-hour period when it might have occurred. Instead of trying to place a single datapoint in one of the hours (beginning, mid-point, or end) in the range, the aoristic method would place 1/5 of a point in each of the five possible hours. Summing up all of the aoristic signatures can then produce a probability time distribution of when the burglaries have occurred. Since different victims report different ranges, the aoristic method combines these alternative reports to improve the probability estimates of occurrence probability as much as possible. In other words, aoristic methods are educated approximations of burglary times.

The temporal scale and the time period studied chosen depend on the needs of the researcher. The temporal scale is the size of the individual time groupings (minute, hour, day, etc.) used while the time period is the cyclical time being checked for patterns (day, week, month, etc.) (Ratcliffe, 2000). Common temporal scales and time periods are hours in a day or week and days in a week or month. This paper will use the 168 hours in a week as the temporal scale and time period studied.

A study comparing four of the different methods of determining the probable time of a burglary concluded that the aoristic signature of the crime was the most accurate indicator based on reported burglary times (Ratcliffe, 2002).

Boldt and Borg (2016) noted that burglary time is less studied than burglary location. They also extended the number of possible methods for studying burglary timing, including the random time method and an extended aoristic method. In the random time method, the researcher selects any single point in time that is during the range where the crime is known to have occurred. In the extended aoristic method, the authors divided the range by minutes instead of hours to get a value for the probability of occurring within any given hour.

The extended aoristic method differs from the aoristic method by assigning a different value for the beginning and end hours than for the remainder of the hours, based on how many minutes in each of those hours were reported as possible times for the crime. For example, if the burglary occurred between 7:30 a.m. and 11:15 a.m., this totals 245 minutes. In this case, 30 of the 245 minutes occurred between 7:00 and 7:59 a.m., 60 of the 245 minutes occurred between 8:00 and 8:59 a.m., 60 of the 245 minutes occurred between 9:00 and 9:59 a.m., 60 of the 245 minutes occurred between 10:00 and 10:59 a.m., and 15 of the 245 minutes occurred between 11:00 and 11:59 a.m. The extended aoristic method would assign a value of 0.1224 (30/245) to the 7:00 hour, 0.2448 (60/245) to the 8:00, 9:00, and 10:00 hours, and 0.0612 (15/245) to the 11:00 hour. Since the burglary took place over a possible 5 hours, the aoristic method would assign the value of 0.20 (1/5) for each hour in this time range. Boldt and Borg also found the aoristic method was the most accurate, even slightly better than the extended aoristic method.

All of these methods, however, are estimates of when burglaries occurred. There may be reasons for choosing one method over another. The aoristic method requires significant mathematical calculations to produce an estimate. The data used may require a different method (the NIBRS data, for example, only includes the beginning point for a time range). The purpose of the research may also require a different method for the analysis.

Aoristic analysis is designed to reveal patterns of when crime may have occurred. It cannot list just the crimes that occurred in a specific time period, but lists all of the crimes that might have occurred in that period. In Ratcliffe and McCullagh's (1998) study that first described aoristic analysis, they found that when analyzing data that is generally known when it occurred combined with a few crimes that were aoristic, the result was very different from the pattern revealed by just the known crimes. In that case, they concluded that a rigid search (a search based on the specific times listed in the report) using just the known crimes was probably the better analysis type.

Aoristic analysis is based on two assumptions. The first assumption is that an offense may have occurred with equal probability during any part of the range given for the unknown time (Ratcliffe, 2000). Ratcliffe did acknowledge that external factors, such as traffic patterns affecting when car thieves strike, could affect the time patterns within the range. There is other evidence that this assumption may not be an accurate assumption. If there were an equal chance of the crime having occurred in each time period, then Boldt and Borg's (2016) study would not have found extended aoristic analysis to be less accurate. Extended aoristic analysis placed the aoristic signature into the hours based on the number of minutes in the range, thus putting a smaller value in the first or last hour if they were not a full hour in the range. The finding that aoristic analysis is more accurate than extended aoristic analysis suggest that crime is slightly more likely to occur at the very beginning or end of the time range than in the middle.

The second assumption is that the time range as recorded by the police is an accurate range. The recorded time range is the starting point for the development of the aoristic signature. There are some indications that this may be faulty based on how people perceive time. Studies indicate that people do not perceive time the same or remember it accurately. Multiple factors, including the duration, number of events, and previous experience may affect the way a person remembers time (Block, 1989). Applying Block's study to a burglary, a person who normally leaves the house at 8:30 a.m. but had something happen on the morning of the burglary where he left late, may misremember how late he left. An actual departure time of 8:50 may be reported as 8:45 or as 9:00, depending on how the subject viewed the event. This difference in time could affect an aoristic analysis.

This dissertation is looking for weekly patterns of when incidents occurred. The aoristic method will provide the best overall pattern for this purpose. This dissertation will use the aoristic method to compare the timings of alarms and burglaries to learn whether these patterns are similar. If this is true, then there may be another method to use for studying when burglaries occur that is not as mathematically involved as the aoristic method.

An aoristic analysis is very similar to a distribution chart and can be compared to a distribution of when something happened. If an action has a single known time for when it occurred, such as alarms, the aoristic time analysis is the same as a distribution chart for that incident. If an action is not known to have a single specific time, the aoristic analysis differs because it cannot show when the specific crimes occurred and instead shows when they are most likely to have occurred based on the possible times. As a visual reminder of this difference, the tables of aoristic times used in this dissertation will be shown with the number of offenses including a single decimal point. This number will be a rounded total for all of the parts of offenses that might have occurred in that time period.

Table 2 and *Table 3* show aoristic analyses of the current data from SAPD. The two tables provide analyses of when during the week the burglaries are occurring. Including cross-totals in the tables allows a quick review of just hours of the day or days of the week instead of the full week analysis. The total number of burglaries is shown as "n" in the bottom right corner of the table. The sum of the individual cells may not equal the total due to rounding.

Table 2: Aoristic Occurrence Time for Residential Burglaries

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
2400-0059	156.4	107.5	101.6	100.0	108.2	101.8	136.6	812.1
0100-0159	152.9	100.5	87.4	93.2	101.2	95.7	119.2	750.0
0200-0259	139.3	95.9	91.6	99.2	96.4	97.7	124.9	744.9
0300-0359	147.7	99.8	91.5	95.3	100.4	107.0	113.1	754.7
0400-0459	123.7	92.6	87.9	85.1	97.1	92.2	102.0	680.7
0500-0559	110.9	82.5	97.7	84.4	91.8	93.3	102.4	663.0
0600-0659	109.1	109.5	107.2	103.5	107.1	105.3	96.5	738.1
0700-0759	109.9	171.3	165.7	173.2	163.2	153.6	100.2	1,037.1
0800-0859	110.7	261.8	266.3	260.3	250.0	244.1	121.6	1,514.8
0900-0959	122.3	324.3	327.5	324.3	315.2	331.2	144.5	1,889.3
1000-1059	155.0	390.8	405.7	412.2	396.3	394.8	155.6	2,310.4
1100-1159	170.2	439.0	439.9	443.9	416.3	425.0	160.2	2,494.4
1200-1259	181.3	462.5	458.4	464.2	462.2	467.7	175.0	2,671.2
1300-1359	195.2	447.5	426.8	471.1	453.4	465.9	185.3	2,645.2
1400-1459	196.9	411.0	432.2	421.4	402.6	450.6	190.0	2,504.6
1500-1559	196.2	360.8	388.6	382.9	365.2	401.0	182.8	2,277.5
1600-1659	175.8	303.1	325.4	300.6	308.7	312.1	190.1	1,915.9
1700-1759	171.7	258.4	256.8	245.7	248.0	270.7	203.1	1,654.4
1800-1859	177.5	211.0	215.3	203.8	212.0	248.3	205.3	1,473.2
1900-1959	172.1	178.3	187.1	197.4	194.7	217.2	216.2	1,363.0
2000-2059	163.8	172.8	161.5	179.3	168.8	224.4	212.6	1,283.3
2100-2159	152.9	141.7	146.6	166.6	151.6	205.6	221.4	1,186.5
2200-2259	142.0	117.2	127.5	141.9	146.2	198.1	200.4	1,073.3
2300-2359	128.3	109.0	137.5	133.3	119.9	170.8	203.5	1,002.4
Total	3,661.8	5,448.5	5,533.7	5,582.7	5,476.4	5,874.3	3,862.6	n=35,440

Table 2 shows the times of occurrence for all residential burglaries, based on a 168-hour resolution. Reading the detail of the 168-hour analysis shows that residential

burglaries peak for the week during the lunch hour on Friday. Reading the cross totals also shows that burglaries peak on Friday and during the 12:00 to 12:59 p.m. hour each day. The full table shows that residential burglaries start increasing at approximately 8:00 a.m. each day and climb until approximately 1:00 p.m. before slowly decreasing. Burglaries are also more concentrated on weekdays than weekends. This finding basically fits with the assumption that burglaries happen when houses are empty because people are at work during normal business hours.

Table 3: Aoristic Occurrence Time for Commercial Burglaries

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
2400-0059	114.1	151.0	130.0	139.0	120.2	126.2	132.5	913.1
0100-0159	137.8	163.6	138.5	167.1	150.0	145.4	140.5	1,042.8
0200-0259	152.3	186.3	157.9	176.8	167.3	155.0	151.8	1,147.4
0300-0359	166.3	169.9	192.9	190.1	184.3	160.2	163.7	1,227.4
0400-0459	168.2	181.9	169.1	167.4	166.9	158.8	162.1	1,174.4
0500-0559	166.6	144.1	129.4	151.0	133.7	145.4	152.9	1,023.1
0600-0659	130.2	119.3	109.9	109.8	103.6	107.1	120.5	800.3
0700-0759	101.6	98.3	83.4	83.2	91.2	83.2	88.7	629.7
0800-0859	95.0	86.4	77.8	84.1	77.7	71.1	81.5	573.7
0900-0959	88.1	85.2	73.8	74.3	63.8	77.7	70.7	533.5
1000-1059	88.5	88.6	72.8	80.7	62.4	69.3	65.7	528.0
1100-1159	87.5	82.4	68.9	68.5	66.0	69.7	62.6	505.6
1200-1259	81.4	79.8	70.3	80.7	78.7	70.4	56.9	518.4
1300-1359	80.6	77.1	67.8	73.0	68.4	79.3	62.8	509.0
1400-1459	73.8	66.5	75.7	63.4	67.4	71.0	67.7	485.7
1500-1559	77.9	64.3	54.4	62.9	70.1	63.1	59.9	452.6
1600-1659	85.4	71.5	59.7	54.2	61.9	59.8	54.4	446.9
1700-1759	85.4	65.1	63.2	64.3	62.8	51.4	66.9	459.0
1800-1859	84.6	78.9	76.5	76.2	63.5	64.5	65.6	509.8
1900-1959	89.6	69.5	69.1	70.2	69.6	66.8	74.6	509.5
2000-2059	84.3	83.7	79.0	88.2	71.8	74.0	68.3	549.3
2100-2159	94.7	78.6	80.1	87.7	89.2	78.8	83.1	592.3
2200-2259	113.5	102.9	104.2	96.6	94.0	99.2	89.6	700.0
2300-2359	142.1	110.9	126.0	116.3	108.6	109.6	106.8	820.4
Total	2,589.4	2,505.9	2,330.8	2,425.9	2,293.1	2,257.0	2,249.8	n=16,652

Table 3 shows a similar analysis for commercial burglaries. In this analysis, we see a slight difference between the cross-totals and the detail. The cross totals show that the peak day for commercial burglaries is Sunday and the peak time is from 3:00 to 3:59

a.m. The detail shows that the peak is actually Tuesday from 3:00 to 3:59 a.m. The detail also explains that more commercial burglaries occur on Sunday during the day than on other days in the week, which explains why it is the peak day for burglaries. This analysis also fits with the assumption of burglaries occurring when businesses are closed (during the night and on weekends). The discrepancy between the details and the cross-totals also shows why the 168-hour time period may be important to use instead of shorter time periods such as just the hours of the day or the day of the week.

There is also another advantage to using a more detailed breakdown for analysis. When using a 168-hour breakdown, it is relatively simple to aggregate the data back to longer time periods to show other comparisons. In addition, the shorter time unit makes it easier to use a different starting point during the day to illustrate the cyclical nature of a time analysis.

Table 4 illustrates this by showing a comparison of the weekday average number of burglaries per hour with the weekend number. It also shows the cyclical nature by having each day start at noon instead of midnight. Note that the column for weekday burglaries shows the average per day, but the cross-sums totals for each row and column show the total number of burglaries by multiplying the weekday column by four.

Table 4: Evening Comparison of Aoristic Commercial Burglary Times

	Weekday	Friday	Saturday	Sunday	Total
1200-1259	77.4	70.4	56.9	81.4	518.4
1300-1359	71.6	79.3	62.8	80.6	509.0
1400-1459	68.3	71.0	67.7	73.8	485.7
1500-1559	62.9	63.1	59.9	77.9	452.6
1600-1659	61.8	59.8	54.4	85.4	446.9
1700-1759	63.8	51.4	66.9	85.4	459.0
1800-1859	73.8	64.5	65.6	84.6	509.8
1900-1959	69.6	66.8	74.6	89.6	509.5
2000-2059	80.7	74.0	68.3	84.3	549.3
2100-2159	83.9	78.8	83.1	94.7	592.3
2200-2259	99.4	99.2	89.6	113.5	700.0
2300-2359	115.5	109.6	106.8	142.1	820.4
2400-0059	128.9	132.5	114.1	151.0	913.1
0100-0159	150.2	140.5	137.8	163.6	1,042.8
0200-0259	164.3	151.8	152.3	186.3	1,147.4
0300-0359	181.9	163.7	166.3	169.9	1,227.4
0400-0459	165.6	162.1	168.2	181.9	1,174.4
0500-0559	139.9	152.9	166.6	144.1	1,023.1
0600-0659	107.6	120.5	130.2	119.3	800.3
0700-0759	85.3	88.7	101.6	98.3	629.7
0800-0859	77.7	81.5	95.0	86.4	573.7
0900-0959	72.4	70.7	88.1	85.2	533.5
1000-1059	71.3	65.7	88.5	88.6	528.0
1100-1159	68.3	62.6	87.5	82.4	505.6
Total	9,367.8	2,281.1	2,352.7	2,650.4	n=16652

Figure 1 shows this analysis in a graphical format that makes the similarities and differences clear. The number of burglaries is plotted by hour and day, with the weekday average per day shown by an orange line, the number for Friday shown with a green line, the number for Saturday shown with a blue line, and the number for Sunday shown with a red line. The orange line is dashed because it is an average of four days and this will help distinguish it from the solid lines that represent a single day. This graph illustrates that, on average, slightly more commercial burglaries happen on Sunday night Starts to increase earlier than other nights and peaks earlier than other nights.

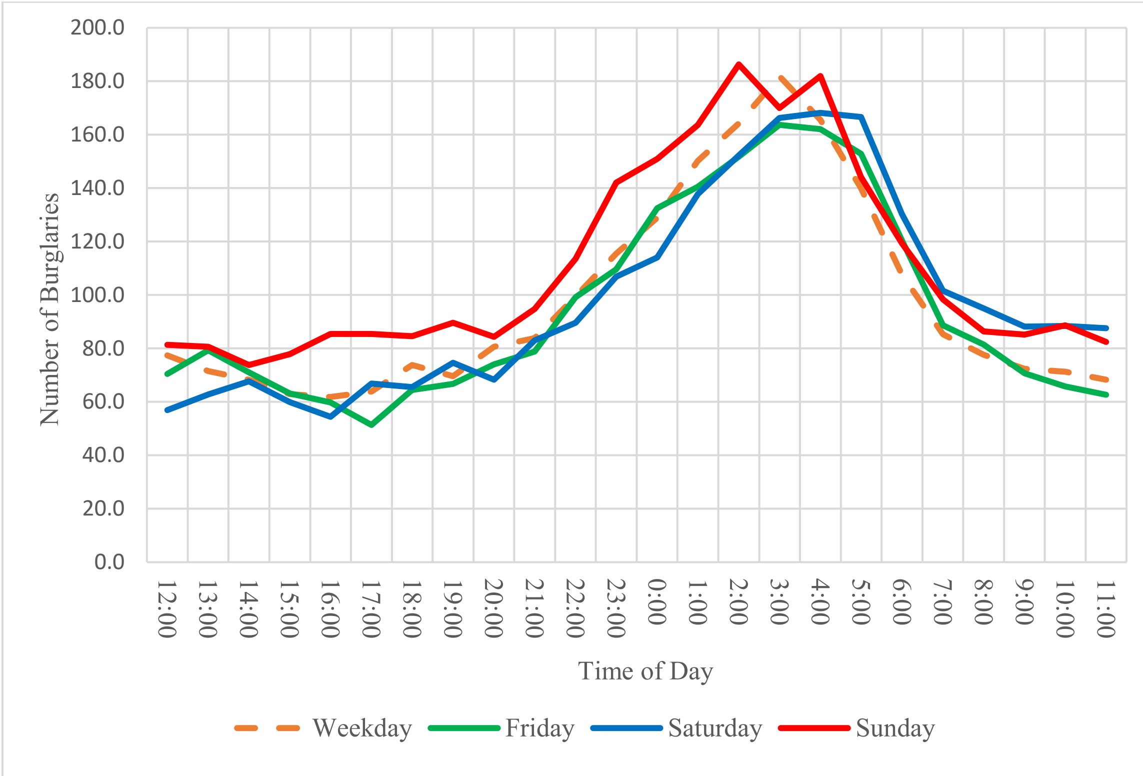

Figure 1: Commercial Burglaries by Aoristic Time of Day

The graph also shows that there is an unusual double peak in the number of burglaries on Sunday night and Monday morning with a decrease between the two peaks. The first peak occurs at approximately 2:00 a.m., followed by a decrease in number of burglaries for one hour at 3:00 a.m. The number of burglaries then climbs to a second peak at around 4:00 a.m. Monday, and then decreases for the rest of the morning. The peak number of burglaries otherwise is a wider peak on weekends than the weekday peak, though the weekday peak is a higher number than any other day except Sunday night. This time scheme would fit with the knowledge that more businesses are closed during those hours than others and that burglaries occur most when businesses are closed.

Burglary has been studied as a subject of academic interest on its own merits but there is very little research comparing the temporal patterns of burglaries to those of alarms. This dissertation will examine six of the factors that have been identified as affecting whether burglaries occur and identify how time patterns coincide between burglar alarms and presumed burglaries. The factors to be examined are:

1. whether the target is a commercial or residential building;
2. the number of burglaries in the area;
3. the proximity of the target to a school;
4. the proximity of the target to a bar;
5. the proximity of the target to a rapid exit from the area; and
6. the number of repeat or near repeat burglaries in the area.

These factors help compare timings of alarms and burglaries, with data available to make the comparisons.

Some of the factors identified as affecting burglaries are not available in the data used for this study. For example, Roth and Roberts (2017) found that burglar decisions to target a building relate to whether or not the building is occupied, the relative ease of access to the building, and the approximate market value of the building. The current dissertation draws data from the San Antonio Police Department, but these data do not include the variables measured by Roth and Roberts.

Target Type: Commercial or Residential

Burglaries are often classified by whether the target is a residential building or a non-residential (usually commercial) building. For example, the Texas Penal Code raises the grade of offense if the building is a habitation, which is defined as “a structure or vehicle that is adapted for overnight accommodation of persons" (Texas Legislature, 2015). The Federal Bureau of Investigation (FBI) Uniform Crime Reporting (UCR) system, however, does not make this distinction in its data collection (2017).

The majority of research on burglary does maintain this distinction. While most of the literature available tends to focus on burglary of residential properties, a few studies look for differences between residential and commercial burglaries and why those differences may exist. One possible difference in the offenses is that commercial buildings are more often vacant at night while residences are usually vacant during the daytime (Butler, 1994). It is also possible that different offenders commit residential as opposed to commercial burglaries. Butler interviewed convicted *commercial* burglars and found that the burglaries were usually planned in advance. He found that the burglars had concerns with the security in place, including alarms, guards, internal secure storage of valuables, lights left on, and cameras in use.

By contrast, Reppetto (1974) interviewed convicted *residential* burglars. He found that there was less planning of residential burglaries and that where the crime was planned, there was an age difference in the burglars. Older burglars tended to do more planning. He also found that the primary security concern was to avoid the resident. Reppetto's research was conducted before home alarms were widely used.

A more recent study still found that planning is uncommon for residential burglaries. Cromwell, Olson, and Avary (2003), interviewed residential burglars and verified earlier research that the planning consisted primarily of having a pre-determined template of a desirable target and refining the template through experience. They found that residential burglars made most of their decisions based on their observations of the risks at the time of the offense.

The literature on near-repeat victimization offers a third reason to look for differences in offenses. This theory says that a structure is more likely to be burglarized if a nearby similar structure was recently burglarized, and research indicates that to be true (Townsley, Homel, & Chaseling, 2003). Several reasons have been offered for near-repeat victimization, including the presence of similar structures. Repeat and near-repeat victimization is further discussed below.

The data used for this dissertation was provided by SAPD. As a Texas police department, its classifications are based on Texas law. Burglary reports are separated into commercial or residential burglaries. SAPD also recognizes a unique difference for alarm calls, separating them into commercial, residential, or governmental buildings. For the purposes of this dissertation, governmental buildings are combined with commercial buildings and are treated as part of the commercial group.

Figure 2 is a line graph of the aoristic times of occurrence of the burglaries, based on data provided by the San Antonio Police Department (SAPD). It shows one line in blue for the commercial burglaries and one line in red for the residential burglaries. The probable number of burglaries forms the y-axis for the graph, while the time of day and day of week form the x-axis. In this graph the x-axis is the 168-hours in a week, beginning at 12:00 a.m. on Sunday.

The number of residential burglaries in San Antonio greatly outweighs the number of commercial burglaries in the comparison, so they cannot be compared very well on the same scale. To make a visual comparison simpler, we multiplied the number of commercial burglaries by two and then replotted the time pattern. This allows the temporal patterns to be compared on one graph. Looking at the patterns shown on the graph makes the difference between the two types of burglary very apparent.

As would be expected from the factors listed above, commercial burglaries occur at very different times of day from residential burglaries. The residential burglaries tend to show large spikes in occurrence during the weekday late morning to early afternoon while the commercial burglaries tend to spike during the early morning hours and show greater numbers occurring on weekends. This result is also what would be expected based on the literature on burglary timings (Yu & Maxfield, 2014).

With timing of alarms and burglaries and the factors associated with the timing as the primary focus of this research, this dissertation will recognize that commercial burglary is a separate offense from residential burglary and will maintain the commonly accepted practice of examining them separately.

After deciding that the two types of burglaries are to be examined separately, the question then arises if the two types of alarms are also different. While there is the argument that the alarms should be separated to maintain the relationship to the type of crime, that argument presumes there is a relationship between alarms and burglaries. If there is not a strong relationship between the two, there may not be the same difference between when the alarms occur.

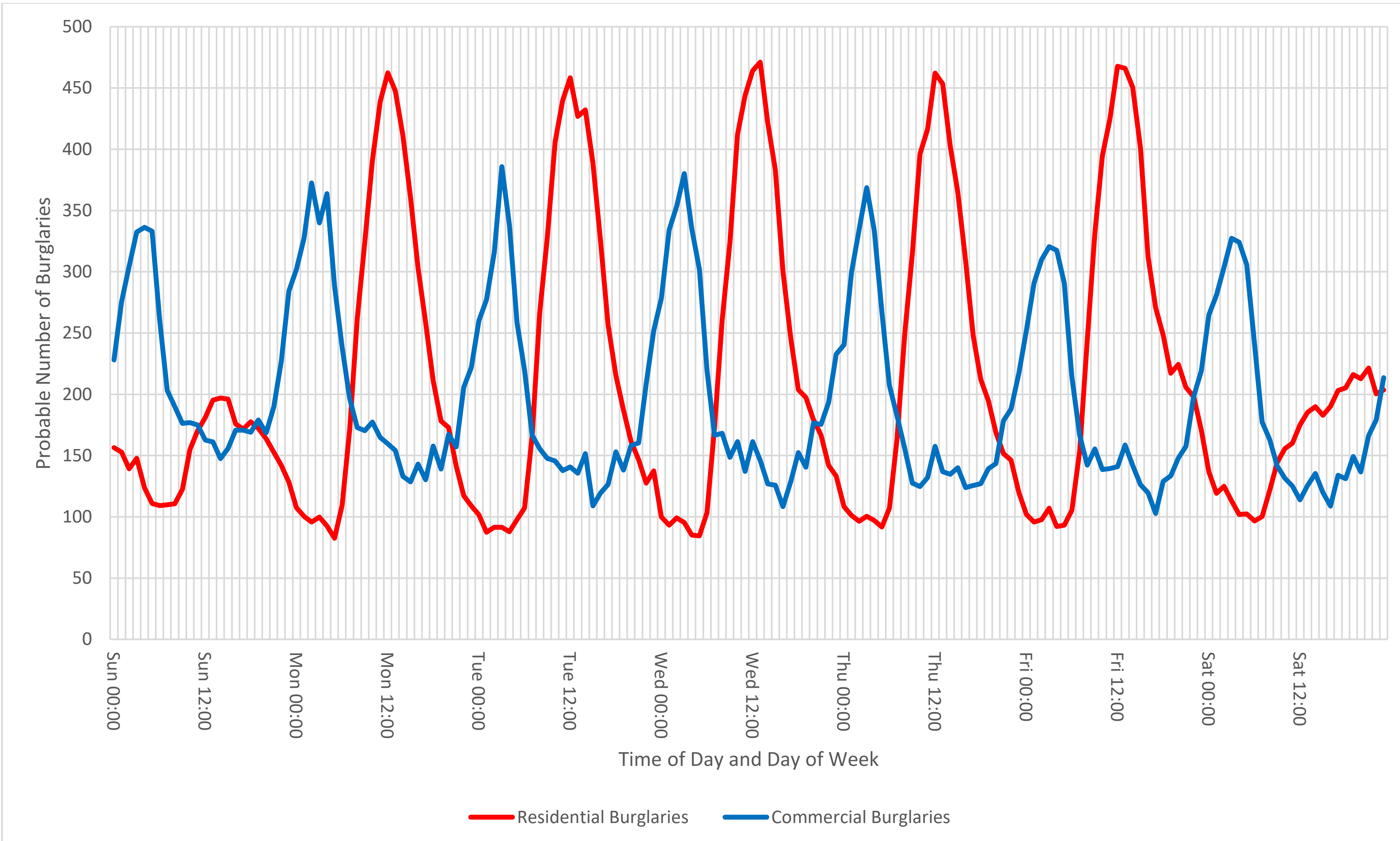

Figure 2: Aoristic Occurrence Times for Burglaries by Target Type

On first examination, it appears logical that the alarms should occur when businesses are closed and people are not home and that this implies the relationship to burglary. There is a difference, however, between the two types of alarms that could create doubt about the relationship to residential burglary. While most businesses cannot have an alarm turned on if they are open for business, this is not true about residential alarms. Residential alarms are designed and advertised for use while people are at home as well as when the home is empty.

The residential alarm has an "away" mode and a "stay" mode (ADT, 2018). In the away mode, there is a perimeter alarm that attempts to detect entry as well as an interior motion alarm that sounds if any motion is detected in the home. In the stay mode, the perimeter alarm is the only part armed, so that the resident may be home and moving about without tripping the alarm.

This difference in the design and use of the alarm types indicates that we should keep the distinction between commercial and residential alarms when studying alarms. It indicates that there may be a relationship between commercial alarms and burglary that might not exist for residential alarms and burglary or vice versa. This dissertation will maintain the separate study of the alarm types as it does with the offense types.

High Burglary Areas

It has long been known that crimes tend to occur in close physical relationship to each other. This clustering was first described as events occurring in a high crime area. As early as 1960, sociologists were attempting to define how crime was limited to specific parts of a city by analyzing both the amounts and types of crimes and the area demographics (Schmid, 1960). These studies compared relatively larger neighborhoods. More modern crime mapping techniques allow researchers to assign crimes to smaller parts of a city, such as blocks, intersections, and block groups. These studies revealed crime to be more concentrated than previously thought. That led to hot spot theory, which says that crime is concentrated in a small number of places. Even in what appears to be a high crime neighborhood, most blocks have little or no crime (Braga, 2012).

If, as shown above, fear of crime is based on the amount of crime in the area, there should be more alarm installations in a high burglary area. This point was verified in by Lee (2010a) in a study on factors affecting alarm installation. He found that a one unit increase in the residential burglary rate increased the alarm installation rate by 14%. With the increase in alarm installations should come an increase in the number of alarm calls to the police.

Lee also found several factors that moderated the relationship between burglary rate and alarm installation rate. These factors included the race and age of both the population and of the homeowners and whether the property was owned or rented. Younger residents tended to install alarms more often than older residents, as did property owners when compared to renters. It is not known if any of these factors will affect the temporal pattern for alarms.

There is some controversy over the concept of crime hot spots, but it appears to focus more on the effects of police changing their patrol tactics to incorporate hot spot policing. Police agencies responded to the recognition of hot spot policing by assigning more officers to the areas where the hot spots existed in an attempt to reduce crime in those spots (Lazzati & Menichini, 2016). The controversy over police tactics is not relevant to the subject studied in this dissertation.

While the data may be examined by several different geographical areas, the smallest area defined by the data is the police patrol district. This is the area assigned by the department to one officer for patrol and call responsibility. There is a problem with using patrol districts as the area for a comparison. In SAPD, patrol districts are drawn in an attempt to even the work load for each patrol officer. In addition to the size of the area and physical barriers to movement (railroads, highways, streams, etc.) the number and types of calls are already calculated into the district size. Since districts are drawn to make the workload equal, one district may have more burglaries than a second, while the second may have more traffic accidents than the first. These two districts might have similar man-minutes of work per shift, even though one is a high burglary area and the other is not.

Hot spot theory implies that the police patrol district should not be used for the comparison. The theory says that there could be a lot of burglaries in a few blocks of an otherwise large district. Because the police districts are already present in the data as geographical areas and the researchers were not able to identify burglary clusters, this dissertation will use those police districts to specify high, mid-range, or low burglary areas. The temporal patterns for burglaries and alarms will be compared based on the number of burglaries in the patrol district.

Repeat and Near Repeat Burglary Patterns

An outgrowth of the recognition of hot spots for crime was the realization that crimes may be repeated within a relatively small time at the same location or other locations very close to it. This phenomenon is known as repeat and near repeat victimization.

Repeat victimization occurs when a single location is the victim of a second similar crime within a short time period. Near repeat victimization occurs when a second location in close physical proximity to the first offense suffers a similar offense within a short time period of the first. This is known to be a factor in whether or not a burglary will occur. Both a person or business that has been victimized and the neighbors nearby are at elevated risk of burglary for a short time period after the original burglary (Johnson et al., 2007).

Repeat and near repeat victimization was first studied in an effort to reduce crime. It was believed that if repeat victimization could be prevented, a large amount of crime would be prevented. In one crime survey, 70% of the crime was experienced by only 14% of the victims (Farrell, 1992). One of the responses to burglary is to install an alarm (Weisel, 2004).

While this would normally lead to a direct relationship between the number of burglaries in an area and the number of alarm calls, this may not hold true. In Lee's (2008) study on the impact of alarm installations on burglaries, he found there was a negative relationship between the presence of a hot spot for burglaries and the presence of a hot spot for alarm installations. While other factors have also been shown to affect the installation of alarms, a relationship where burglaries occur more if there are fewer alarms implies that the presence of an alarm system does prevent burglaries.

Farrell, Phillips, and Pease (1995) tie both routine activities theory and rational choice theory into why this is likely to happen. They cite research from Polvi, Looman, Humphries, and Pease that said the repeat victimization is possible because the first burglar told others about what was left, the first burglar recognized more opportunity for crime getting remaining property, or that features of the property make it an attractive target to other burglars also. If repeat burglaries are occurring because it was the first burglary returning or because the first burglar told others about the property, it may be possible that the repeat burglary is happening at close to the same time as the original. This may be a different time pattern than the burglaries that are not repeat burglaries.

There is some question on what percentage of burglaries are repeat burglaries. One study on how often repeat burglary actually occurs concluded that in some nations repeat burglaries constitute almost half of all burglaries, as opposed to the approximately 20% that show as repeats in police data (Frank, Brantingham, & Farrell, 2012). This study defined actual burglaries as the crimes that occurred, whether or not they were reported to the police. The authors assumed that all crimes are reported with the same frequency, whether they are the first crime or not. They then created a model for calculating how many actual burglaries occurred and showed that repeat crimes are much more frequent than believed from the initial list of police calls.

Demers (2016) felt that the model proposed in Frank, Brantingham, and Farrell's study did not properly account for the calculation of the odds of reporting multiple victimizations. He noted that the original study had shown that it was unlikely that a repeat victim with a high (above 6) number of victimizations would report all of the offenses to the police. He also noted that the math implied that it was highly unlikely that they would report none of the offenses and felt that the model ignored this factor. Demers noted that this was mentioned by Frank, Brantingham, and Farrell as a limitation of the study. Demers proposed a model that weighed the factors differently and concluded that only 30.8% of the actual burglaries are repeat victimizations. He did agree that this is still a significant difference from what is initially apparent from the police data.

In addition to the evidence showing that crimes tend to occur in close geographical relationship to similar crimes, there is the above-mentioned study by Townsley, Homel, and Chaseling (2003). This study showed that there was both a geographical and temporal relationship between burglaries. They studied burglaries in Brisbane and found that the more homogenous a neighborhood was in terms of housing design, the higher probability of a burglary resulting in increased risk to nearby houses. They theorized that the repeat burglary risk is transferred to other nearby houses when they are designed alike because there is less to distinguish one house from another to make it a preferred target.

There are a few problems in measuring the effect of near repeat victimization on burglaries. The first problem is the operationalization of what is "near" in terms of both distance and time. The second problem is the previously mentioned problem of knowing when a burglary occurred. Recognizing these problems, Johnson, et al. (2007) studied residential burglaries in 5 different countries using various time and distance definitions. They studied distances from 100 to 2000 meters and from 1 to 70 days. The researchers concluded that there was always an elevated risk of burglary to locations within 100 meters of the primary burglary for the first 14 days after the initial offense. They did note that the density of the buildings affected the distance decay. The researchers noted the problem of defining when the burglary occurred and noted that most police reports used a time range with a beginning and end date and time. They chose to use one of these two times and held the same choice for all occurrences.

For defining repeat and near repeat residential burglaries, this dissertation will use the two-week time frame and the 100-meter distance shown as defined in the Johnson, et al. study. Noting that many commercial businesses are larger properties than residences, therefore having a lower density, this dissertation will use a larger distance of 200 meters for commercial burglaries while still maintaining the two-week time frame. In all cases, this study will be based on the beginning time from the police report.

The findings on repeat victimization and alarm installations imply that there would be fewer repeat burglaries and more alarm calls in that area. If people are installing alarms to prevent the repeat burglary, an alarm at the same location could be expected in near time to the original burglary. This may be partially verified by a study done by Le Beau and Vincent (1997). They studied repeat burglaries and repeat alarms in Charlotte, NC. In particular they tried to map repeat alarms to repeat burglaries. As part of the study, they separated those locations where there were both reported burglaries and reported alarms. While they did not check the timing of the events, they did find that there were 8,116 burglaries during the time period studied and that 542 of these were tied to repeat burglar alarm calls. They also noted that even in those cases, there were at least 75% false alarm calls.

Additionally, if the neighborhood is aware of the first burglary and the findings on the fear of crime are correct, we can also expect to see increased alarms and fewer near repeat burglaries as the alarms work to prevent those near repeat burglaries also. In both cases (the installation of an alarm as a result of being victimized or as a result of a neighbor being victimized), the timing of these alarm calls in lieu of the burglary should match when the burglaries would have occurred.

A different problem occurs when studying repeat alarms that does not occur when studying repeat burglaries. A mechanical malfunction can sound several repeat alarms at the same location until the malfunction is repaired. The timing of the repeat alarms would have nothing to do with the timing of burglaries. Because of this, this study will study alarms that are repeat or near repeat to a reported burglary. It will not include alarm calls that are repeat or near repeat calls only to another alarm call.

Pattern: The Proximity to Schools

Roncek (1981) documented an important pattern – the proximity of crime to schools. In a later study, Roncek and LoBosco (1983) found that public high schools tend to increase crime in their area, with the highest crime being in the blocks adjacent to the school. The authors theorized that this occurred because public schools tend to bring more people into the area and there is less social control over the use of the school. They noted that private high schools do not appear to have the same effect on crime and theorized that this is because there is a greater degree of social control on the private high school grounds.

Private high schools also tend to be smaller in size, both in physical size of the buildings and lots and in the size of the student body. This could also contribute to the lower effect on crime, as fewer primary individuals are brought into an area by private high schools.

The effects noted in Roncek and LoBosco’s study were verified and expanded slightly in a later study. Research by Roncek and Faggiani (1985) verified the effect of public high schools on burglary rates in a different city. This study showed that the theory could be generalized to another city and verified that other land uses did not affect the crime around public high schools. The second study also verified that the effect was limited to public and not private high schools.

A study by Chamberlain and Boggess (2016) showed the continuation of the social control aspect of burglary. When studying how burglars decide where to target, they found that burglars are more likely to target areas with low social cohesion, especially if they perceive the cohesion to be lower than in their own neighborhoods. If this is combined with the lowered social control in public high school areas that was theorized by Roncek and LoBosco above, it would support the concept that there is a relationship between the proximity of a building to a public high school and its likelihood to be burglarized.

There is no direct research on the effects of social cohesion on either alarm installations or police calls for alarms. It is unknown if there is a direct relationship between the two, but given the relationship between burglary and alarm installations, it is possible that there is an indirect relationship between the two. Lee (2010b) looked at the installation of alarms in neighborhoods and individually considered some of the factors that contribute to social cohesion. While not combining the individual factors to indicate a social control variable, he found that race, unemployment, median income, age, and home ownership all affect alarm installation. By looking at his results, we can conclude tentatively that social cohesion in a neighborhood affects alarm installations and that the higher the level of social cohesion the fewer the installations of alarms.

This dissertation is comparing temporal patterns between burglary and alarm calls. As such, the information on the factors affecting burglaries is being presented as a background for discussion of that relationship. If the factors affecting if burglaries occur also show an effect on the timing of burglaries, a comparison of the timing of alarm calls with the same factors will help show any similarities between burglaries and alarms.

Pattern: The Proximity to Bars

There is some debate in the literature concerning whether or not businesses have an effect on burglary occurrence. A study on land use attempted to differentiate the effect on crime between commercial land use that catered towards residents (such as bus stops) and commercial use that did not cater towards residents (such as stores or bars). It found that business places, and specifically bars located within 3 blocks, did increase the chances of burglary (Wilcox, Quisenberry, Cabrera, & Jones, 2004).

A later study of land use attempted to control for the possible neighborhood guardianship effect of businesses in an area. This study found that the number of businesses in an area acted as an aggregate form of guardianship and did not increase the chances of a burglary (Wilcox, Madensen, & Tillyer, 2007).

Other studies, while not specifically mentioning bars, seem to indicate that the presence of a bar would affect the odds of a burglary. Brantingham and Brantingham (1993) applied routine activities theory in a study of crime and found that zoning boards contribute to the odds of crime by keeping commercial land use in one area and residential in another. This has potential burglars walking past the same potential targets as they go about their daily activities and crime generally increases along those routes.

Another study pointed out that certain businesses, including bars and bar districts, are crime attractors (Brantingham & Brantingham, 1995). A crime attractor was defined as a location where people go when they are looking to commit a crime and the study used the example of someone looking for a fight going to a bar. A side effect of crime attractors is that while the criminals are in the area looking to commit a crime, they may commit other crimes not related to the first, thereby increasing the crime rate for the area.

A more recent study may shed some light on the opposing results found in the literature. This study first noted that most prior studies did not separate commercial and residential burglary or focused solely on residential burglary (Yu & Maxfield, 2014). It also noted that most prior studies did not consider many aspects of the businesses other than the type of business. This study suggested that factors inherent in whether or not a business affects crime in an area is dependent on the size of the business as measured by the number of customers, whether or not the business serves local residents or attracts others to the area, and whether or not the business sells products or services intended for on-site use. Controlling for these factors, this study found that bars and restaurants tended to affect commercial burglary rates but not residential burglary rates.

The literature tends to indicate that there is a relationship between proximity to bars and the chances of being burglarized. This is especially true for close proximity and for commercial buildings. This dissertation will consider proximity to a bar as one of the factors affecting the burglary rate.

As with other factors shown in this dissertation, there is a dearth of research on the effects of commercial land use on alarm installations. Studies on factors affecting alarm installation, such as those by Lee (2008, 2010a, 2010b), tend to focus on residential alarms because commercial alarm use is so prevalent compared to residential installations. They also tend to focus on the characteristics of the individual property instead of what is located around it.

This dissertation will study the proximity of bars to locations of alarm calls and burglaries for both commercial and residential properties. Since the literature tends to indicate that a close proximity is affected while more distant properties are not, the study will compare the timing of alarm calls and burglaries based on a near, medium, and far distance to the nearest bar. If the timings are similarly affected, it will help show the similarity between burglaries and alarm calls.

Pattern: The Proximity to Escape Routes

Environmental criminology is the study of how variations in the local environment affects the likelihood that crime will occur and where it will occur (Bruinsma & Johnson, 2018). The street networks in an area describe the paths anyone must take between two points, including both pedestrians and vehicles. As such, it is natural to study these networks and their effect on crime (Davies & Johnson, 2015).

Davies and Johnson analyzed residential burglaries and the street networks for the city of Birmingham, U.K. They defined a street segment as any distinct portion of a street between two points and a street junction as any point where two street segments met. Their study included notations on the characteristics of each street segment, such as pedestrianized road, local street, or highway. They then calculated how likely the segment was to be used in a path between two points. They found that the more often a segment was used in a path, the higher the likelihood of a burglary along that segment.

Another way of viewing this finding is that proximity to a larger thoroughfare affects the odds of being burglarized.

One of the limitations of Davies' and Johnson's methodology is that the likelihood of a segment being used in a journey is significantly greater for people living in the area. Vandeviver, Van Daele, and Vander Beken (2015) studied what factors affect burglaries when the burglar is making a long-distance trip to commit the crime. Their study examined how criminals make the decision on what areas to target based on a rational choice framework. They found that if a neighborhood had access to a highway, it had a higher likelihood of burglary occurring.

Beavon, Brantingham, and Brantingham (1994) studied street networks at the segment level for their impact on all property crime in the area as opposed to just burglary. They compared the number of turns into a street segment and the traffic flow on the segment with the amount of property crime on the segment. As they expected, there was a positive relationship between traffic flow and the number of turns into a segment. Within the limits of their study, they found that there was a positive relationship between the higher traffic flow and the amount of crime, though other factors might be stronger indicators. This also indicates that proximity to a major thoroughfare affects the odds of being burglarized.

One of the important limits that the authors noted was that street networks design only impacts offenders using automobiles or public transportation that is confined to street usage. They illustrated this point by saying that juvenile offenders may commit more of the property crime like bicycle thefts, but they did not drive so the street network did not show this relationship. They suggested that the juveniles traffic patterns and restrictions might show the same effect on the crimes they commit. While people walking or using bicycles are not restricted by traffic laws, the habits developed in travelling will tend to keep them on the same routes (major thoroughfares for example) when walking.

There is at least one study that directly relates the distance of the target house from a highway entrance ramp to the chances of being burglarized. Rengert and Groff (2011) noted that previous studies had shown a relationship between street networks and burglary. They theorized that if a burglar is familiar with a neighborhood, he might be more willing to use the back streets but if he is unfamiliar, he would stay with streets giving him easy access to an exit from the area. After studying burglaries in Greenwich, Connecticut, Rengert and Groff found that houses which had a highway at the rear had a significant relationship with the odds of being burglarized. They also found that the further from a highway entrance ramp the house was, the less likely it was to be burglarized.

One study noted that there are disagreements in the literature on whether or not accessibility affects the burglary rate or not (Ward, Nobles, Youstin, & Cook, 2014). The authors first noted that most of the foundational level studies say there is a relationship while many second-generation studies disagree. They theorized this may be due to methodology differences but it might also be due to confounding factors that were not accounted for in early studies. They tested if the socio-economic status of the neighborhood affected the relationship between crime and accessibility. To test this theory, the authors constructed a variable for concentrated disadvantage based on the percent of the neighborhood in poverty, the percentage unemployed, and the percentage of Black residents. The study found that the effect of network accessibility is conditioned on the amount of concentrated disadvantage in the neighborhood. Specifically, if the neighborhood is highly disadvantaged, the amount of accessibility decreases the burglary rate and if in low disadvantaged neighborhoods, the burglary rate is positively linked with the burglary rate.

As with other factors, there is a dearth of research into whether or not there is a relationship between the street network and alarm calls. If there is a relationship, it will be shown when the timings of alarms are compared based on the proximity of the escape route.

This dissertation will consider the accessibility of a property as a factor affecting the odds of it being burglarized. It will not take into account the amount of concentrated disadvantage in a neighborhood because that is not included in the data received from the police department. The study will measure the straight-line distances of the properties to the nearest point on major thoroughfares to check for timing differences. The alarm calls and the burglaries will be measured and compared for near, medium, and far distances. The comparison of the effects of distance on the two types of events will be used to show if the timings are similar.

Chapter Conclusion

While understanding the lack of research into factors affecting when burglaries occur, this chapter has reviewed the factors known to affect the odds of a burglary occurring and reviewed how alarms might be affected by the same factor. The factors reviewed include the:

1. target type (commercial or residential);
2. high burglary areas;

3. repeat and near repeat burglaries;
4. proximity of the target to a public high school;
5. proximity of a target to a bar; and
6. proximity of the target to a rapid escape route from the area.

In reviewing the target type, the chapter showed how commercial and residential burglaries occur at such different times that they should be considered individual crimes. The review showed how high burglary areas might affect whether burglaries or alarms are occurring.

The chapter explained the phenomenon of repeat and near repeat burglaries. The largest problem in this part of the study is the definition of “near” in time and space. The chapter explained that a two-week period will be used for the time study and the distance of 100 meters will be used for near repeat residential burglaries while 250 meters will be used for commercial burglaries.

In reviewing the proximity of the target to bars, public high schools, and escape routes, the chapter showed how the burglaries and alarms would be grouped into three groups for near, medium, and far for each factor to check for differences in timing.

This chapter thus defines which analyses will be performed to compare temporal patterns for police-coded burglaries and alarms, taking these spatial features into account.

III: BURGLAR ALARMS

This dissertation compares temporal patterns of burglar alarms to temporal patterns of police burglary counts. We pay close attention to whether alarm patterns are parallel to burglaries reported to the police. Although we cannot be sure which burglaries are real and which alarms are false, we can measure and compare their patterns in time and, to some extent, space. That gives us a window into false alarm patterns, too.

Background

A burglar alarm is a system used to detect the entry or attempted entry of an intruder into a protected premise and to signal the detection to others, either locally or remotely (Lee, 2008). The system consists of a component used for detection, a control component, and a component for reporting the detection.

A locally monitored alarm is one that only shows the detection in the area of the protected premises and depends on a person in that area calling the police to notify them of the alarm. In many cases, this consists of a flashing light and a siren but one special form of locally monitored alarm is the ownership of animals. Various animals have been used for quite a long time as alarms, including geese (Bailey, 1981) and, more recently, dogs (Garofalo & Clark, 1992). Locally monitored alarms based on animal ownership are not included in this study because the neighbors reporting the alarm to the police usually report it as a noise complaint (e.g., dogs barking) instead of recognizing it as a burglar alarm. The data provided are unable to differentiate which noise disturbances were caused by animals responding to an intrusion detection or other stimulation.

As with almost any type of test, burglar alarms no not always correctly determine that a burglary has occurred. Incorrect determinations include false positives and false negatives. The term "false alarms" is almost always associated with false positive alarms. False positives are the cases where the alarm detected an intrusion attempt that, in fact, did not occur. False negative alarms occur when the alarm system fails to detect an intrusion attempt that did occur in fact.

Figure 3 shows the possible relationships between alarms and burglaries. This diagram is not drawn to scale and is use just to illustrate the possible relationships between calls to the police for alarms and calls to report burglaries. The area in the green circle is used to represent all of the burglary calls the police receive. The area in blue represents all of the alarm calls the police receive. The junction between these two areas represents the number of burglaries the police find as a result of alarm calls. This area is the true positive or real alarm calls. The blue area that is not in the junction with the area for burglaries represents the alarms the police have classified as false alarms. False alarms calls are the false positives for alarms.

The area in red represents burglary calls where the police did not get a call for an alarm but the system had an alarm that was turned on. This is the false negative for alarms and there are several possible reasons for them. The alarm could have malfunctioned, been improperly designed or set, or been defeated by the criminal. The last area is the yellow area which represents calls where the alarm sounded and police labelled it as a false alarm but there really was a burglary or burglary attempt. Possible reasons for this include that the police were unable to check the entire building or that it was an attempt that failed and police could not find the evidence of the attempt. If there are enough burglaries that are incorrectly coded as false alarms, then this may affect the temporal pattern of alarms and make it more similar to the burglary pattern.

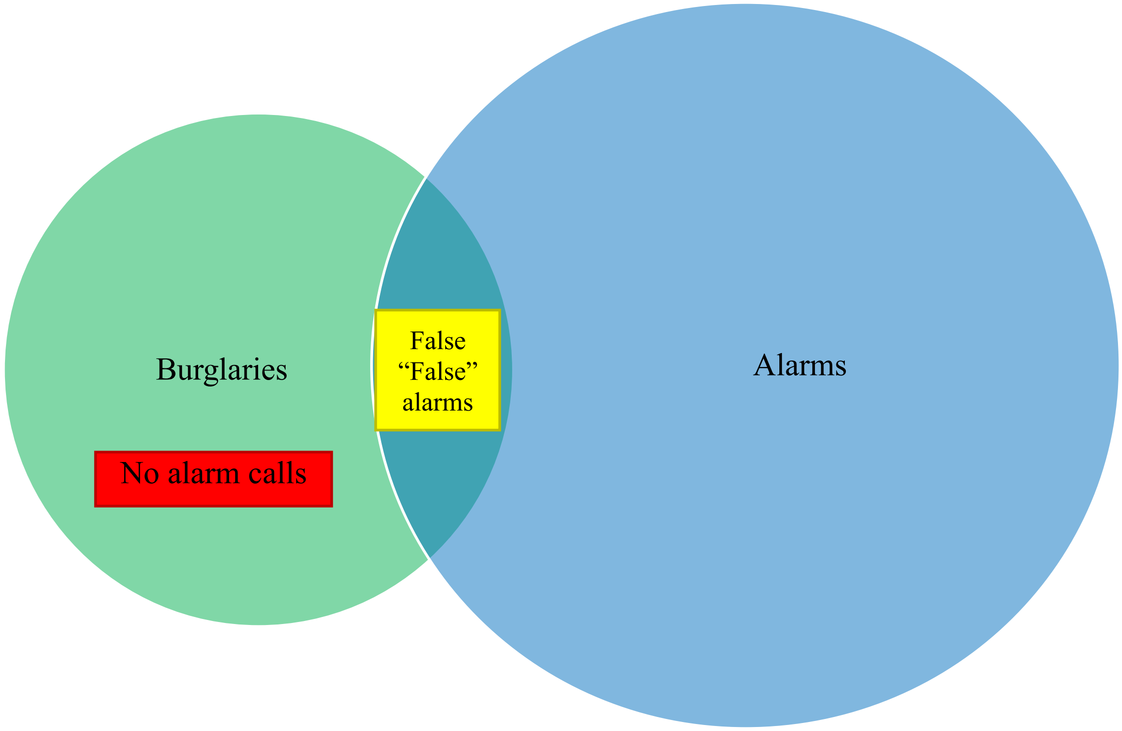

Figure 3: Possible Alarm - Burglary Relationships

While the owners and alarm companies may be concerned with false negative alarms (failing to detect an intrusion), both the problem for the police and the proposed use of information provided are dependent on alarms that report an intrusion when no such offense occurs (false positives). A false negative may never get discovered if the intrusion attempt was not successful and did not leave damage to the property. When it is discovered, it may be reported to the police as a burglary or attempted burglary but it may also be reported as vandalism (in Texas the proper name for this crime is criminal mischief).

There is some disagreement with the definition of what is a false alarm. The alarm industry does not agree with the police that any call for an alarm where the police do not find evidence of an intrusion or intrusion attempt is a false alarm. They would prefer to define false alarms solely as calls where there was a mechanical malfunction that tripped the alarm. They argue that alarms can be activated by vibrations from trucks driving by, but that these are not false because the system worked as designed (Institute for Local Self Government, 1977).

An additional argument is that basing a false alarm rate on just calls for alarms provides an inaccurate picture of how alarms work. This is because it does not count the number of alarm systems installed. The alarm industry preferred method is to develop and report an “alarm factor”, which is the number of operator-handled incidents per month divided by the number of alarms monitored by the company (Matlock, 2010). For example, seven alarm calls in one month for a company that has 10 alarms is an alarm factor of 0.7. A recommended alarm factor for residential alarms is 0.33 and for commercial alarms is 0.75. It is important to note that these are the incidents handled by the alarm system operators and not every incident will result in a call to the police. The police could develop an alarm factor for their agency only if they have some method of knowing how many alarms are installed.

This dissertation, as is common for the literature, uses data from a police department to determine what is a false alarm. The police definition of a false alarm is based on what they know at the time they handle the call. The data do not distinguish mechanical malfunction from user error. Therefore, this dissertation will continue to use the police definition of a false alarm as any call for an alarm where no evidence of an intrusion attempt is found. However, these are treated as “presumed” false alarms with no claim of absolute knowledge that they are false.

The current data do not allow us to determine whether a burglary location has an installed alarm system, unless an alarm was tripped. This makes it impossible to count case where there was an intrusion attempt that the alarm system did not detect (false negative alarms). Unless specifically noted otherwise, the general consensus of the literature is to use the term false alarm to refer to false positive alarms. Based on the data used and the consensus in the literature, this dissertation will use the term false alarm to refer to only those alarms that were reported to the police and were coded as false alarms (false positives).

Considering that alarms are installed, at least partially, in response to the fear of property crime (Yuan & McNeeley, 2016), an examination of the relationship between alarms and burglaries must include the interaction between people and alarms. This examination should separate the reactions of burglars to alarms, police to alarms and alarm calls, and victims or potential victims of burglary to alarms. The examination should include whether alarms help prevent or reduce burglary by examining how burglars react to the presence of alarms, if alarms help police apprehend burglars by examining police reactions to alarm calls, and if alarms help make citizens feel safer.

Burglars Attitudes Towards Alarms

Alarms clearly affect the way burglars behave. They will try to avoid targeting buildings that have alarms installed. Buck, Hakim, and Rengert (1993) studied burglaries in three suburbs of Philadelphia, Pennsylvania. This study was predicated on the belief that burglars use rational choice processes in their decision making. The authors specifically looked at what factors made a building more likely to be burglarized by comparing the buildings burglarized to the buildings not burglarized. They noted several factors such as the street design or the apparent value of the home affected the chances of being burgled. After controlling for factors they determined would affect the chances of being burglarized, they determined that the presence of an alarm reduced the likelihood that a burglar would choose that building as a target and that this was even more true when combined with other related factors, such as an alarm sign in the yard.

A more recent study in England found a slightly different result that still indicates that alarms affect the way burglars behave (Tilley, Thompson, Ferrell, Grove, & Tseloni, 2015). This study reviewed several years of data from the British Crime Survey and compared combinations of other increased security features (better locks, window locks, etc.) and the same increased security with an alarm. In the data from 1992 to 1996, when alarms were present in conjunction with other methods, the combination lowered the risk of the building being burglarized. However, in the data from 2008 to 2012, the presence of an alarm in combination with other security measures increased the odds of being burglarized over the combination of increased security features without an alarm. The authors added that some burglars might conclude from the presence of an alarm that the premises contained more valuable items. With no other target hardening factors present, this might increase the desire of the burglar to select that premise.

The best indicator of how burglars react to alarms might come directly from the burglars. In one survey of active residential burglars, conducted in St. Louis, Missouri, most often burglars said that they would avoid a house with an alarm (Wright, Logie, & Decker, 1995). The researchers selected a group of 47 people who admitted committing between 4 and 900 burglaries each. None of these subjects were incarcerated at the time of the study, though 9 had previously served time in jail for burglary and 13 had served time for other offenses. The subjects were asked to rate various features of houses that were thought to affect the suitability of the house as a burglary target. Alarms were rated as a detractor in 87% of the cases presented.

A different response was found in a British study of 50 convicted residential burglars, all currently imprisoned. Only 17 of the burglars said they always or sometimes avoided alarms (Nee & Meenaghan, 2006). The authors concluded that residential burglars primarily search for targets when about to commit a crime instead of pre-planning their burglaries. The lack of pre-planning might help explain the difference between the results of the studies. The difference might also be the result of surveying burglars who were in prison as opposed to those who were still in the community actively committing burglaries. This would lend credence to the claim that alarms help reduce burglaries by helping police arrest burglars.

An older study of convicted burglars by Brown and Bentley (1993) shows a potential response to alarms that is very relevant to the relationship between false alarm calls and burglaries. This study primarily focused on how territorial the burglars believed the residents of the area to be. The researchers found that one of the primary concerns of the burglars was if they could get in and out of the target without being caught. The burglars were concerned about the residency of the target, but were as concerned with if the neighbors would respond to protect the house also. If the burglar thought the neighbors would respond, they did not commit the burglary. This leads to the possibility that an audible alarm sounding during the initial attempt to gain entry would motivate the burglar to leave. If this happens early enough in the attempt, such as when a door is rattled to check for a lock, the responding officer would not find a burglary and might code the call as a false alarm. This type of event could cause the occurrence time of false alarms to match the occurrence time of burglaries.

Police Attitudes Towards Alarms

There are two separate views on alarms by police that should be considered. The police administrators will have one view to consider, while the officers on patrol who respond to the calls also will have a view to consider. These views may or may not agree.

Police Administrative Response. Police administrators view alarm calls as a type of call for service that must be answered. They see alarm calls as part of the services that the department provides that consume officers time and departmental budgets. Sampson (2007) points out that answering these calls is part of community-oriented policing. She also shows that they are seen as a problem because of the large number of false alarms (98% false) and the cost of responding ($1.8 billion in 2002).

Administrators have adopted several different policies in their attempts to "solve" the problem of false alarm calls. These responses have included verified response requirements (Sampson, 2007), requiring permits from alarm owners (Blackwell & Burns, 2008), and fines for false alarms (Gaines, Famega, & Bichler, 2007). As there is very little research on alarm permit systems that did not include penalties for excessive false alarms, this dissertation will consider them as one combined response. Neither verified response or fines have worked to eliminate false alarm calls, though they have had a moderate reduction (about 25%) in the number of false alarm calls (Sampson, 2007).

Verified response systems. One possible policy for police administrators to adopt is not answering alarm calls unless there is some other indication of a real crime.

The predominant version of this policy is a visually verified response system. Under this system, police do not answer the call for an alarm unless there are private security officers on the scene first.

The Las Vegas, Nevada, Police Department adopted this policy in 1991. Their policy requires the security company to respond and find some sign of a real burglary before the police respond. The security officers check the building but do not enter it if they find anything broken into. They secure the scene and wait for the police to arrive to check the interior of the building. This resulted in a savings to the police of over $600,000 and a decrease in police response time (Blackwell & Burns, 2008).

Salt Lake City, Utah, police adopted a verified response system in 2000 and found similar results. They estimated that they gained the equivalent of 5 full time officers on patrol, decreased workloads on dispatch staff, and decreased police response times on all other calls (Sampson, 2007).

A second version of verified response is somewhat less effective. In an audio verified response system, police do not respond to an alarm call unless there is some form of audio evidence from the alarm that indicates a crime is taking place. Cities (London, England; Fremont, California; Salt Lake City, Utah; Burien, Washington) that have examined or implemented audio verification found that they still had a false alarm rate from 80 to 92% (Sampson, 2007).

Other forms of verified response include waiting for a second alarm from the same location (for instance, a motion detector inside the property after a perimeter alarm is set off) or verification from the alarm owner that no one is at the premises. While the

IACP supports these policies (Sampson, 2007), there is little research into their effectiveness.

The Gaines, Famega, and Bichler study compared the effectiveness of various administrative policies adopted in attempts to reduce alarms calls. They found that verified response systems provided the best method of reducing alarm calls but they were vigorously fought by the alarm companies. The alarm companies would stoke the fear of crime to help stop the police from adopting verified response policies.

Alarm permit systems. Some police departments have worked with their local government to require permits for alarms. These ordinances usually provide some form of penalty for false alarms. There are generally three types of penalty schemes used in Texas police responses (Blackwell & Burns, 2008). A department may levy the same fine for every response to a false alarm, it may level increasing fines based on the number of false alarms, or it may allow a certain number of false alarms with no penalty and then fine based on the number of calls over that number. Some departments do not charge for false alarm responses.

In 1997, the City of Memphis and Shelby County in Tennessee adopted policies requiring permits for alarms and fines for excessive false alarms. They formed a joint office to manage the permits and fines. A review of this policy found that while there was a small reduction in alarm calls, the policy was not truly workable as implemented (Forde & Hellerman, 2004). The authors recommended either a complete restructuring of the permit ordinances or doing away with the office completely.

A study of alarm ordinances in San Bernardino County, California, indicated that fines for false alarms were not an effective way to reduce the number of calls (Gaines, Famega, & Bichler, 2007). Of the nine agencies in the study, six reported no reduction in the number of calls. Of the three that did report a reduction, one had no quantification for the reduction. The other two reported 10% and 15% reductions.

One study found a possible reason that false alarm fines are not very effective in reducing the number of false alarm calls. The researcher cites Dave Butzer of the Portland, Oregon, Police Department explaining that the fines are not effective because companies just budget for them and because individuals probably do not deliberately trigger false alarms (Sostek, 1998). A later study found that fines for false alarms might not have achieved their goals. Residents did not reduce the number of alarms while some property owners removed their alarms entirely, increasing fear of crime and reducing actual security (Blackstone, Buck, & Hakim, 2005). In addition, systems that grant owners a fixed number of free false alarms might actually encourage false alarms until the permitted number is reached.

The Gaines, Famega, and Bichler study did report another possible fine scheme. They listed as a possibility an alarm ordinance penalty scheme that fined the alarm company instead of the alarm owner. This had been implemented in Palm Beach County, Florida. As none of the agencies in the study had adopted this penalty scheme, the authors could not draw any independent conclusion but stated that it had been reported as an ineffective penalty scheme. Flint, Michigan, adopted this penalty scheme in the late 1990s but did not try to enforce it at first. When they did move to enforce it, companies refused to pay the bills (Associated Press, 2013).

Fines for false alarms did not reduce the number of calls and in some ways increased the costs to the police department. When Riverside, California, implemented one scheme to fine the alarm companies, it resulted in lawsuits against the department (Gaines, Famega, & Bichler, 2007). The same study showed that fines for individual property owners also did not produce significant reductions in alarm calls. The authors attributed this partially to lax collection practices and partially to lenient fine policies, such as no fine until the third false alarm each year.

Alarms still a problem. Police administrators continue to view alarm calls as a problem and most police agencies are not satisfied with their current policies on alarm responses. Blackwell and Burns (2008) surveyed law enforcement agencies in Texas that employed more than 100 sworn officers. They found that law enforcement generally sees alarm calls as a problem still, with an average of 8.2% of CFS involving burglar alarms while only 2.2% of the alarm calls involved crimes. Over 75% of the agencies surveyed fined the owners of alarms for false alarm calls but only 37.5% of the agencies were very satisfied with the policy. More than 62% thought private companies should be shouldering more of the burden of responding to alarm calls.

However, there are also indicators that the administrators still believe that alarms may reduce crime or aid in the arrest of burglars. Police administrators still recommend the installation of alarms to prevent or reduce crime. After a crime occurs, police may recommend an alarm or deploy a portable alarm for short-term use by the property owner. Cincinnati police were experiencing a series of burglaries at the homes of homicide victims and started deploying portable alarms into these homes to protect them without needing to assign an officer to guard the location (Bradberry, 2015). The alarms resulted in the arrests of several burglars.

Police Officer Responses. The second point of view to consider was the view of individual officers on patrol. This is important for how the officers respond to the call and because part of the police administrator's view on alarm calls is colored by how the officers handle the calls and record what is happening. The officers making the calls decide if the call was a false alarm or an indication of a real problem. It is highly unlikely that their view will change as long as such a high proportion of these calls is recorded as false.

There is only a small amount of research on patrol officer attitudes towards alarm calls. In one study on police stress (White, Lawrence, Biggerstaff, & Grubb, 1985), officers indicated that there was a large amount of stress when answering false alarm calls based on the potential threats involved and a moderate amount of stress based on the perceived lack of support in these calls. The perceived lack of departmental and supervisor support may reflect how much officers dislike these calls.

How officers view alarm calls may be seen in the types of calls they group it with when discussing their jobs. In a study where officers were asked to list the calls they don't like, the officers grouped answering alarm calls with calls where they were "instructing parents in child-rearing," quieting loud parties, and calls that were "initiated by people who are simply lonely and want to talk to someone – anyone" (Barker, 1999).

There has been research into the problems with repeated false alarms in various systems. When alarms go off repeatedly, they tend to get ignored (Stanton, 1994). While Stanton was discussing intrusion alarms on computer systems, this has been shown in several other areas also. Lawless (1994), and more recently Landrigan (2015), found this to be true in the medical field. Eberhard (1991) worried about this problem in journalists, specifically in the number of claims of attacks on freedom of the press. Huxford (2006) also found this to be true in journalism but, in this instance, it was specifically in journalists warning people of dangers from "doomsday asteroids" that do not come true.

Another example shows that this is so common and well known, that it doesn't take scientific study to recognize the phenomenon. Bill Wiggin was a British government official who warned that too many fire drills at the Parliament offices could cause crying wolf syndrome to occur and put people's lives in danger (Malnick, 2013).

This is known as the "crying wolf syndrome" from Aesop's fable "The Shepherd's Boy and the Wolf" (Aesop, 2009). In this story, the young shepherd calls for help four times yelling that a wolf is attacking the sheep. The villagers respond and find there is no wolf. One day, the wolf does attack and the boy yells for help but no one comes because they no longer believe the shepherd.

There is one study on exactly how this works with people. Manzey, Gerard, and Wiczorek (2014) designed a series of experiments to test how people react to alarms. The alarms were in a system designed to provoke a response from the observer when the alarm sounds. The authors found that when there was a high rate of false alarms, people tended to ignore the alarm and not perform the response task. The presence of additional information on alarm validity changed this to show that people do respond to alarms when there is additional information available.

Generalizing these test results and the crying wolf syndrome to police officers would lead to the conclusion that officers do not have faith in alarms and tend to ignore them. This attitude could result in officers not properly checking buildings when dispatched to a false alarm, leading to even more alarms being recorded as false and reinforcing the officer's belief that alarms cannot be trusted.

Victims Attitudes Towards Alarms

Burglary victims and potential victims generally feel that alarms work to reduce crime. One of the best indicators of this belief is the growth in the number of installed alarms. Yuan and McNeeley (2016) showed that alarms were installed as a result of the fear of crime. This dissertation has already shown how the fear of crime has been growing and the number of alarm installations is also growing.

Calahane (2001) showed that the number of installed alarms in England increased by 52% between 1990 and 1998. Lee (2010a) showed that alarm installations in the US are increasing at the same or greater rates. Based on this growth rate, it can be assumed that people feel that alarms will help protect their property.

A survey of burglary victims by Dr. Kristie R. Blevins was quoted in a security magazine article (BNP Media, 2017). It indicated that there is a widespread belief in alarms. Respondents who did not have an alarm were asked why not. Only 10.32% of the people who responded answered that an alarm would not help protect their property while 6.35% indicated that they did not need an alarm. The majority of the remainder (46.05% of those surveyed) indicated that they would have an alarm but they lived in rented properties. Of these, a few had still asked their landlord to install an alarm for them. Other responses included that the alarm cost too much or that the homeowner was considering it, with only 3.97% having not considered installing an alarm.

Without necessarily knowing the attitudes of police administrators, police officers, or burglars, victims and potential victims believe that alarms will work to reduce crime. It is not known if this group of people know how many alarms calls to the police are false alarms. There is no research available on if owners are affected by the crying wolf syndrome when their alarm is noted by the police as a false alarm.

Sensitivity and Specificity of Alarms

Alarm System Sensitivity. Sensitivity is the ability of test results to correctly classify reality. Sensitivity can be calculated by dividing the number of true positives by the sum of the true positives and the false negatives (Parikh, Mathai, Parikh, Sekhar, & Thomas, 2008). In the case of alarms, true positives are intrusion attempts and false negatives are intrusion attempts where the alarm did not sound. Wickens (2001) refers to alarm sensitivity as the “hit rate.” The formula from Parikh, et al. will yield a probability that the alarm will activate when an intrusion is attempted. The failure of an alarm system to detect an intrusion is the result of either the equipment malfunctioning or the failure of the user to operate it properly.

The private security industry has done research on lowering the malfunctions in alarm systems. The research has led to the Underwriters Laboratories (UL) developing standards for the components of alarms and for the overall system of the alarm. These standards are written in such a manner as to allow for the adoption of newer technology as needed (Mangan, 1990). As with many industries, the research is an on-going process and includes updating the concept of alarms to use current technology.

One example of improving the mechanical reliability of the alarm system was the idea of using two sensors instead of a single sensor for any point in the alarm system. Noticing how often a single sensor could fail, using two sensors where both must detect the intrusion makes the system more reliable. The odds of two sensors failing in a short time were very low, thus increasing the reliability of the alarm (United States Patent No. US4195286A, 1980). A second improvement was incorporating intrusion alarms into smart house technology using microcomputer control (Hamed, 2012)).

Alarm companies are selling the concept of security and, understandably, do not want criminals or potential customers to know how often the alarm systems may malfunction. Therefore, there is little public research in this area. There is continuing research, however, into improving alarm reliability. As far back as 1952 (USA Patent No. US2599623A, 1952), increased reliability has been cited as one of the benefits of inventions in alarm systems. This has continued through 1976 (USA Patent No. US4123752A, 1976), 1981 (USA Patent No. US4350978A, 1981), 1986 (USA Patent No. US4803465A, 1986), 2001 (USA Patent No. US6906626B2, 2001), 2008 (Liu, Wang, Chen, & Wu, 2008), 2016 (Liu & Zheng, 2016), and 2017 (Li & Li, 2017).

An examination of the inventions citing increased reliability in burglar alarms shows that system malfunctions are reduced by improving the components of the system. Based on this, system reliability may be viewed as the general reliability of the components for alarm systems, such as the electronic sensors. The reliability of sensors has been growing. Fraden (2016) wrote that between 2010 and 2016 sensor technology has improved in leaps. Sensors have become smaller, more sensitive, and lower priced.

Alarm System Specificity. Wickens (2001) defined specificity for alarms as the correct-rejection rate. Parikh et al. (2008) give the formula for specificity as the number of true negatives divided by the sum of the true negatives and the false positives. While the formula would yield the false alarm rate, the problem is that it was written for tests with a positive or negative answer. In alarm systems, a true negative is when there is no intrusion attempt and the alarm does not sound. Burglar alarms, however, do not truly test for a lack of an intrusion. When activated, they are instead a constant watch for an intrusion.

This dissertation, and most of the literature on alarms, focus on the cases where the alarm sounded and there was not an actual intrusion attempt (the false positives). The standard measurement used for the false alarm rate is the inverse of the selectivity rate. This is the number of false alarms as a percentage of all alarms received.

Even though the selectivity of alarm systems has increased, most alarm systems do not score well in terms of their false alarm rate. As was shown in the *Burglar Alarms* section of the introduction, estimates that alarms reported to police were false alarms ranged from 90% (Webster, 1970) to 98% (Hakim & Shachmurove, 1996). The preliminary analysis of the San Antonio Police data shown in *Table 1* reveals that offenses were only found in relation to approximately 1.4% of the alarm calls.

There is another possible measure of alarm validity which is not extensively researched. The false alarm rate of alarm systems that are monitored can be compared with the false alarm rate of locally monitored alarms or people notifying the police when they detect a problem.

Locally Monitored Alarm Sensitivity. Locally monitored alarms depend on citizens calling in the alarm to the police. When discussing locally monitored alarms, it is important to differentiate between alarms with mechanical devices such as sirens or flashing lights and alarms based on animals. Since animal-based alarms are generally not reported to the police as alarms, this dissertation will only consider the mechanical alarms when referring to locally monitored alarms.

Locally monitored alarms appear to be much more common in residential alarms than in commercial alarms. There are a few possible explanations for this. The first is that locally monitored alarms rely on people being in the area when the alarm goes off. While in residential neighborhoods, someone may be present at almost any time, commercial and industrial neighborhoods may be nearly empty of people during the hours that businesses are closed.

Alarms may be installed professionally or installed by the property owner. Professionally installed alarms are generally sold by alarm companies with monitoring contracts while self-installed alarms are generally not connected to monitoring systems. People may also decide not to renew an alarm monitoring service for some reason. It is more likely that a commercial alarm will be professionally installed and the monitoring contract will be renewed.

In addition to hearing or seeing an alarm, citizens may also call in when they see a possible burglary or when they see suspicious people in their neighborhood. Are citizen reports as reliable or valid as monitored alarm reports of intrusions? The reporting of crimes in progress by citizens is an act of guardianship for other people and their property. This is a different social role than normal for the citizens and has not been studied as much as police activities (Cohen & Felson, 2010). One area where this has been studied is the psychological activities of people helping (or not helping) strangers.

The most infamous case of this was the reported lack of bystander involvement in the murder of Kitty Genovese. Initial reports said that 38 witnesses observed the rape and murder in New York in 1964 and none of them called the police. There has been some doubt raised about whether or not there actually were witnesses who did not get involved.

At least one report shows that there could not have been that many witnesses to the incident and disputes the claim of people not calling the police (Manning, Levine, & Collins, 2007). The authors cite the power of the story in how it has focused psychological research on the presence of bystanders as a potential result of the repetition of the story in textbooks.

Another study argues that the theory known as the bystander effect, commonly argued as the basis for inaction during the Genovese murder, is not the only possible explanation for the lack of action. The bystander effect is based on three components – diffusion of responsibility, fear of being perceived negatively by others present, and the social influence of others present (Latane & Darley, 1970). Levine (1999) argues that social categorization may also play a part in the non-responsiveness of bystanders. He examined the witnesses to the murder of James Bulger, a two-and-one-half-year-old by two ten-year-old boys. The witnesses either had been told or assumed that the three boys were brothers and they did not want to get involved in family related problems.

The bystander effect may lead to the assumption that locally monitored alarms will not generally be called in to the police by neighbors. A study on the bystander effect found that if specific people were asked by name for help, they will respond without the bystander effect taking place (Markey, 2000). In this case, the confession to a murder took place on a computer self-help forum and very few (3 out of 200) of the witnesses notified the police. In an experiment where people were asked by name for help, they did respond. This implies that if a homeowner asks a neighbor specifically to call the police if they hear an alarm, the alarm will be reported to the police.

The results of these studies indicate that the sensitivity rate for people calling the police may not be very high as a general rule, but it can be enhanced by asking specific people to listen for the local alarm and then notify the police.

Locally Monitored Alarm Specificity. A preliminary analysis of the San Antonio Police data also shows that people calling the police for alarms or other crimes in progress is more accurate than alarm monitoring. Between 2012 and 2015, there were 57,877 calls to the police where citizens reported either a burglary in progress, a burglary alarm in progress, a suspicious person, or a suspicious vehicle in the area. Of this number, 11,386 resulted in officers writing a report for some type of criminal offense.

One possible explanation for the difference in the false alarm rate for people calling in and alarm calls is that the citizen on the scene can show the officer exactly where to look for a problem. An alarm called in by a remote monitor cannot tell the police where the possible intrusion took place other than by address.

Nothing in the sensitivity rate of alarms indicates any similarities or differences between alarms and burglaries in occurrence time patterns. The increased specificity rate of the locally monitored alarm indicates that more of the alarms should be occurring at approximately the same times as burglaries or other offenses. This may make the overall pattern for locally monitored alarms more similar to the pattern for burglaries. Without knowing what percentage of alarms calls are from locally monitored or remotely monitored alarms, no conclusions can be drawn about the overall pattern similarities of alarms and burglaries.

The Causes of False Alarms

A few studies have asked what causes an alarm to malfunction and report an intrusion that did not occur. There is no single set of categories for false alarms, but Bailey (1981) grouped false alarms into four categories: human error or negligence, alarm system design or layout, equipment failure, and equipment mismatch with the physical environment. He also cited a 1978 article in Security Surveyor where Mr. Cornwell grouped false alarms into seven categories: subscriber's error, inadequate surveying of premises, lack of maintenance, equipment failure, main electricity supply faults, standard of installation, and telephone system line faults.

A study of false alarms in Atlanta, Georgia, (Touche Ross and Company, 1976) used four main categories: subscriber related problems, equipment related problems, transmission problems, and unidentified. The study then gave several subcategories for each of these categories. Subscriber related problems included items such as users inadvertently setting off the alarm, the loss of electricity at the user's location, the failure of the operator to properly close and secure the building, and merchandise falling and tripping the alarm. Equipment related problems included items such as defective equipment, error in installation, and system application. Transmission problems referred to anything that involved the lines sending the signal to the monitoring station such as telephone line repairs and weather malfunctions. When lacking more specific evidence, they designated the false alarm as unidentified.

False alarm research is limited and does not include studies of their temporal distribution. Most importantly, nothing much is known about the temporal distributions of different causes of false alarms. Some researchers have proposed methods for reducing alarm calls overall, such as implementing a verified response system (Blackwell & Burns, 2008; Sampson, 2007). Others have focused on improving the standards for alarm installation to reduce equipment failures (Mangan, 1990).

In order to check for a relationship between burglaries and alarms, the current dissertation considers especially the temporal distribution of alarm calls. We hope to find indirect evidence of false alarms deriving from:

1. mechanical malfunction;
2. end-user (subscriber) errors; and
3. weather.

Mechanical Malfunction. The category of mechanical malfunction or equipment failure includes any type of failure in the equipment, whether it is a specific piece of equipment such as an alarm sensor or a system failure such as a power outage. System design that is improper for the specific premise is included as an equipment failure.

As noted in the discussion on alarm sensitivity, there is little publicly available research on mechanical failures for alarms systems. None of the available research concerns the occurrence time for such failures. This dissertation may discuss probable failures, but cannot directly measure them.

Any mechanical or electronic device can be expected to fail at some point in time. The device will fail when some component in the device fails (McPherson, 2013). McPherson suggests that measuring device failure is a statistical process. There is no way to predict specifically when any one device or component will fail, but there are methods for determining when the average component for that design will fail. Devices will fail over time in use, given that materials can degrade and time in use can stress the system. These mechanical malfunctions are estimated in terms of the mean time between failures.

Duan, Deng, Gong, and Wang (2018) point out that proper preventative maintenance can extend the life of a device. While this does not provide an exact time for occurrence of the failure, it does show that even within one design, the occurrence time will differ for various specific systems. In addition to the age and usage of the alarm system, the maintenance of the system is also a factor to be considered in determining a time of failure.

Alarm system age and maintenance would be internal information available only to the alarm owner and servicer. This data is not available to the police and therefore cannot be included in our study. Lacking a direct measure of the mechanical failure of an alarm system, one can still infer that a false alarm caused by a mechanical failure is a random event that could happen at any time of day.

User Error. False alarms caused by the end user (subscriber) will be referred to as user error. The three primary types of user error are:

1. the user improperly entering the code to activate or deactivate the alarm system.
2. the user activating the alarm before the building is properly secured; and
3. the user improperly setting the alarm to detect interior motion while people or animals are in the premises to trip the alarm's motion detectors.

Improper entry of alarm codes will not affect the occurrence time of false alarm calls. When a code is entered improperly into a monitored alarm system, there are two possible results. Either the alarm will ignore the entry and not activate/deactivate or the alarm will transmit to the monitoring station as a user being forced to enter an alarm code (known as a duress alarm). If the system ignores the code and does nothing, the police will not consider the call. One example of this is the Valley Communications Center (VCC) policy of declining calls from businesses that do not turn on their alarm or turn it off at the normal time, unless there is some other indication of a crime (Valley Communications Center, 2006). The VCC is a combined dispatch center that handles dispatch and communications for more than 20 public safety agencies in King County, Washington.

If the system transmits a duress alarm, a verified response system would require the alarm company to call the user who could then cancel the response, eliminating the police call. If there is no verified response system, the alarm company would notify the police. In cases like this, the police typically record the alarm as a panic/robbery alarm call instead of a burglary alarm call. One police department procedure that is representative of this states that this type of alarm is included in their definition of robbery alarms (City of Madison Police Department, 2019). This would generate a different dispatch code for the call would not be included in this study of burglar alarms. If the alarm is locally monitored only, it may activate but the user would re-enter the proper code ending the alarm. It is highly unlikely that the neighbors would call about the alarm for such as short duration activation.

It is also unlikely that activating an alarm system while the building is not secured properly would transmit an alarm to the police. Either the system would not activate or the user would hear it activate and would shut the system off quickly to properly secure the building. In addition, the verified response systems would have the alarm company contacting the user and not first calling the police (Berube, 2010).

When alarm activation on an unsecured building does occur, there would be a tendency for false alarms to occur at approximately the times that alarms are most activated. This would be mornings for residential alarms (as people are leaving for the day) and evenings for commercial alarms (as businesses are closing and people leaving).

Improperly activating an alarm while people or animals are inside and roaming around is the third major type of user error. This error could affect when alarms occur since the person inside may not know the proper alarm code or how to respond to a monitoring company to avoid the police call. If the person is authorized to be there, the verified response system would result in the alarm company not calling the police when the person has the appropriate answer for their calls.

Activating an alarm with an unauthorized person inside the building may not affect alarm calls to police because it may not be recorded as an alarm. If there is a verified response system and a person answers the phone that does not belong in the store, it may be called in to the police as a burglary in progress, a disturbance, or some other problem instead of as an alarm. The verification process confirmed a live person inside the location, transforming the call type.

Improper activation of alarms with an animal inside the premises will result in an alarm call to the police. This type of false alarm may be more of a problem for residential alarms than commercial alarms. Animals lose inside a premise are generally pets in a house. While some businesses may use dogs for security inside a building, this practice is being replaced by mechanical alarms and by keeping security guards with the dogs (Ward

D. , 2014). Keeping people assigned with the animals would result in a system design for the alarm system that would allow the movement without triggering an alarm.

Residential alarms may be set with motion detectors when there are people or animals in the house. A residential system may be designed to provide either perimeter only or perimeter and interior motion detection (Sloane, 1977). This concept allows for better protection when no one is home while also providing perimeter protection for use when residents are home and asleep. A problem arises if the motion detectors are activated while animals or people may be moving inside the house. While there is no research on how this may affect the time the alarm activates, it is probable that this would tend to occur earlier in the activation period for the alarm. Animals and people may move at any time and the longer the time period of exposure the more likely there is to be an alarm activation. This should tend to make the alarm activation show more alarms closer to the activation times of morning as people leave for work and late evening as people are activating the alarms for sleep.

Reviewing the type of user errors, the combination of errors may show a tendency to occur as alarms are being activated. Residential alarms may show two time spikes caused by user errors, one in the morning as people leave and one in the late evening as people are getting ready for sleep. Commercial alarms may show one spike in the early evening as businesses close and people leave for the day.

Weather Malfunctions. Weather malfunctions include any false alarm calls caused by any weather event, such as high wind, rain, drought, or flooding which may interfere with an alarm. It does not distinguish between weather related false alarms that are caused by the individual alarm being affected or by some system component such as telephone lines being affected that triggers multiple false alarms from various locations.

While exposure to the weather may have long term effects on alarms systems that contribute to false alarms, it would be very hard to separate those causes from mechanical failures in the system. For example, Brischke and Meyer-Veltrup (2015) studied the decay of different woods after a period of five years exposure to weather. As part of their study, they found that wood exposed to weather changed its dimensions, cracked, or suffered from rot. If an alarm sensor is embedded in a wooden door frame, at some point the weather exposure would make it more susceptible to motion within the wood, causing false alarms.

Some of the weather-related causes for false alarms can be separated out as immediate causes. Wind, rain, and thunder can be observed by the police when responding to an alarm and may be recorded as a suspected cause for the false alarm. Wind could cause the door or window to vibrate, triggering a motion sensor or opening sensor. Water from rain could get into an alarm system in various places, causing short circuits and triggering a false alarm in that manner. Thunder may trigger an acoustic glass breakage sensor.

SAPD has a specific code they use to indicate that an alarm call was a false alarm directly caused by weather. The same code is used for commercial and residential alarms, eliminating the ability to tell what type of structure the alarm was for. The results of a preliminary analysis of weather-related false alarms are shown in *Figure 4*. This graph shows a significant peak in the overnight hours between midnight and 5:00 a.m. and a relatively flat line for the daytime. This may be related to when alarms are in use, but usage times are not covered in the data available.

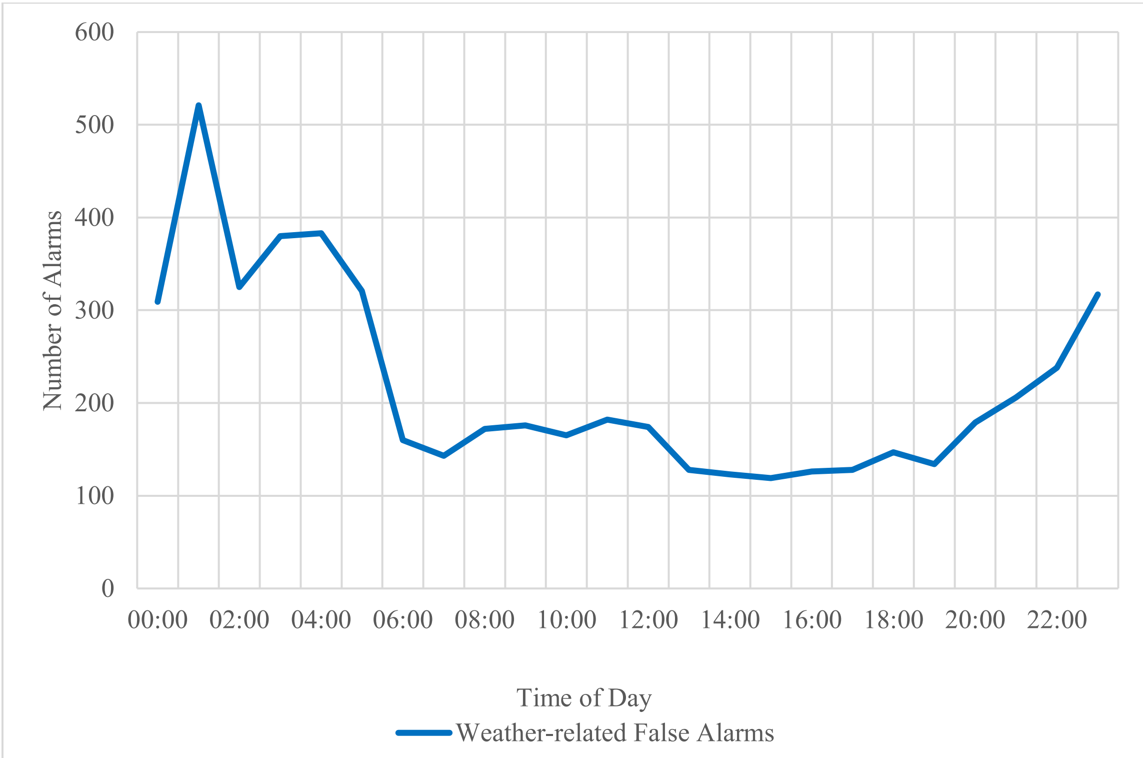

Figure 4: Occurrence Time for Weather-Related False Alarms

Given that the weather-related false alarms are separated from the remaining false alarms and that the data does not allow us to separate the weather-related alarms by type of structure (commercial or residential), this preliminary analysis of the temporal pattern for weather-related alarms is interesting but not of direct use in this dissertation. Based on the inability to classify the target type as commercial or residential, this dissertation will not include weather-related false alarms in the study.

Based on all of the above factors that affect false alarm calls to the police, the two possibilities that can be shown are that false alarms are randomly distributed throughout the time of day when the alarms are in use or that there may be a tendency for false alarms to occur close to the activation time of the alarms.

Figure 5 shows the results of a preliminary analysis of alarm calls to SAPD. The time of day that alarm calls came in and were recorded as false alarms at residential buildings is shown with the red line while alarms at commercial buildings are shown with the blue line. The residential false alarms show that they climb in the morning, peaking just before noon, then starting a slow decrease in number until about 4:00 p.m. when they start a sharp decline. This matches when most people are leaving for work in the morning and coming home in the evening. The decrease after noon matches both the tendency described above for false alarms to occur closer to when they are set and the known tendency for residential burglaries to occur on weekday mornings, as shown in *Table 2*. The times for the commercial alarms also match both the tendency for alarms to occur shortly after setting and the times when burglaries are occurring, as shown in *Figure 1*

This preliminary analysis of false alarm temporal patterns suggests that the alarm calls to police are not happening at random times as would be normally expected. One possible explanation for the lack of randomness in alarm calls is that user error skews the timing of alarms, as discussed above. Another possible explanation is that the alarm call times may be influenced by some other factor such as a previously undetected relationship between false alarms and burglaries.

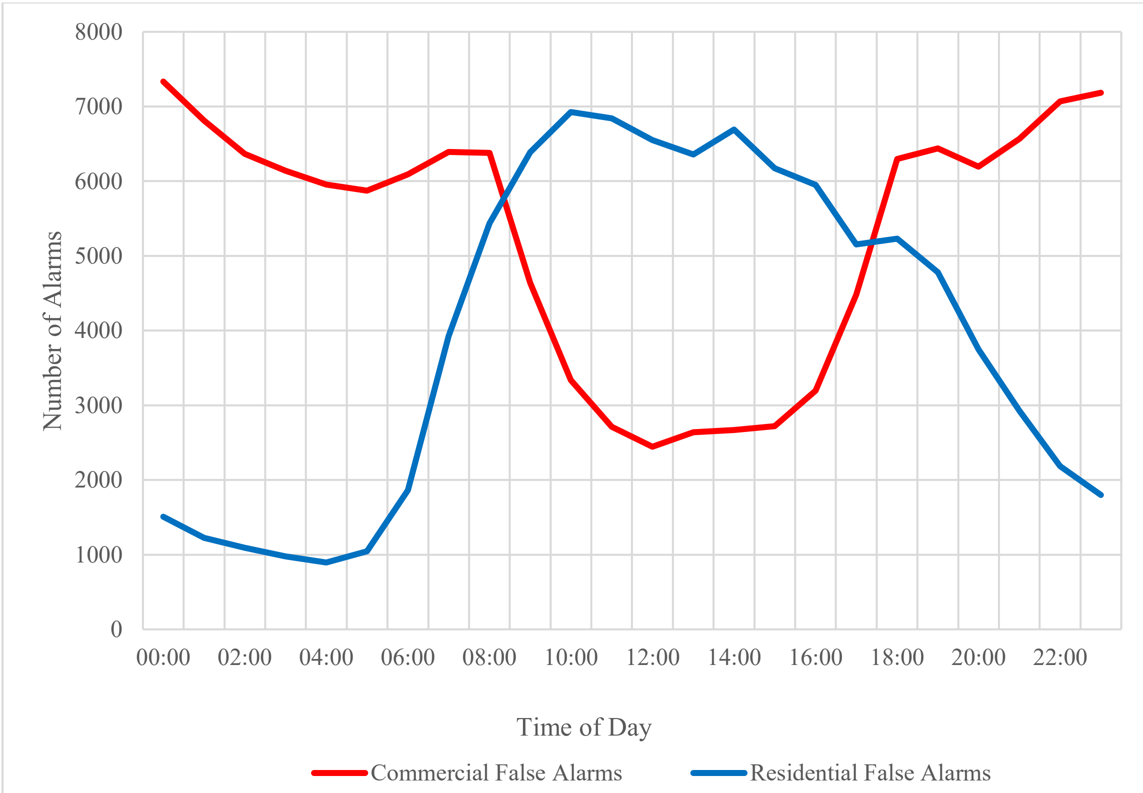

Figure 5: Occurrence Times for False Alarm Calls

Chapter Conclusion

This chapter has reviewed what an alarm is and the definition of a false alarm. While acknowledging the disagreement felt within the alarm industry, this dissertation will use the common definition of a false alarm as call to the police for an alarm system trigger that they record as a false alarm.

The chapter reviewed what is known about the selectivity and specificity of alarm systems. In general, alarms system component reliability is being continuously worked on by alarm companies and may be measured in the same manner as any other mechanical or electronic system. Alarm calls to police do not have a very high specificity rate and are not valid as often as when people call in to report a possible burglary in progress to the police.

The chapter reviewed the sources of false alarms determined in terms of three broad categories: user error, weather related, or mechanical failure. The review showed that weather related alarms will not be used in the current study because of the way SAPD records them. Alarm malfunctions should happen at random times and would not affect this study. User error might affect the timing of alarms, producing more alarms closer to their activation time. The temporal pattern also matches when burglaries tend to occur, based on the current data, and suggests a possible previously unknown link between alarm calls and burglaries.

IV: METHODOLOGY

Research Area

The increase in alarms has caused a problem for police, but may have helped solve a problem for researchers. Alarms offer us a window into the timing of burglary, since alarms are triggered almost immediately.

One of the problems for police and criminologists who study burglaries is knowing when the crime incidents occur. Studying burglaries would be easier if there were a method that did not require extensive calculations to produce an estimate, that is present in most data sets, and that is at least as accurate as the aoristic method.

This dissertation will attempt to provide an alternate method of studying when burglaries occur. Alarms occur at a specific time that is recorded by the police when they are notified. This dissertation will examine similarities and dissimilarities between temporal patterns alarm calls and police-coded burglaries.

Research questions. The primary research question for this dissertation is:

Do alarm calls occur at times that match or approximate the times at which police-coded burglaries also occur?

This dissertation compares temporal patterns for alarms calls to other temporal patterns for burglary based on police data. In an effort to answer the research question, the dissertation will also study if any of the factors chosen for the study affect when burglaries occur. This is not a primary concern of the dissertation but is being done to prove the robustness of the answer to the research question. In examining this question, this dissertation will use a hypothesis that the factors chosen for the study do affect when burglaries actually occur.

Data

This research will use data from several different sources. The primary data used is records from the San Antonio Police Department. The research uses two datasets from SAPD, one from their computer-aided dispatch system (CAD) and one from their report management system (RMS). These datasets cover the years from 2012 through 2015.

Three additional datasets are used to compare patterns for alarm calls to patterns for police-coded burglaries for similarities. The locations of all bars in Bexar County was obtained from public records held by the Texas Alcoholic Beverage Commission (TABC). The locations of all public high schools in Bexar County was obtained from public records held by the Texas Education Agency (TEA). The proximity of the nearest escape route is based on a dataset listing all streets and their owners that was obtained from the City of San Antonio GIS (Geographic Information System) department.

Dispatch System Records. The CAD records have every call made by SAPD during the period studied. The record for each call includes the type of call, the date and time the call was received by the department, the location of the call, a unique case number for the call, and an indicator of the disposition for the call.

The indicator of the disposition includes whether a report was written or not. The majority of the calls do not have a report written, but instead use a code to indicate the result of the call. SAPD calls this code an N-Code. The N-Code is used for the most common results of calls and indicates that there will be no further police action taken on the call. Examples of this code are N-Code 2 for a caller who stated that no one at that location called for police assistance and N-Code 3 for when officers found no evidence of the call at the location when they arrived.

The N-Code system uses an N-Code 4 to indicate a false alarm, with a secondary identifier added to indicate if the alarm was for a residential, commercial, or governmental building. For this dissertation, all governmental buildings will be included in the commercial building group. The system uses N-Code 9 for false alarms caused by weather, but does not have a secondary code with the N-Code 9 to indicate the type of building. Alarm calls marked with N-Code 9 are only used in *The Causes of False Alarms* section of *III: BURGLAR ALARMS* of this dissertation to check how weather affects alarm calls.

This dissertation uses the data from the CAD for any call that was dispatched as a burglar alarm. It classifies the alarms as false if there was no offense code written and the closing code indicates it was a false burglar alarm (N-Code 4). Codes indicating any closing result (i.e. no such address, etc.) other than a false alarm are not included in this study.

Codes indicating that there was a written report for an alarm call are used if the offense code for the report indicates a burglary, attempted burglary, or a crime that would reasonably be expected to be found in a response to a burglary alarm. Examples of these offenses include criminal trespass and criminal mischief (vandalism). The call is counted as a residential alarm if the offense code indicates that the offense involved a habitation. The call is counted as a commercial alarm if the offense code does not indicate a habitation is involved. If the alarm cannot be determined to be from a commercial or a residential structure, it is listed as unknown. The timing of the call from the CAD system will be used for the alarm call time. Alarm calls with any missing or indeterminate data may be included in the study of all alarms and excluded when studying the particular alarms for a specific criterion. Examples of missing data include the police district where the call was located. An example of an indeterminate data point is described above for commercial or residential alarms.

Report Management System Records. The RMS records include an offense begin and end date and time for each call for which a report was written. When a report does not know the exact time of the offense, these fields indicate the range of possible times. To indicate that there was a specific known time for the offense, the begin and end times are the same time. The records also include a location for the offense and an offense code that states exactly which crime was committed. The offense codes used are from a state list for every possible offense for which a suspect may be charged in Texas.

The offense code in the record identifies which reports were written for burglaries. It also identifies if the crime was complete or just an attempt and whether or not the premise was a habitation or other type of structure. This dissertation uses all offense codes for any type of burglary or attempted burglary of a structure as a burglary. It does not include any burglaries of vehicles or vending machines as burglaries. The codes for habitations are used to identify which burglaries are residential. Any non-habitation burglary is considered a commercial burglary for this study. A list of the offense codes used for burglaries is included in Appendix C.

The RMS records also contain a case number for each report. This case number is the same case number used on the CAD records for the call and allow report records to be paired with the dispatch records for that call.

When a burglary report was written and it can be matched to an alarm call, the time for the burglary is corrected to match the time of the alarm call. If the offense code indicates that an offense other than burglary occurred and there is not sufficient data to establish whether the target is a commercial or residential structure, then the burglary call is marked as unknown for commercial or residential purposes. For any call where there is missing data, such as district of occurrence, or indeterminate data, such as unknown for residential or commercial, the call is used in the study for all burglaries but is excluded where the data is required for a relevant sub-portion of the study.

Bar Locations. In order to compare burglary and alarm locations based on the proximity of a bar, this dissertation uses a list of premises obtained from the Texas Alcoholic Beverage Commission (TABC). The list includes any location in Bexar County that is licensed by TABC for the retail sale of alcoholic beverages.

This table was obtained by downloading a listing of all premises licensed by the TABC from the TABC Public Inquiry database. TABC is responsible for the regulation of all sales of alcoholic beverages in Texas. It divides the classes into manufacturers, wholesalers, and retailers. Manufacturers and wholesalers may not sell directly to the public. Retailers may be licensed for sale for the public to consume the beverages on their premises or only off their premises. An example of an off-premises retailer is a liquor store where the beverages are sold by the bottle. It is illegal for anyone to consume alcoholic beverages on these premises. An on-premises retailer may be a bar, restaurant, or place of entertainment where drinks are sold incidentally to the entertainment.

There is no strict definition of a bar in Texas law, but there is a law that restricts the licensed carrying of handguns in licensed premises where the retailer gets more than 50% of their sales from the sale of alcoholic beverages. A restaurant selling drinks with meals is highly unlikely to receive more sales from alcohol than from food, and an entertainment venue that sells drinks is also unlikely to have higher sales from the alcoholic beverages than from the entertainment revenue. For the purposes of this dissertation, a bar is defined as any retail licensee of the TABC that is determined by TABC to have more than 50% of their sales from alcoholic beverages consumed on the premises.

School Locations. In order to compare burglary and alarm locations based on proximity of a school, a listing of the public schools is used. This listing was obtained from the Texas Education Agency (TEA). TEA is the state agency in Texas charged with regulating the public education system. The list includes the location of all schools in Bexar County that are managed by a public school district, that are charter schools, or that are managed by a charter school system. The list was restricted to only schools that teach grades nine or above for this dissertation.

While the reviewed research makes a distinction between public and private schools, charter schools are not discussed. Charter schools are privately managed but publicly funded schools. In Texas, a charter school must accept any student that lives in its service area and is attending a grade that it teaches and the school may not charge any tuition or fees that a traditional public school may not charge (Texas Education Agency, 2020). For these reasons, this dissertation will categorize charter schools as public schools.

Escape Route Locations. In order to compare burglary and alarm locations based on the proximity of an escape route, the escape route locations must be identified. The locations of all streets were obtained from the City of San Antonio GIS department and loaded into ArcGIS Pro. As part of the dataset, the owner for each street segment was identified.

In Texas, streets may be owned and maintained by different governmental agencies or by private individuals or corporations. This is defined in part by the importance of the thoroughfare. For example, the streets inside a gated subdivision may be owned and maintained by the subdivision. The streets in a city are generally owned by the city and the city is responsible for maintaining them, but some exceptions apply. If a thoroughfare is part of the federal or state highway system, it is owned by the State of Texas and maintained by the Texas Department of Transportation (TxDOT).

Examples of the federal highway system are either designated Interstate Highways (such as IH-35 in San Antonio) and US Highways (such as US HWY 281 in San Antonio). In almost every case, these highways are major thoroughfares. Examples of the state highway system include designated state highways (such as State Highway 151 in San Antonio) and farm-to-market roads (such as FM-78 in San Antonio). These highways also are major thoroughfares designed for moving traffic with few delays. An example of the city streets that are not major thoroughfares are the side streets inside a subdivision (such as Maple Street in San Antonio).

While it is possible that a city owned street could be more than one lane in each direction, the state and federal highways are almost always a minimum of two lanes in each direction or greater, or are limited access highways. This dissertation considered any street in San Antonio that was maintained, either wholly or in part, by TxDOT as major thoroughfares for the purpose of defining escape routes. The distance from an incident to the nearest point on a major thoroughfare was calculated for escape route distances.

Analysis Methodology

The occurrence time for burglaries is analyzed for this dissertation based on the aoristic method. For this analysis, this research will use the 168 hours in a week as the time period studied. The time of alarm calls is plotted using the specific time called in to the police for the occurrence time. While each alarm call has a single specific time, the end result of plotting them in a 168-hour table is that the time distribution can be directly compared to the aoristic signature of the burglaries.

Mapping and Distance Functions. This study will use ArcGIS Pro for all mapping and distance calculations. All burglary and alarm call records have the location address, location latitude, and location longitude included from the SAPD files. The list of schools and bars include just the address data for the location.

ArcGIS Pro includes a plotting function that will locate the property by either the provided address or the latitude and longitude. All locations required will be plotted on the street map of San Antonio that was provided by the city as a dataset.

The study will use ArcGIS Pro internal routines to calculate and save the straight-line distances between each alarm call or burglarized premise and each bar or school. The internal routine for calculating the straight-line distance between each alarm call or burglarized premise and the nearest point on a major thoroughfare will be used for distance to escape routes. The internal routine for straight-line distance will be used for calculating the distance between burglaries and for calculating the distance between alarm calls and burglaries.

Analysis. This dissertation will use visual comparisons for most comparisons of the time signatures of the various burglaries and alarms when comparing various factors.

An example of this has been shown in the section on the timing of burglaries by type of target in Chapter II.

Figure 6 is a comparison of the aoristic occurrence times for residential and commercial burglaries. This is the same data that was shown in *Figure 2*. *Figure 2* showed the times in a line format while *Figure 6* is a radial graph that clearly shows how the times for a burglary are cyclical in nature. *Figure 6* has a blue line showing when residential burglaries occur and a red line showing when commercial burglaries occur. Looking at the graph, it is clear that commercial and residential burglaries occur almost in direct opposite times to each other. Commercial burglaries have peaks in the early mornings and lows in the middle of the day, while residential burglaries peak during the middle of the day and have lows occurring at night. This graph is based on the data in *Table 2* and in *Table 3.*

Radial graphs will be used to present analysis of the data. Radial graphs have the advantage of clearly showing the cyclical nature of the temporal patterns, but have the disadvantage of distorting the pattern for visual purposes. The radial graph has the effect of compressing the low points and emphasizing the peaks because of the different circumferences of the circle at those points. Radial graphs were selected for convenience to fit the page size used in this dissertation. Examining *Figure 6* illustrates the disadvantage of radial graphs. Since there were approximately three times as many residential burglaries as commercial burglaries, the lower peaks for the commercial burglary pattern get compressed.

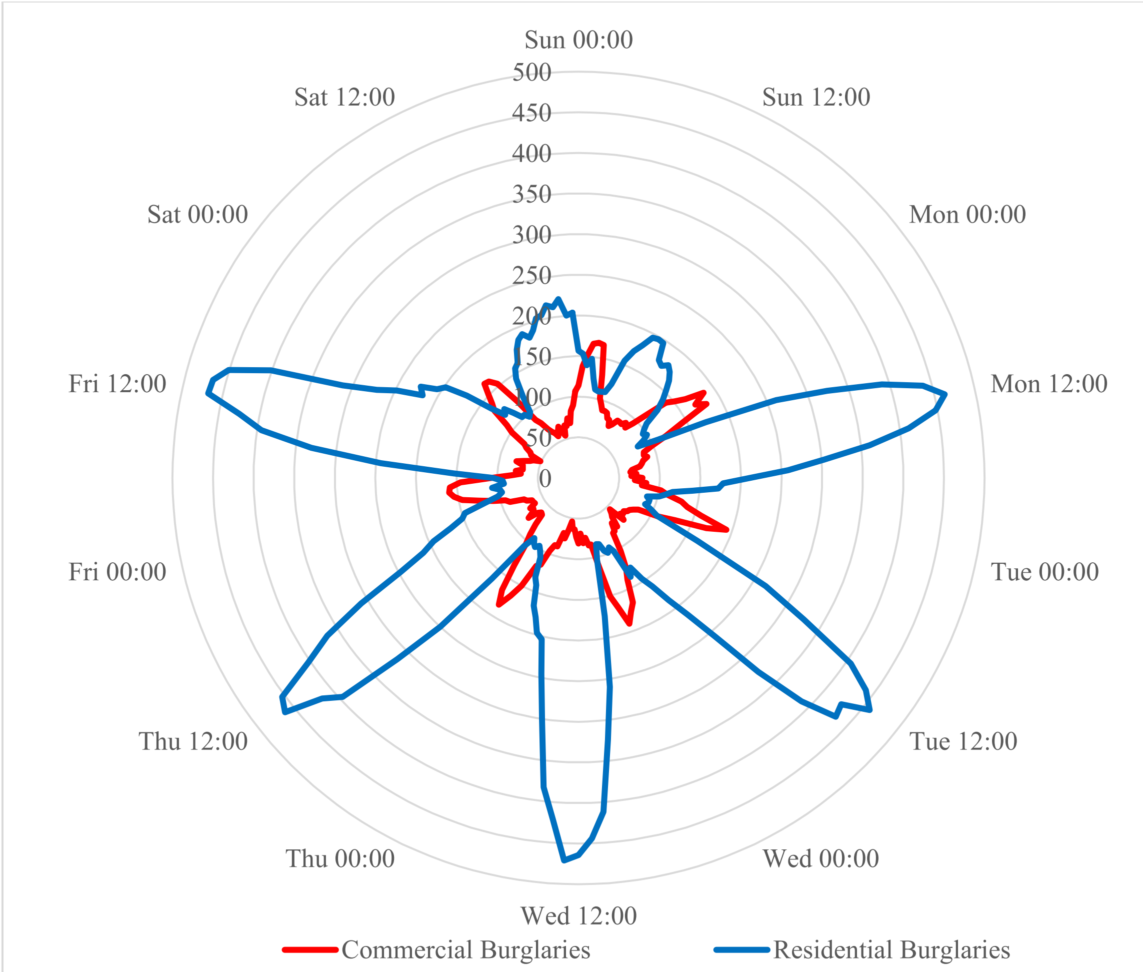

Figure 6: Aoristic Occurrence Times for Burglaries by Target Type

Chapter Conclusion

This chapter has reviewed the research data and methodology for this dissertation. It has covered the primary research question (do alarms occur at similar times as burglaries?). The chapter has also mentioned a possible second question that may be answered: which factors affect when burglaries occur? This second question is not a primary goal of the study, but may be answered while answering the primary question.

The chapter reviewed the data to be used in the study. The data includes all calls available from the San Antonio Police Department that were handled as either burglaries or burglar alarm calls. Additional data to be used includes the streets and highways in San Antonio as obtained from the City of San Antonio GIS Department, the locations of all public high schools from the Texas Education Agency, and the locations of all bars in Bexar County from the Texas Alcoholic Beverage Commission.

The chapter reviewed how the aoristic method will be used to calculate when burglaries occur. It discussed how distances from bars, schools, escape routes, and other events will be calculated using the GIS program. The last step in the methodology that was discussed was the comparison between various time signatures to see if they are similar. This will be a combination of a visual comparison of the data in table and graph formats.

V: COMMERCIAL AND RESIDENTIAL BURGLARIES

This chapter will analyze and compare the data for commercial and residential coded burglaries and alarms. This is expected to further confirm the earlier observation that commercial and residential burglaries and alarms occur at different times. It is also expected to find that police-coded burglaries and alarms occur at similar times. The review also shows that there were many more alarms than burglaries where the target type could not be determined. Burglaries where the target type could not be determined were originally reported as alarms but were incomplete burglaries. This results in a different offense being reported by the officer, such as criminal mischief (the legal offense in Texas for vandalism) or criminal trespass. The higher number of undetermined target types for alarms was also expected from the data. As one example, false alarms caused by weather were noted as one of the types where the target type could not be determined.

The chapter will start by showing the times of occurrence for all alarm calls and all burglaries in San Antonio. These will be correlated to establish a base line to check for differences in times with the various criteria. After reviewing and correlating all burglaries and alarms, this study will compare the burglaries and alarms by target type to see if this is a factor that can affect when burglaries occur.

Table 5 shows how many burglaries and alarms occurred each year and were counted in this study, totaled and broken down by target type. Comparing the number of alarms to the number of burglaries shows that there were many more alarms of each type than there were burglaries. This matches the literature in the field and supports that there are a significant number of false alarm calls.

The review also shows that there were many more alarms than burglaries where the target type could not be determined. Burglaries where the target type could not be determined were originally reported as alarms but were incomplete burglaries. This results in a different offense being reported by the officer, such as criminal mischief (the legal offense in Texas for vandalism) or criminal trespass. The higher number of undetermined target types for alarms was also expected from the data. As one example, false alarms caused by weather were noted as one of the types where the target type could not be determined.

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Table 5: Number of Burglaries and Alarms by Year and Target Type

	2012	2013	2014	2015	Total
Residential Burglaries	10,932	9,474	7,885	7,149	35,440
Commercial Burglaries	4,423	4,225	4,157	3,847	16,652
Unknown Burglaries	389	283	328	269	1,269
All Burglaries	15,744	13,982	12,370	11,265	53,361
Residential Alarms	23,974	23,428	24,887	24,324	96,613
Commercial Alarms	32,448	30,688	32,185	32,645	127,966
Unknown Alarms	22,477	23,361	32,697	34,298	112,833
All Alarms	78,899	77,477	89,769	91,267	337,412

Aoristic Occurrence Times for All Burglaries

Table 6 shows the times when all burglaries tend to occur. This table shows that burglaries tend to occur during the midday hours (9:00 a.m. to 3:00 p.m.). Most of the burglaries occur during the week as opposed to on weekends. From the prior review of this data, it is known that these times tend to match when residential burglaries occur. The larger number of residential than commercial burglaries may explain why the occurrence time pattern for all burglaries more closely resembles the residential burglary times than the commercial burglary times.

Table 6: Aoristic Occurrence Time for All Burglaries

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
2400-0059	300.5	273.4	246.7	264.0	240.4	241.0	280.1	1,846.2
0100-0159	302.7	282.1	254.9	284.2	265.1	253.1	284.6	1,926.9
0200-0259	320.6	308.2	270.5	303.0	278.7	277.7	303.7	2,062.3
0300-0359	347.0	288.7	302.4	299.4	297.7	280.2	292.8	2,108.1
0400-0459	314.9	288.5	273.1	267.5	279.0	266.0	285.1	1,974.1
0500-0559	289.5	238.7	236.1	244.4	232.5	245.7	272.2	1,759.1
0600-0659	244.3	229.8	223.1	214.3	214.7	214.3	221.0	1,561.5
0700-0759	214.4	278.6	251.0	257.4	259.5	239.9	189.9	1,690.7
0800-0859	209.7	355.2	350.2	345.4	331.7	319.3	207.1	2,118.6
0900-0959	215.4	412.5	406.3	400.6	382.9	410.9	218.2	2,446.9
1000-1059	249.5	485.4	480.5	494.8	460.6	466.1	222.4	2,859.4
1100-1159	264.7	525.3	511.8	519.4	484.3	495.7	223.8	3,025.0
1200-1259	265.6	545.3	529.7	545.9	547.9	540.1	235.9	3,210.5
1300-1359	283.8	526.5	496.5	550.1	524.8	551.2	250.1	3,183.2
1400-1459	278.7	478.6	509.9	490.8	472.9	524.7	262.7	3,018.3
1500-1559	277.1	430.1	445.1	447.8	439.2	468.1	243.7	2,751.2
1600-1659	262.2	377.6	387.2	355.8	373.6	374.9	248.5	2,379.8
1700-1759	261.1	325.5	322.9	310.0	314.7	327.1	272.0	2,133.4
1800-1859	266.1	292.9	292.9	282.0	275.5	316.8	271.8	1,998.1
1900-1959	265.7	250.8	258.2	270.6	267.4	288.0	294.8	1,895.4
2000-2059	254.1	260.5	243.6	271.6	242.6	303.4	285.9	1,861.6
2100-2159	256.7	226.3	229.7	263.3	242.8	291.4	316.5	1,826.7
2200-2259	262.5	224.1	237.8	243.5	246.2	303.3	302.0	1,819.3
2300-2359	285.4	229.9	281.6	261.7	240.5	283.4	322.3	1,904.8
Total	6,492.2	8,134.5	8,041.6	8,187.6	7,915.5	8,282.3	6,307.4	n=53,361

Occurrence Times for All Alarms

Table 7 shows when alarms occurred during the week. It is a straight distribution table showing how many alarm calls were received by SAPD in each hour of each day of the week. This table shows that alarm calls tend to peak at approximately 8:00 a.m. and tend to occur more on weekends (Friday, Saturday, and Sunday). There is a second peak occurrence time in the early evening (approximately 7:00 p.m.).

Looking at the times for all alarms is not very revealing other than as establishing the base line for if a comparison between alarms and burglaries. The split between commercial and residential burglary alarms is much more even than that for burglaries. In addition to a closer split for target type, there is a large number, approximately a third of all alarm calls, where the target type cannot be determined from the data.

Table 7: Occurrence Time for All Alarms

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
2400-0059	1,670	1,472	1,621	1,664	1,609	1,707	1,816	11,559
0100-0159	1,688	1,387	1,494	1,534	1,567	1,447	1,523	10,640
0200-0259	1,677	1,231	1,328	1,298	1,322	1,437	1,462	9,755
0300-0359	1,476	1,188	1,299	1,277	1,334	1,367	1,672	9,613
0400-0459	1,321	1,369	1,302	1,411	1,276	1,484	1,582	9,745
0500-0559	1,331	1,438	1,483	1,491	1,486	1,620	1,564	10,413
0600-0659	1,523	1,797	1,822	1,843	1,944	1,912	1,690	12,531
0700-0759	1,751	2,360	2,330	2,445	2,393	2,566	2,304	16,149
0800-0859	2,188	2,653	2,615	2,685	2,650	2,708	2,739	18,238
0900-0959	2,351	2,363	2,428	2,402	2,441	2,411	2,816	17,212
1000-1059	2,510	2,177	2,284	2,304	2,186	2,140	2,662	16,263
1100-1159	2,804	2,115	2,206	2,290	2,264	2,234	2,394	16,307
1200-1259	2,716	2,037	2,138	2,132	2,171	2,150	2,312	15,656
1300-1359	2,633	2,222	2,157	2,047	2,235	2,366	2,445	16,105
1400-1459	2,502	2,123	2,164	2,073	2,112	2,198	2,429	15,601
1500-1559	2,260	2,066	1,889	1,853	1,970	2,145	2,359	14,542
1600-1659	2,380	1,893	1,781	1,910	2,090	2,197	2,566	14,817
1700-1759	2,536	2,037	1,946	1,983	1,932	1,955	2,605	14,994
1800-1859	2,388	2,289	2,266	2,277	2,309	2,438	2,560	16,527
1900-1959	2,135	2,195	2,171	2,289	2,339	2,686	2,327	16,142
2000-2059	1,751	1,925	1,992	2,090	2,077	2,302	2,186	14,323
2100-2159	1,614	1,908	2,031	2,152	2,114	2,290	2,155	14,264
2200-2259	1,700	1,976	1,805	1,986	1,888	2,204	2,126	13,685
2300-2359	1,644	1,884	1,776	1,697	1,809	1,778	1,743	12,331
Total	48,549	46,105	46,328	47,133	47,518	49,742	52,037	n=337,412

Aoristic Occurrence Times for Residential Burglaries

The aoristic time signature table for residential burglaries was first shown in *Table 2* and discussed in Chapter II. *Table 8* is a copy of *Table 2* but is included here for ease of reference in this section.

A review of the times of occurrence for residential burglaries shows that they tend to occur during the midday hours of weekdays. They occur least during the early morning hours and start increasing in frequency at approximately 7:00 a.m. They continue to increase until they peak around noon to 1:00 p.m., after which they start declining in frequency. This is believed to match the hours when houses are most often vacant as people work. Furthering this logic, weekends tend to have fewer residential burglaries than weekdays, again matching the most common work schedules.

Table 8: Aoristic Occurrence Time for Residential Burglaries

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
2400-0059	156.4	107.5	101.6	100.0	108.2	101.8	136.6	812.1
0100-0159	152.9	100.5	87.4	93.2	101.2	95.7	119.2	750.0
0200-0259	139.3	95.9	91.6	99.2	96.4	97.7	124.9	744.9
0300-0359	147.7	99.8	91.5	95.3	100.4	107.0	113.1	754.7
0400-0459	123.7	92.6	87.9	85.1	97.1	92.2	102.0	680.7
0500-0559	110.9	82.5	97.7	84.4	91.8	93.3	102.4	663.0
0600-0659	109.1	109.5	107.2	103.5	107.1	105.3	96.5	738.1
0700-0759	109.9	171.3	165.7	173.2	163.2	153.6	100.2	1,037.1
0800-0859	110.7	261.8	266.3	260.3	250.0	244.1	121.6	1,514.8
0900-0959	122.3	324.3	327.5	324.3	315.2	331.2	144.5	1,889.3
1000-1059	155.0	390.8	405.7	412.2	396.3	394.8	155.6	2,310.4
1100-1159	170.2	439.0	439.9	443.9	416.3	425.0	160.2	2,494.4
1200-1259	181.3	462.5	458.4	464.2	462.2	467.7	175.0	2,671.2
1300-1359	195.2	447.5	426.8	471.1	453.4	465.9	185.3	2,645.2
1400-1459	196.9	411.0	432.2	421.4	402.6	450.6	190.0	2,504.6
1500-1559	196.2	360.8	388.6	382.9	365.2	401.0	182.8	2,277.5
1600-1659	175.8	303.1	325.4	300.6	308.7	312.1	190.1	1,915.9
1700-1759	171.7	258.4	256.8	245.7	248.0	270.7	203.1	1,654.4
1800-1859	177.5	211.0	215.3	203.8	212.0	248.3	205.3	1,473.2
1900-1959	172.1	178.3	187.1	197.4	194.7	217.2	216.2	1,363.0
2000-2059	163.8	172.8	161.5	179.3	168.8	224.4	212.6	1,283.3
2100-2159	152.9	141.7	146.6	166.6	151.6	205.6	221.4	1,186.5
2200-2259	142.0	117.2	127.5	141.9	146.2	198.1	200.4	1,073.3
2300-2359	128.3	109.0	137.5	133.3	119.9	170.8	203.5	1,002.4
Total	3,661.8	5,448.5	5,533.7	5,582.7	5,476.4	5,874.3	3,862.6	n=35,440

Occurrence Times for Residential Alarms

During the time period studied, there were 96,613 residential alarm calls handled by the SAPD. *Table 9* shows when these alarms occurred on a weekly basis. A review of the data shows that the alarms tended to start increasing at approximately 7:00 a.m., climbing to a peak just before noon. The number of alarms tended to stay elevated until approximately 3:00 p.m., when they would start to decrease. The alarms tended to occur on weekdays, though weekend alarms do follow the same pattern for when they occurred during the day.

This pattern for when the alarms occur follows the logic of when the homes would be vacant due to normal work schedules.

Table 9: Occurrence Time for Residential Alarms

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
2400-0059	344	188	153	179	173	188	295	1,520
0100-0159	286	144	134	155	151	158	202	1,230
0200-0259	242	125	118	123	123	152	215	1,098
0300-0359	199	116	94	111	109	141	218	988
0400-0459	174	117	102	125	115	119	152	904
0500-0559	158	127	145	166	164	152	140	1,052
0600-0659	226	293	294	286	281	285	207	1,872
0700-0759	375	599	639	690	591	628	415	3,937
0800-0859	572	864	837	853	855	839	651	5,471
0900-0959	720	979	1,023	991	986	967	777	6,443
1000-1059	863	1,016	1,108	1,141	1,029	994	874	7,025
1100-1159	940	928	1,057	1,115	1,070	1,001	853	6,964
1200-1259	924	904	1,017	1,019	993	983	837	6,677
1300-1359	793	1,004	954	902	953	1,058	822	6,486
1400-1459	735	1,045	1,069	1,040	996	1,005	909	6,799
1500-1559	736	961	899	890	938	977	833	6,234
1600-1659	718	807	803	851	931	934	931	5,975
1700-1759	765	686	697	711	694	735	879	5,167
1800-1859	702	638	703	703	736	787	975	5,244
1900-1959	582	581	563	643	699	884	847	4,799
2000-2059	381	402	431	506	554	705	794	3,773
2100-2159	325	284	347	372	402	606	609	2,945
2200-2259	260	232	228	259	273	431	515	2,198
2300-2359	217	226	188	214	242	318	407	1,812
Total	12,237	13,266	13,603	14,045	14,058	15,047	14,357	n=96,613

Aoristic Occurrence Times for Commercial Burglaries

The aoristic time signature table for commercial burglaries was first shown in *Table 3* and was also discussed in the section on the timing of burglaries by type of target in Chapter II. *Table 10* is a copy of *Table 3* but was included here for ease of reference in this section.

A review of the data in *Table 10* shows that commercial burglaries tend to occur at different times and on different days than residential burglaries. The number of burglaries occurring starts to rise in the late evenings and climbs to a peak in the early morning hours (between 2:00 and 4:00 a.m.). The burglaries also tend to occur more on weekends than weekdays. This timing appears to match what would be expected for when commercial buildings are closed.

Table 10: Aoristic Occurrence Time for Commercial Burglaries

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
2400-0059	114.1	151.0	130.0	139.0	120.2	126.2	132.5	913.1
0100-0159	137.8	163.6	138.5	167.1	150.0	145.4	140.5	1,042.8
0200-0259	152.3	186.3	157.9	176.8	167.3	155.0	151.8	1,147.4
0300-0359	166.3	169.9	192.9	190.1	184.3	160.2	163.7	1,227.4
0400-0459	168.2	181.9	169.1	167.4	166.9	158.8	162.1	1,174.4
0500-0559	166.6	144.1	129.4	151.0	133.7	145.4	152.9	1,023.1
0600-0659	130.2	119.3	109.9	109.8	103.6	107.1	120.5	800.3
0700-0759	101.6	98.3	83.4	83.2	91.2	83.2	88.7	629.7
0800-0859	95.0	86.4	77.8	84.1	77.7	71.1	81.5	573.7
0900-0959	88.1	85.2	73.8	74.3	63.8	77.7	70.7	533.5
1000-1059	88.5	88.6	72.8	80.7	62.4	69.3	65.7	528.0
1100-1159	87.5	82.4	68.9	68.5	66.0	69.7	62.6	505.6
1200-1259	81.4	79.8	70.3	80.7	78.7	70.4	56.9	518.4
1300-1359	80.6	77.1	67.8	73.0	68.4	79.3	62.8	509.0
1400-1459	73.8	66.5	75.7	63.4	67.4	71.0	67.7	485.7
1500-1559	77.9	64.3	54.4	62.9	70.1	63.1	59.9	452.6
1600-1659	85.4	71.5	59.7	54.2	61.9	59.8	54.4	446.9
1700-1759	85.4	65.1	63.2	64.3	62.8	51.4	66.9	459.0
1800-1859	84.6	78.9	76.5	76.2	63.5	64.5	65.6	509.8
1900-1959	89.6	69.5	69.1	70.2	69.6	66.8	74.6	509.5
2000-2059	84.3	83.7	79.0	88.2	71.8	74.0	68.3	549.3
2100-2159	94.7	78.6	80.1	87.7	89.2	78.8	83.1	592.3
2200-2259	113.5	102.9	104.2	96.6	94.0	99.2	89.6	700.0
2300-2359	142.1	110.9	126.0	116.3	108.6	109.6	106.8	820.4
Total	2,589.4	2,505.9	2,330.8	2,425.9	2,293.1	2,257.0	2,249.8	n=16,652

The only unusual point in the commercial burglary timing is that the hours with the most burglaries tends to be Tuesday and Wednesday mornings between 3:00 and 4:00 a.m. Even though these two hours have the highest number of burglaries, the two days with the highest number of burglaries overall are Sunday and Monday, which reflects the effects of the increased number of burglaries on weekends.

Occurrence Times for Commercial Alarms

During the time period studied, there were 127,966 commercial alarm calls handled by the SAPD. *Table 11* shows when these alarms occurred on a weekly basis. A review of the data shows that the number of alarm calls tended to start increasing between 9:00 and 10:00 p.m., climbing to a peak between midnight and 2:00 a.m. The number of alarm calls decreased from the peak slightly on weekends and significantly during weekdays. The fewest number of commercial alarm calls tended to be on weekdays around noon.

Table 11: Occurrence Time for Commercial Alarms

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
2400-0059	978	979	1,077	1,112	1,087	1,138	1,128	7,499
0100-0159	1,068	938	993	1,020	1,065	961	985	7,030
0200-0259	1,029	857	915	932	937	985	964	6,619
0300-0359	885	812	960	911	932	914	1,030	6,444
0400-0459	821	903	882	884	863	949	937	6,239
0500-0559	778	873	873	847	833	929	940	6,073
0600-0659	770	837	895	893	943	930	913	6,181
0700-0759	819	880	863	876	902	1,001	1,084	6,425
0800-0859	941	877	858	827	817	854	1,230	6,404
0900-0959	891	539	538	495	553	520	1,127	4,663
1000-1059	840	321	327	299	362	320	883	3,352
1100-1159	888	271	247	242	239	258	587	2,732
1200-1259	802	248	215	197	214	245	543	2,464
1300-1359	792	238	230	183	223	278	714	2,658
1400-1459	804	251	214	203	226	270	718	2,686
1500-1559	749	267	239	198	229	314	735	2,731
1600-1659	810	317	280	260	320	394	827	3,208
1700-1759	906	550	505	482	532	524	995	4,494
1800-1859	977	929	886	846	854	929	891	6,312
1900-1959	918	929	872	953	936	1,021	833	6,462
2000-2059	801	889	934	932	919	948	797	6,220
2100-2159	726	962	1,003	1,045	1,042	995	843	6,616
2200-2259	867	1,135	1,000	1,092	1,032	1,082	933	7,141
2300-2359	1,017	1,134	1,101	1,037	1,082	1,026	916	7,313
Total	20,877	16,936	16,907	16,766	17,142	17,785	21,553	n=127,966

Commercial alarms tended to occur on weekends with between 20 and 25% more calls occurring on Saturday or Sunday than on weekdays. As with commercial burglaries, this pattern tends to match when most businesses are closed.

Discussion

Comparison of Burglary Occurrence Times by Target Type. The relationship between the timing for commercial burglaries, residential burglaries, and all burglaries was discussed in the section on the timing of burglaries by target type in Chapter II. The aoristic times for residential and commercial burglaries were compared in *Figure 2* and in *Figure 6*.

In *Figure 6*, the red line showed the aoristic times for commercial burglaries while the blue line showed the aoristic times for residential burglaries. As discussed before, the peak times for commercial burglaries tend to occur when residential burglaries are at their lows and the red line clearly stands out showing this. During the discussion in Chapter II, it was concluded that whether the burglary target was commercial or residential made a difference in when the burglary occurred.

Comparison of Alarm Occurrence Times by Target Type. During the time studied, SAPD received 96,613 residential alarm calls and 127,966 commercial alarm calls. *Figure 7* shows a graphical representation of when the alarms occurred, indicating residential alarms with the blue line and commercial alarms with the red line. The graph shows that commercial and residential alarms tend to happen at very different times, with the peak numbers of occurrences for residential alarms being recorded generally at the low times for commercial alarms and vice versa.

The study of the tables and graphs lead to the conclusion that the occurrence time for residential alarms is very different from commercial alarms.

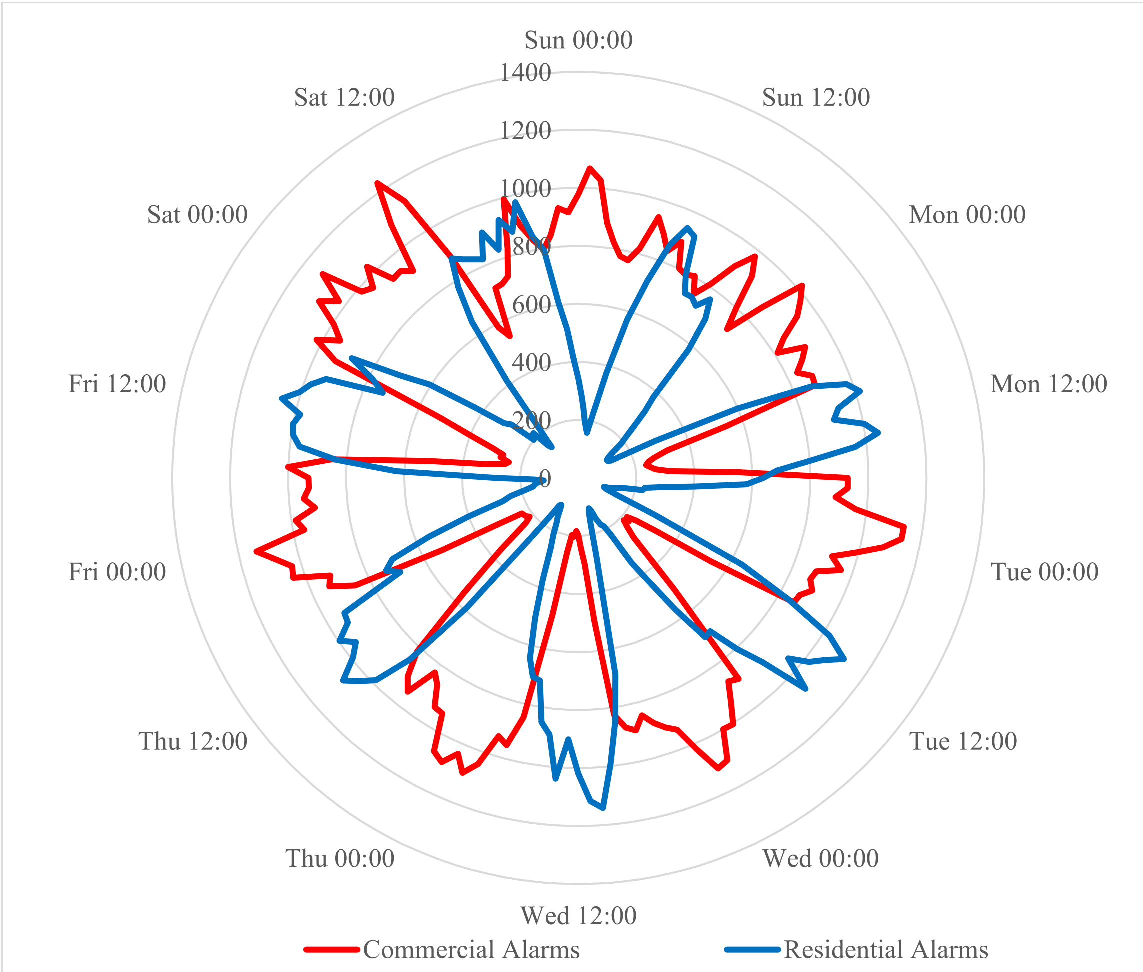

Figure 7: Comparison of Occurrence Times of Alarms by Target Type

Comparison of All Alarm Occurrence Times to All Burglary Aoristic Occurrence Times. Having shown that the target type affects the timing of both alarms and burglaries, the question remains whether alarm patterns are a close parallel to burglary patterns.

Comparing the data in *Table* 6 and *Table 7* shows some similarities and some differences. The occurrence times for all alarms have much broader peaks, beginning as early as 8:00 a.m. and staying high until the late evening hours. The alarms tend to occur more on weekends (Friday, Saturday, and Sunday) than on weekdays.

In comparison, the occurrence times for burglaries start at approximately the same time, but peak much earlier in the day (around noon) and only stay high until late afternoon or early evening. By approximately 8:00 p.m., the number of burglaries has decreased significantly. The burglaries also tend to occur during the week, with much lower numbers on weekends than weekdays.

The graph shown in *Figure 8* shows the patterns for the occurrence times for all alarms and all burglaries. Since there were so many more alarms than burglaries, the number of burglaries for each hour was multiplied by six. This allows both patterns to be compared on approximately the same scale. The burglaries (in blue) show the five peaks during the weekdays and the alarms (in red) show that they start to peak at slightly earlier times than the burglaries. The burglaries show that the weekend is relatively low all weekend while the alarms show peaks on weekends also. The sharpness of the burglary peaks is also in contrast with the broad peaks of the alarms, showing that the burglaries tend to decline from their peak much more quickly than the alarms do.

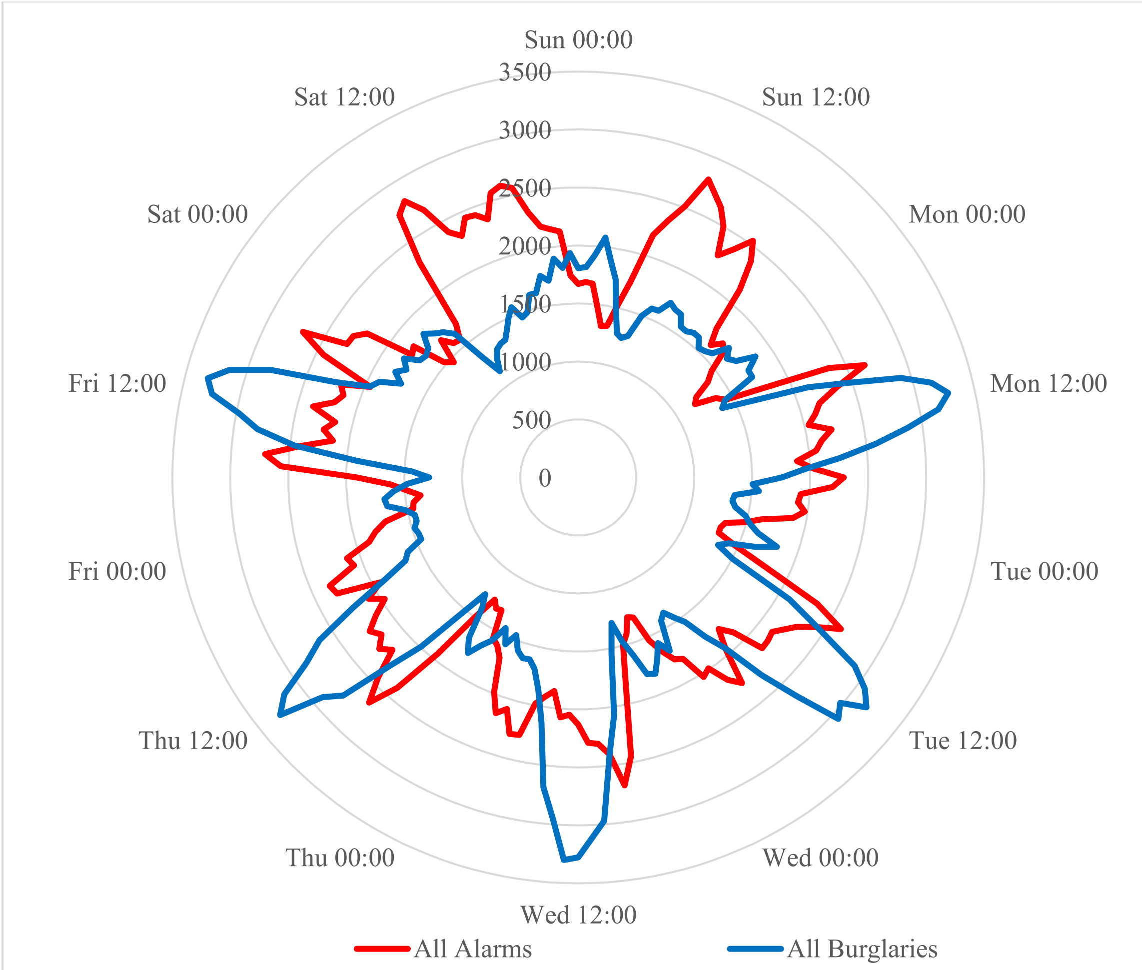

Figure 8: Comparison of Temporal Patterns for All Alarms and All Burglaries

Comparison of Residential Burglary Aoristic Occurrence Times to Residential Alarm Occurrence Times. As shown in the literature review, the research in the field generally separates residential and commercial burglaries. Based on this accepted practice, this dissertation will compare residential alarm times to residential burglary times.

A comparison of the data in *Table 8* and *Table 9* shows similar patterns. Both tables show that the incidents tend to occur on weekdays and both show that the incidents tend to start increasing in frequency around 7:00 a.m., peak in late morning, and start sharply declining in late afternoon. The alarms tend to stay elevated a for a short period (approximately two hours) longer than the burglaries do. The alarms also tend to have more on Saturday when compared to the burglaries.

Figure 9 shows a graphic comparison of the times for when residential burglaries (in blue) and residential alarms (in red) occur. To display the two patterns in approximately the same scale for ease of comparison, the burglary counts were multiplied by three. In the graph, the similarity of the weekday peaks is easily seen. The smaller peaks on the weekends are clear, though there is an obvious difference where the burglaries have a larger difference between the weekdays and weekends. This graph shows that the temporal patterns for residential alarms and residential burglaries are more similar to each other than when the patterns for all alarms and burglaries are compared.

Residential alarm time patterns have a shape very similar to police coded residential burglary time patterns.

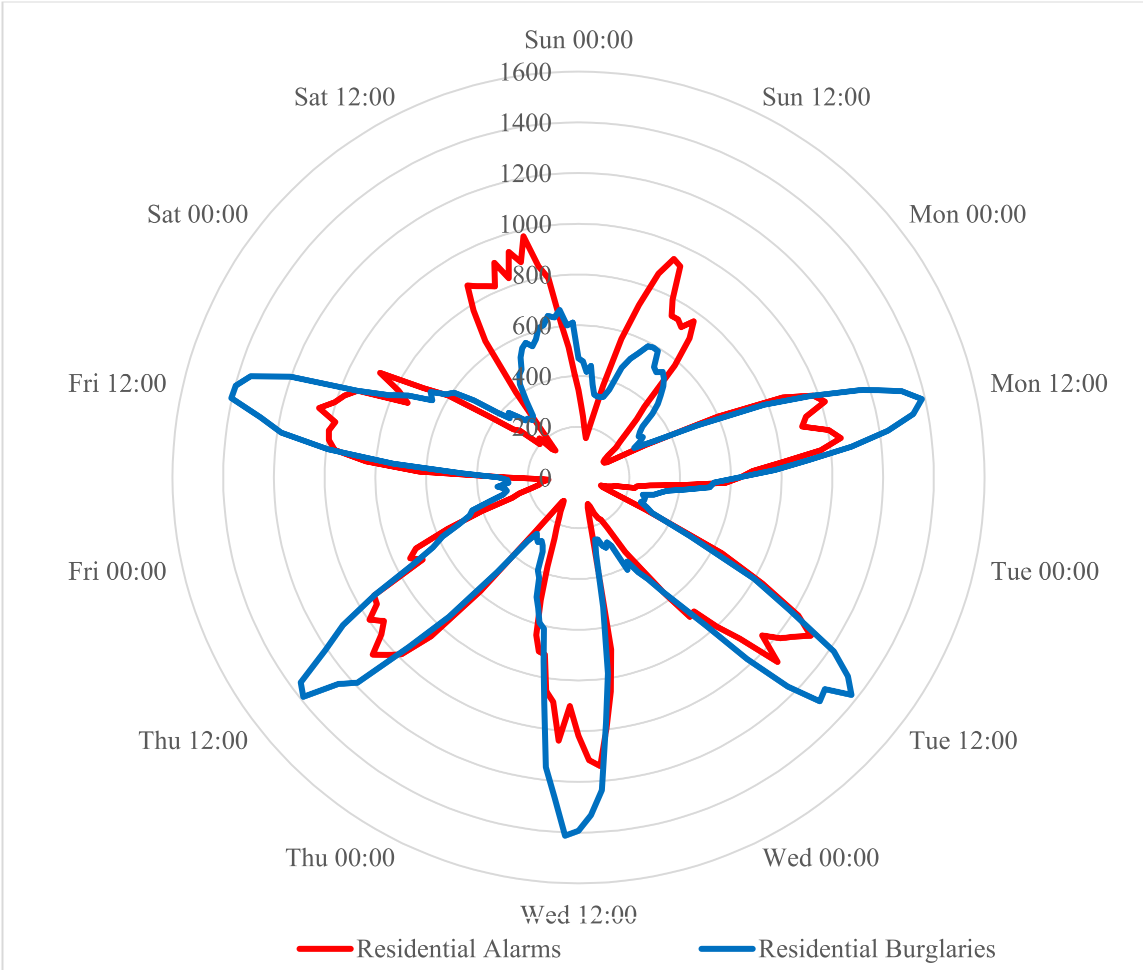

Figure 9: Comparison of Temporal Patterns of Residential Burglary to Residential Alarms

Comparison of Commercial Burglary Aoristic Occurrence Times to Commercial Alarm Occurrence Times. A comparison of the data in *Table 10* and *Table 11* shows some similarities and some differences. Both alarms and burglaries tend to occur at night, though alarms tend to increase earlier than burglaries due. Alarms and burglaries tend to occur as expected, when businesses are normally closed. Burglaries appear to peak at about 3:00 a.m. while alarms tend to peak around midnight to 1:00 a.m. Both burglaries and alarms tend to occur on weekends, though alarms start to increase

Friday night and show a lower level on Monday during the early morning. In contrast, burglaries tend to start on Saturday evening and peak on Monday mornings.

Figure 10 shows a graphical comparison of the times of occurrence for commercial burglaries and alarms. To keep the patterns on approximately the same scale for ease of comparison, the number of burglaries was multiplied by seven. The peaks during the week look like they are occurring at the same times, but the peak for alarms (in red) is much wider a time period than the peak for burglaries (in blue). This shows that the number of alarm calls is starting to increase earlier each day than the actual burglaries do, and generally stays elevated for a longer time period. The graph also emphasizes the difference in times for the weekends between alarms and burglaries. The alarms increase on Friday evening to a peak and, with the exception of a decrease on Saturday afternoon, the alarm calls stay elevated all weekend until Monday morning. In contrast, the burglaries have a distinct peak number at approximately the same time each day of the week, with a decrease between these peaks. The only difference in this pattern for when burglaries is on Sunday where the decrease occurs but the number of daytime burglaries is higher than on other days of the week.

The shape of commercial alarm time patterns are somewhat similar to police-coded commercial burglaries. However, alarms are more widely spaced in time than police reports, indicating that commercial burglaries are discovered and reported to police in a narrower time span than alarms would indicate.

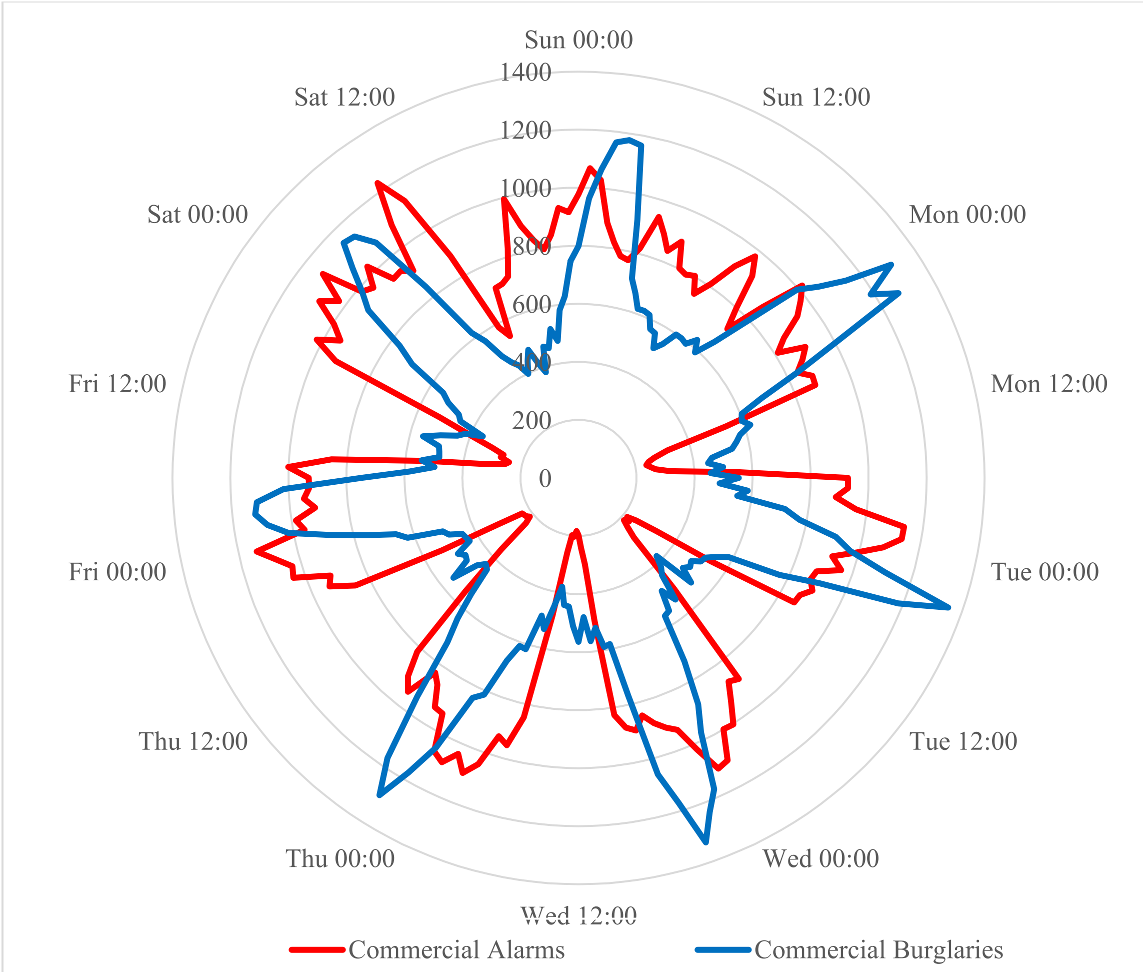

Figure 10: Comparison of Temporal Patterns of Commercial Burglaries to Commercial Alarms

Chapter Conclusion

This chapter has compared burglaries and alarms based on the target type. There are clear differences in the occurrence time for both burglaries and alarms based on whether the target is a residence or a business. In addition, there are similarities in the temporal patterns for alarms and burglaries for the same types of targets.

There were only 2.72 alarm calls for each residential burglary coded by police. For commercial incidents, there were 7.68 alarms per burglary coded by police.

VI: REPEAT AND NON-REPEAT BURGLARIES

In this chapter, the alarms and burglaries will be compared for repeat or near repeat incidents and non-repeat incidents. The review of the literature has shown that if a burglary has occurred, then that property or another near it has an increased chance of being burglarized in the near future.

This dissertation will use the term "repeat" for all incidents that are either repeat or near repeat incidents, and the term "non-repeat" for all incidents that are not repeat incidents. Only incidents that could be classified as residential or commercial will be included in this study.

The result expected from this analysis is that both burglary and alarm patterns are different for repeat incidents when compared to non-repeat incidents. It is also expected to find that burglaries and alarms occur at similar times.

For this dissertation, the distance for residential incidents to be considered repeat is 100 meters. For commercial incidents, the distance to be considered repeat is 200 meters. In both cases, the start time of the burglary must have occurred within 14 days of the start time of another burglary.

Alarms were not considered repeat alarms unless they occurred within the time and distance requirements of a burglary. This was done because of the shown response that people have to nearby burglaries of installing alarms. It does mean that repeat attempts to burglarize a building or nearby building are not included in the classification of repeat alarms.

Table 12 shows the number of burglaries and alarms that are considered in this study, broken down by repeat or non-repeat and target type. The table shows the number for each year plus the total for each type of incident. The literature generally shows that repeat burglaries are approximately 20% of the total burglaries reported.

This expectation held true for the residential burglaries (18.98%) but the number of repeat commercial burglaries was a little lower than expected at 15% repeat burglaries. This difference may be explained by the distances being used to define a repeat offense. While the literature seems to agree on the timing of two weeks being valid, the distance is not as conclusive. In their study, Johnson et al., (2007) used figures of 100 to 200 meters to determine proximity, but mentioned that lower density areas and commercial properties might need larger areas.

The number of alarms did not follow the expectation of 20% repeat incidents. Only 3.44% of the residential alarms and 4.1% of the commercial alarms were determined to be repeat incidents. This may be explained by the number of false alarms or by the use solely of comparing them to known burglaries.

To determine if the repeat burglary phenomenon affects the timing of the crime, the repeat and non-repeat incidents will be compared to the total incidents by target type.

Table 12: Number of Repeat and Non-repeat Burglaries and Alarms

	2012	2013	2014	2015	Total
Residential Non-repeat Burglaries	8,700	7,641	6,423	5,953	28,717
Residential Repeat Burglaries	2,232	1,833	1,462	1,196	6,723
Commercial Non-repeat Burglaries	3,805	3,584	3,405	3,275	14,069
Commercial Repeat Burglaries	618	641	752	572	2,583
Residential Non-repeat Alarms	22,955	22,534	24,164	23,636	93,289
Residential Repeat Alarms	1,019	894	723	688	3,324
Commercial Non-repeat Alarms	31,040	29,427	30,964	31,290	122,721
Commercial Repeat Alarms	1,408	1,261	1,221	1,355	5,245

Occurrence Times for Residential Repeat Burglaries

Table 13 shows the aoristic times for when residential repeat burglaries occur. A comparison of the time pattern shown in this table to the data for all residential burglaries shown in *Table 8* shows very little difference. Both tables show that the burglaries tend to occur on weekdays, with a peak on Fridays. The number of burglaries starts to increase at approximately 7:00 a.m. and peak at approximately noon. The number shows a slight decline through the afternoon, and a sharper decline beginning between 3:00 and 4:00 p.m.

Table 13: Aoristic Occurrence Time for Residential Repeat Burglaries

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
2400-0059	31.0	22.8	19.6	26.0	19.5	21.3	33.5	173.7
0100-0159	40.1	20.1	18.9	18.7	22.7	20.7	28.4	169.8
0200-0259	28.3	21.0	16.7	21.4	21.5	20.6	24.6	154.2
0300-0359	28.2	21.5	15.6	18.7	24.8	22.4	21.4	152.6
0400-0459	24.2	16.8	16.3	20.1	15.5	17.0	19.9	129.6
0500-0559	23.8	16.2	21.9	17.9	18.2	18.4	17.6	133.9
0600-0659	22.9	22.6	22.4	23.7	24.3	18.6	20.0	154.4
0700-0759	20.2	30.5	37.6	36.5	31.7	26.6	20.4	203.6
0800-0859	15.2	46.4	53.2	55.7	41.4	44.2	22.1	278.2
0900-0959	18.3	58.2	62.2	64.0	62.1	54.9	28.3	347.9
1000-1059	32.0	67.7	72.3	72.9	64.4	75.4	23.3	407.9
1100-1159	35.1	72.0	73.5	76.2	66.5	66.6	32.7	422.6
1200-1259	34.6	81.8	75.6	82.1	79.9	73.9	34.0	461.8
1300-1359	40.6	72.8	72.9	76.8	80.8	75.6	34.6	454.1
1400-1459	43.4	73.1	73.3	82.8	66.5	80.9	33.7	453.6
1500-1559	38.0	67.9	71.0	67.9	70.8	74.4	34.4	424.4
1600-1659	34.6	52.8	61.3	51.2	56.3	55.6	31.9	343.6
1700-1759	32.5	44.8	45.3	45.3	44.6	56.4	35.5	304.3
1800-1859	36.9	41.7	43.8	41.0	42.5	54.0	36.1	295.9
1900-1959	39.1	41.9	34.6	38.2	33.0	45.7	37.4	269.8
2000-2059	42.7	35.2	36.8	36.4	33.6	50.9	44.4	280.0
2100-2159	36.1	30.4	35.6	37.9	33.7	49.9	45.1	268.7
2200-2259	29.5	24.5	23.3	25.9	30.8	39.1	38.7	211.8
2300-2359	28.8	23.8	31.5	31.8	27.4	40.2	43.1	226.5
Total	756.0	1,006.2	1,034.9	1,069.0	1,012.3	1,103.5	741.0	n=6,723

Occurrence Times for Residential Non-repeat Burglaries

Table 14 shows the aoristic times for when residential non-repeat burglaries occur. As with residential repeat burglaries, a comparison of the time pattern shown in this table to the data for all residential burglaries shown in *Table 8* shows very little difference. Both tables show that the burglaries tend to occur on weekdays, with a peak on Fridays. The number of burglaries starts to increase at approximately 7:00 a.m. and peak at approximately noon. The number shows a slight decline through the afternoon, and a sharper decline beginning between 3:00 and 4:00 p.m.

Table 14: Aoristic Occurrence Time for Non-repeat Burglaries

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
2400-0059	125.4	84.7	82.1	74.0	88.7	80.6	103.1	638.4
0100-0159	112.8	80.4	68.4	74.4	78.4	75.0	90.7	580.2
0200-0259	111.0	74.9	74.8	77.8	74.9	77.0	100.2	590.7
0300-0359	119.5	78.3	75.9	76.5	75.5	84.6	91.6	602.1
0400-0459	99.6	75.8	71.7	65.1	81.6	75.2	82.2	551.1
0500-0559	87.2	66.4	75.8	66.5	73.6	74.9	84.8	529.1
0600-0659	86.2	86.9	84.8	79.8	82.8	86.6	76.5	583.7
0700-0759	89.7	140.7	128.1	136.7	131.5	127.0	79.8	833.5
0800-0859	95.5	215.3	213.2	204.6	208.6	200.0	99.5	1,236.6
0900-0959	104.0	266.1	265.3	260.4	253.1	276.3	116.2	1,541.4
1000-1059	123.1	323.1	333.4	339.3	331.9	319.4	132.4	1,902.5
1100-1159	135.1	366.9	366.4	367.6	349.8	358.4	127.5	2,071.8
1200-1259	146.7	380.7	382.8	382.1	382.3	393.7	141.0	2,209.4
1300-1359	154.6	374.7	353.9	394.3	372.7	390.3	150.7	2,191.1
1400-1459	153.5	338.0	358.9	338.7	336.0	369.7	156.3	2,051.0
1500-1559	158.2	293.0	317.6	315.0	294.4	326.5	148.4	1,853.1
1600-1659	141.1	250.3	264.2	249.4	252.5	256.6	158.2	1,572.3
1700-1759	139.2	213.7	211.4	200.4	203.4	214.3	167.7	1,350.1
1800-1859	140.6	169.3	171.6	162.7	169.6	194.4	169.1	1,177.3
1900-1959	133.0	136.4	152.5	159.2	161.7	171.5	178.8	1,093.1
2000-2059	121.1	137.6	124.8	142.9	135.2	173.5	168.2	1,003.3
2100-2159	116.8	111.2	111.0	128.7	117.9	155.7	176.4	917.7
2200-2259	112.5	92.7	104.3	115.9	115.5	159.0	161.7	861.6
2300-2359	99.5	85.2	106.0	101.5	92.6	130.7	160.4	775.9
Total	2,905.8	4,442.3	4,498.8	4,513.6	4,464.1	4,770.8	3,121.5	n=28,717

Occurrence Times for Residential Repeat Alarms

Table 15 shows the occurrence times for residential repeat alarms. This table shows a very similar pattern of time to *Table 9*, which included all residential alarms. The pattern shows the alarms occur primarily during the daytime on weekdays, with the largest number of alarms on Friday. There is an unusual double peak in how many alarms occur around the lunch hour, with a peak between 11:00 a.m. and noon, a decrease for an hour, and a second peak from 1:00 to 2:00 p.m. The alarms tend to decrease slightly after 2:00 p.m. and have a sharper decrease in the evening.

Table 15: Occurrence Time for Residential Repeat Alarms

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
2400-0059	9	8	6	7	4	6	9	49
0100-0159	8	3	5	4	3	6	8	37
0200-0259	6	4	4	2	4	2	5	27
0300-0359	5	5	4	4	7	9	5	39
0400-0459	6	3	2	4	5	6	7	33
0500-0559	3	2	4	10	7	5	4	35
0600-0659	6	5	8	6	5	11	10	51
0700-0759	7	20	8	18	16	20	10	99
0800-0859	11	21	30	25	34	25	21	167
0900-0959	21	30	42	22	36	42	6	199
1000-1059	24	43	43	58	45	40	26	279
1100-1159	23	58	46	57	58	49	22	313
1200-1259	19	43	52	46	43	42	20	265
1300-1359	25	52	54	52	38	66	21	308
1400-1459	14	49	51	41	46	49	31	281
1500-1559	25	32	32	34	40	39	30	232
1600-1659	20	19	21	32	34	28	26	180
1700-1759	19	30	14	16	20	23	19	141
1800-1859	13	18	26	21	15	21	31	145
1900-1959	12	12	16	19	21	23	25	128
2000-2059	8	11	12	17	20	17	14	99
2100-2159	12	9	8	13	9	19	20	90
2200-2259	6	3	5	10	8	16	17	65
2300-2359	10	8	8	5	7	9	15	62
Total	312	488	501	523	525	573	402	n=3,324

While there were approximately three times as many residential alarms as there were residential burglaries, there were more than 29 times as many residential alarms as there were residential repeat alarms. This difference in the number of alarms may help explain the difference in the width of the peak times observed. The repeat alarms, having so many fewer incidents, increase and decrease more sharply than all residential alarms.

Occurrence Times for Residential Non-repeat Alarms

Table 16 shows the occurrence times for residential non-repeat alarms. As expected after reviewing the residential repeat alarms, this chart also shows a similar pattern of time to *Table 9*, which included all residential alarms. Both patterns show the alarms occur primarily during the daytime on weekdays, with the largest number of alarms on Friday. Both patterns clearly show the unusual double peak in how many alarms occur around the lunch hour, with a peak between 11:00 a.m. and noon, a decrease for an hour, and a second peak from 1:00 to 2:00 p.m. The alarms tend to decrease slightly after 2:00 p.m. and have a sharper decrease in the evening.

Table 16: Occurrence Time for Residential Non-repeat Alarms

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
2400-0059	335	180	147	172	169	182	286	1,471
0100-0159	278	141	129	151	148	152	194	1,193
0200-0259	236	121	114	121	119	150	210	1,071
0300-0359	194	111	90	107	102	132	213	949
0400-0459	168	114	100	121	110	113	145	871
0500-0559	155	125	141	156	157	147	136	1,017
0600-0659	220	288	286	280	276	274	197	1,821
0700-0759	368	579	631	672	575	608	405	3,838
0800-0859	561	843	807	828	821	814	630	5,304
0900-0959	699	949	981	969	950	925	771	6,244
1000-1059	839	973	1,065	1,083	984	954	848	6,746
1100-1159	917	870	1,011	1,058	1,012	952	831	6,651
1200-1259	905	861	965	973	950	941	817	6,412
1300-1359	768	952	900	850	915	992	801	6,178
1400-1459	721	996	1,018	999	950	956	878	6,518
1500-1559	711	929	867	856	898	938	803	6,002
1600-1659	698	788	782	819	897	906	905	5,795
1700-1759	746	656	683	695	674	712	860	5,026
1800-1859	689	620	677	682	721	766	944	5,099
1900-1959	570	569	547	624	678	861	822	4,671
2000-2059	373	391	419	489	534	688	780	3,674
2100-2159	313	275	339	359	393	587	589	2,855
2200-2259	254	229	223	249	265	415	498	2,133
2300-2359	207	218	180	209	235	309	392	1,750
Total	11,925	12,778	13,102	13,522	13,533	14,474	13,955	n=93,289

Occurrence Times for Commercial Repeat Burglaries

Table 17 shows the aoristic occurrence times for commercial repeat burglaries. Even though there was a smaller percentage of commercial repeat burglaries (15.5%) than of residential repeat burglaries (18.98%), the data shows that the occurrence times were still similar to all commercial burglaries. The highest number of commercial repeat burglaries occurred in the early morning hours (approximately 4:00 a.m.). More of the burglaries tended to occur on weekends than during the week. There is a difference in commercial repeat burglaries from all commercial burglaries in that the peak number of burglaries occurred on Tuesday night through Wednesday morning. Sunday night was the second highest number for burglaries in this case.

Table 17: Aoristic Occurrence Time for Commercial Repeat Burglaries

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
2400-0059	16.5	22.7	20.8	27.9	20.6	22.6	26.4	157.5
0100-0159	21.6	25.4	29.0	34.0	29.7	20.3	24.7	184.5
0200-0259	23.3	30.5	25.9	43.9	30.5	24.3	33.1	211.7
0300-0359	22.3	23.0	27.3	42.5	35.4	27.8	28.9	207.2
0400-0459	32.7	28.9	32.2	29.8	29.6	25.5	31.1	209.7
0500-0559	31.1	26.8	20.7	26.2	21.2	26.3	23.5	175.8
0600-0659	19.1	19.3	19.9	20.6	19.9	17.8	15.1	131.7
0700-0759	14.9	14.9	13.6	18.7	16.8	10.4	12.2	101.7
0800-0859	17.4	12.2	10.2	11.9	13.5	10.5	13.5	89.1
0900-0959	14.7	13.1	8.3	9.4	10.5	8.3	8.9	73.2
1000-1059	19.1	11.4	5.1	7.9	8.3	7.5	9.5	68.8
1100-1159	11.6	7.6	9.5	6.7	8.5	7.5	8.7	60.3
1200-1259	8.0	6.5	6.2	10.1	7.8	7.2	9.5	55.3
1300-1359	11.6	9.2	8.6	10.1	9.5	8.4	10.1	67.4
1400-1459	9.0	6.4	7.8	10.6	8.6	6.5	7.9	56.8
1500-1559	10.7	7.3	6.1	7.7	8.0	6.5	6.9	53.1
1600-1659	14.0	6.9	6.3	5.8	9.0	6.4	9.0	57.3
1700-1759	8.7	7.1	8.2	6.3	6.8	6.5	9.6	53.2
1800-1859	8.5	8.4	11.4	8.9	8.7	8.4	9.8	64.1
1900-1959	15.1	9.3	10.6	10.4	8.9	8.6	10.5	73.3
2000-2059	10.6	15.3	12.8	14.8	9.5	9.6	11.5	84.2
2100-2159	17.3	10.5	12.5	17.7	11.8	12.8	16.5	99.1
2200-2259	17.0	14.8	22.6	17.4	12.7	12.7	13.1	110.4
2300-2359	20.8	20.2	22.7	23.2	15.4	17.3	17.8	137.6
Total	395.7	357.7	358.4	422.6	361.2	319.7	367.8	n=2,583

Occurrence Times for Commercial Non-repeat Burglaries

Table 18 shows the aoristic occurrence times for commercial non-repeat burglaries. Considering that these are almost 85% of all commercial burglaries, the number of burglaries during any particular hour should be very similar to when all commercial burglaries occur. The data in *Table 10* support this conclusion. The time patterns for the two tables is very similar, including the Tuesday peak number of burglaries between 3:00 and 4:00 a.m., while most burglaries occur on Sunday and

Monday. One difference between the two is that the Wednesday morning peak does occur for non-repeat commercial burglaries but it is not nearly as high as the peak on Tuesday. The non-repeat burglaries actually show a peak on Thursday morning at 3:00 that is higher than the Wednesday peak. The rest of the time patterns are very similar for non-repeat and all commercial burglaries.

Table 18: Aoristic Occurrence Time for Commercial Non-repeat Burglaries

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
2400-0059	97.5	128.3	109.3	111.1	99.6	103.6	106.2	755.6
0100-0159	116.2	138.3	109.6	133.1	120.3	125.1	115.8	858.3
0200-0259	129.0	155.8	132.0	132.9	136.8	130.7	118.7	935.8
0300-0359	143.9	146.9	165.6	147.6	149.0	132.5	134.8	1,020.2
0400-0459	135.5	153.0	136.9	137.5	137.3	133.3	131.0	964.6
0500-0559	135.5	117.3	108.7	124.8	112.5	119.1	129.4	847.3
0600-0659	111.2	100.0	90.0	89.2	83.7	89.3	105.4	668.7
0700-0759	86.7	83.4	69.8	64.5	74.5	72.8	76.5	528.0
0800-0859	77.6	74.3	67.6	72.2	64.2	60.7	68.0	484.6
0900-0959	73.4	72.1	65.6	64.9	53.2	69.4	61.8	460.4
1000-1059	69.3	77.3	67.7	72.7	54.0	61.8	56.3	459.2
1100-1159	75.9	74.8	59.3	61.8	57.4	62.2	53.9	445.4
1200-1259	73.4	73.3	64.1	70.6	71.0	63.3	47.4	463.1
1300-1359	69.1	67.8	59.2	63.0	58.9	70.9	52.7	441.5
1400-1459	64.8	60.1	67.9	52.8	58.8	64.5	59.8	428.8
1500-1559	67.2	57.0	48.4	55.2	62.1	56.6	53.0	399.5
1600-1659	71.4	64.6	53.4	48.4	52.9	53.4	45.4	389.6
1700-1759	76.7	58.0	55.0	58.1	55.9	44.8	57.3	405.9
1800-1859	76.0	70.6	65.1	67.3	54.8	56.1	55.8	445.7
1900-1959	74.5	60.3	58.5	59.8	60.8	58.1	64.2	436.2
2000-2059	73.8	68.3	66.2	73.4	62.2	64.4	56.8	465.2
2100-2159	77.4	68.1	67.7	70.0	77.4	66.0	66.6	493.2
2200-2259	96.6	88.0	81.6	79.2	81.3	86.5	76.4	589.6
2300-2359	121.3	90.7	103.3	93.1	93.2	92.2	89.0	682.8
Total	2,193.7	2,148.2	1,972.4	2,003.3	1,931.9	1,937.3	1,882.0	n=14,069

Occurrence Times for Commercial Repeat Alarms

The occurrence times for commercial repeat alarms is shown in *Table 19*. As was noted with residential repeat alarms, there is a very low percentage of commercial alarms that are repeat alarms. Only 3.4% of the residential alarms were repeat alarms, and only 4.1% of the commercial alarms are repeat alarms. Even with that low a percentage of alarms being repeat alarms, the time pattern for them is similar to the pattern for all alarms. Most of the repeat alarms also occur on weekends, though there is a peak on Tuesday mornings that brings Tuesday up to being the second highest number of alarms. One difference between the two patterns is that the number of alarms starts climbing earlier in the evening during the week for all commercial alarms, showing a weekday peak around midnight to 1:00 a.m., but the repeat alarms tend to show the peak number of incidents later in the morning around 3:00 a.m.

Table 19: Occurrence Time for Commercial Repeat Alarms

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
2400-0059	41	47	53	57	44	51	52	345
0100-0159	51	55	60	63	65	63	66	423
0200-0259	58	65	56	55	64	72	55	425
0300-0359	52	54	77	65	73	62	69	452
0400-0459	55	71	66	60	65	65	48	430
0500-0559	64	44	58	46	48	45	42	347
0600-0659	37	32	31	35	27	31	43	236
0700-0759	31	27	24	33	40	34	29	218
0800-0859	24	33	32	19	26	23	29	186
0900-0959	25	25	19	19	8	16	28	140
1000-1059	23	8	11	12	12	15	26	107
1100-1159	25	10	3	7	7	11	11	74
1200-1259	27	5	8	6	10	2	10	68
1300-1359	31	9	10	7	4	4	9	74
1400-1459	21	5	6	9	9	6	16	72
1500-1559	18	12	9	3	3	6	21	72
1600-1659	30	8	14	8	5	14	19	98
1700-1759	24	12	9	12	14	15	25	111
1800-1859	28	24	31	25	19	23	22	172
1900-1959	21	26	26	19	21	27	26	166
2000-2059	26	31	30	28	23	23	18	179
2100-2159	28	28	31	28	41	34	27	217
2200-2259	44	43	47	31	33	60	34	292
2300-2359	52	51	55	55	49	43	36	341
Total	836	725	766	702	710	745	761	n=5,245

Occurrence Times for Commercial Non-repeat Alarms

The occurrence times for commercial non-repeat alarms is shown in *Table 20*. As would be expected from non-repeat alarms being almost 96% of all commercial alarms, the pattern for when they occur is very similar to when all commercial alarms occur. Most of the alarms occur on weekends, with the highest numbers of alarms occurring on Saturday and Sunday. The number of alarms starts to climb in the late evening during the week, peaking just after midnight. The number of alarms stays fairly elevated during the day on Saturday and Sunday, though it is slightly lower than the overnight numbers even on weekends. This pattern, as with all commercial alarms tends to match when most businesses are closed.

Table 20: Occurrence Time for Commercial Non-repeat Alarms

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
2400-0059	937	932	1,024	1,055	1,043	1,087	1,076	7,154
0100-0159	1,017	883	933	957	1,000	898	919	6,607
0200-0259	971	792	859	877	873	913	909	6,194
0300-0359	833	758	883	846	859	852	961	5,992
0400-0459	766	832	816	824	798	884	889	5,809
0500-0559	714	829	815	801	785	884	898	5,726
0600-0659	733	805	864	858	916	899	870	5,945
0700-0759	788	853	839	843	862	967	1,055	6,207
0800-0859	917	844	826	808	791	831	1,201	6,218
0900-0959	866	514	519	476	545	504	1,099	4,523
1000-1059	817	313	316	287	350	305	857	3,245
1100-1159	863	261	244	235	232	247	576	2,658
1200-1259	775	243	207	191	204	243	533	2,396
1300-1359	761	229	220	176	219	274	705	2,584
1400-1459	783	246	208	194	217	264	702	2,614
1500-1559	731	255	230	195	226	308	714	2,659
1600-1659	780	309	266	252	315	380	808	3,110
1700-1759	882	538	496	470	518	509	970	4,383
1800-1859	949	905	855	821	835	906	869	6,140
1900-1959	897	903	846	934	915	994	807	6,296
2000-2059	775	858	904	904	896	925	779	6,041
2100-2159	698	934	972	1,017	1,001	961	816	6,399
2200-2259	823	1,092	953	1,061	999	1,022	899	6,849
2300-2359	965	1,083	1,046	982	1,033	983	880	6,972
Total	20,041	16,211	16,141	16,064	16,432	17,040	20,792	n=122,721

Discussion

Comparison of Aoristic Occurrence Times for Residential Burglaries by Repeat or Non-repeat. Residential repeat burglaries were approximately 18.9% of all residential burglaries. This is close to the literature analysis that 20% of burglaries that show up in police data are repeat burglaries.

Figure 11 shows a graphical representation of the comparison of residential repeat and non-repeat burglary aoristic temporal patterns to each other. To keep the two patterns on approximately the same scale for ease of comparison, the number of repeat burglaries in each hour was multiplied by four. The time pattern for residential non-repeat burglaries is in red and residential repeat burglaries is in blue. This graph makes it clear that both residential repeat and non-repeat burglaries generally occur in similar temporal patterns.

It can be seen that there are some differences then between the repeat and the non-repeat residential burglary patterns, primarily in the shape of the peak. The repeat burglary pattern tends to have a sharper peak than the non-repeat burglary pattern. While there are also a few small differences in the increase from low to peak, the pattern also shows more of the repeat burglaries occur on weekends than do the non-repeat burglaries. This pattern difference is probable if the same offenders were committing the repeat burglaries as suggested by Farrell, Phillips, and Pease (1995) in their study, and those burglars tended to commit their crimes at the same time.

The study of the tables and graphs lead to the conclusion that the repeat or near-repeat phenomenon has an effect on when residential burglaries occur but it is very slight.

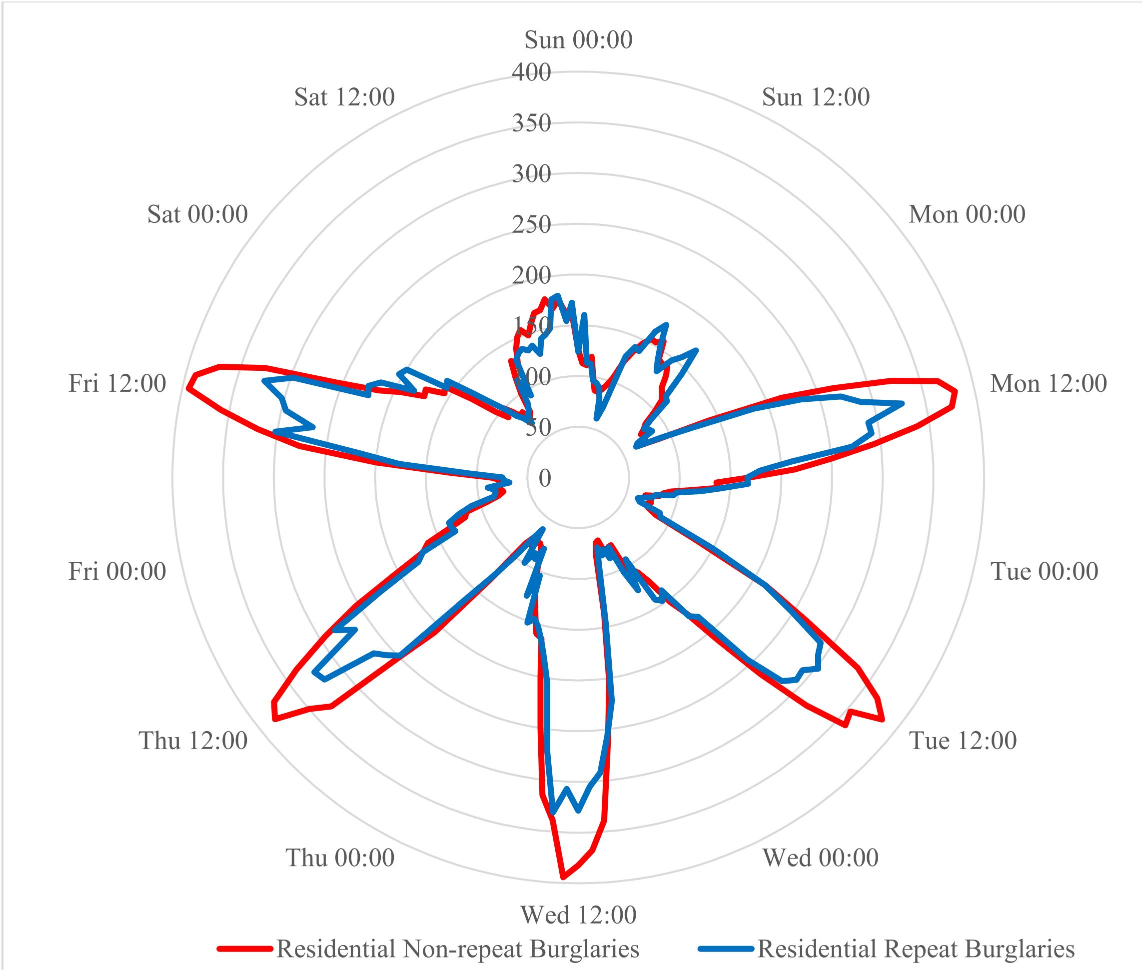

Figure 11: Comparison of Aoristic Occurrence Times for Residential Burglaries by Repeat or Non-repeat

Comparison of Occurrence Times for Residential Alarms by Repeat or Non-repeat. Residential repeat alarms comprise only 3.4% of all residential alarms. This is a significantly lower percentage than had been expected. There is little literature on repeat alarms compared to repeat burglaries, and a figure closer to the number of residential repeat burglaries was expected. Considering the way alarms are installed in response to burglaries and fear caused by nearby burglaries, it was possible that the percentage of repeat alarms would be even higher than the percentage of residential repeat burglaries.

This finding raises questions about the response time to install alarms as a response to a burglary. It is presumed that the decision to install an alarm system and the time it takes to install it must take longer than the two weeks used for defining a repeat incident for this dissertation.

The comparison of residential repeat alarms to residential non-repeat alarms can best be viewed in the radial chart format used for other comparisons. To keep the patterns on approximately the same scale for ease of comparison, the number of repeat alarms per hour is multiplied by 20.

Figure 12 shows the comparison of the temporal patterns of residential repeat and non-repeat alarms. The repeat alarms are shown in blue and the non-repeat alarms are in red. While the patterns show a general similarity, the differences between the repeat alarms and the non-repeat alarms is easily noted. The peaks on weekdays tend to be much broader for non-repeat alarms than for repeat alarms. This pattern matches the differences noted between repeat and non-repeat residential burglary patterns.

On weekends though, the peaks for non-repeat alarms are much taller than the peaks for repeat alarms. This is a difference from the comparison of burglaries where the peaks were much closer in size.

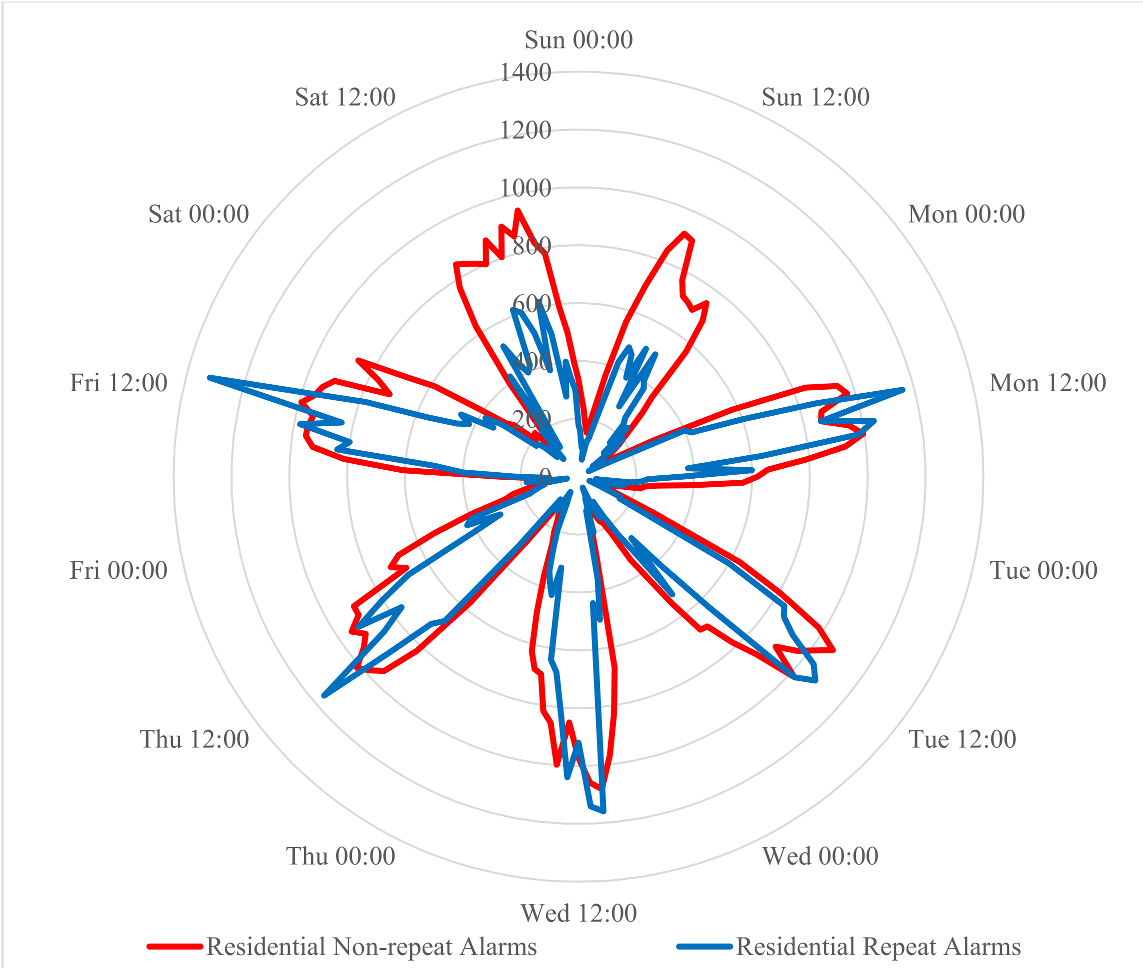

Figure 12: Comparison of Occurrence Times for Residential Alarms by Repeat or Non-repeat

These differences show that in residential alarms, the repeat or near-repeat phenomenon affects the timing of when the alarms occur.

Comparison of Occurrence Times for Commercial Burglaries by Repeat or Non-repeat. Commercial repeat burglaries were approximately 15.5% of all commercial burglaries. This number was slightly lower than was expected from the literature in the field. This may be explained by the distance used to designate what is a near-repeat burglary for commercial purposes. Johnson et al. (2007) mention that commercial property might involve longer distances due to the lower building density in commercial areas than in residential areas. For this study, a longer distance (200 meters) was used. This figure may not have been enough to capture the true effect of the phenomenon.

Figure 13 shows a graphical representation of the temporal patterns for commercial non-repeat burglaries (in red) and commercial repeat burglaries (in blue). To keep the patterns on approximately the same scale for ease of comparison, the number of repeat burglaries per hour was multiplied by five. The graph shows how similar the overall patterns are, while making the few differences visible. The graph shows that the peak number of both commercial non-repeat and repeat burglaries occurred on Wednesday morning, but that the number of burglaries on Wednesday morning was a much higher peak for repeat burglaries than it was for non-repeat commercial burglaries. The graph also shows that the non-repeat commercial burglaries do not have the same pattern for the lows as the repeat commercial burglaries.

These differences show that in commercial burglaries, the repeat or near-repeat phenomenon affects the timing of when the burglaries occur.

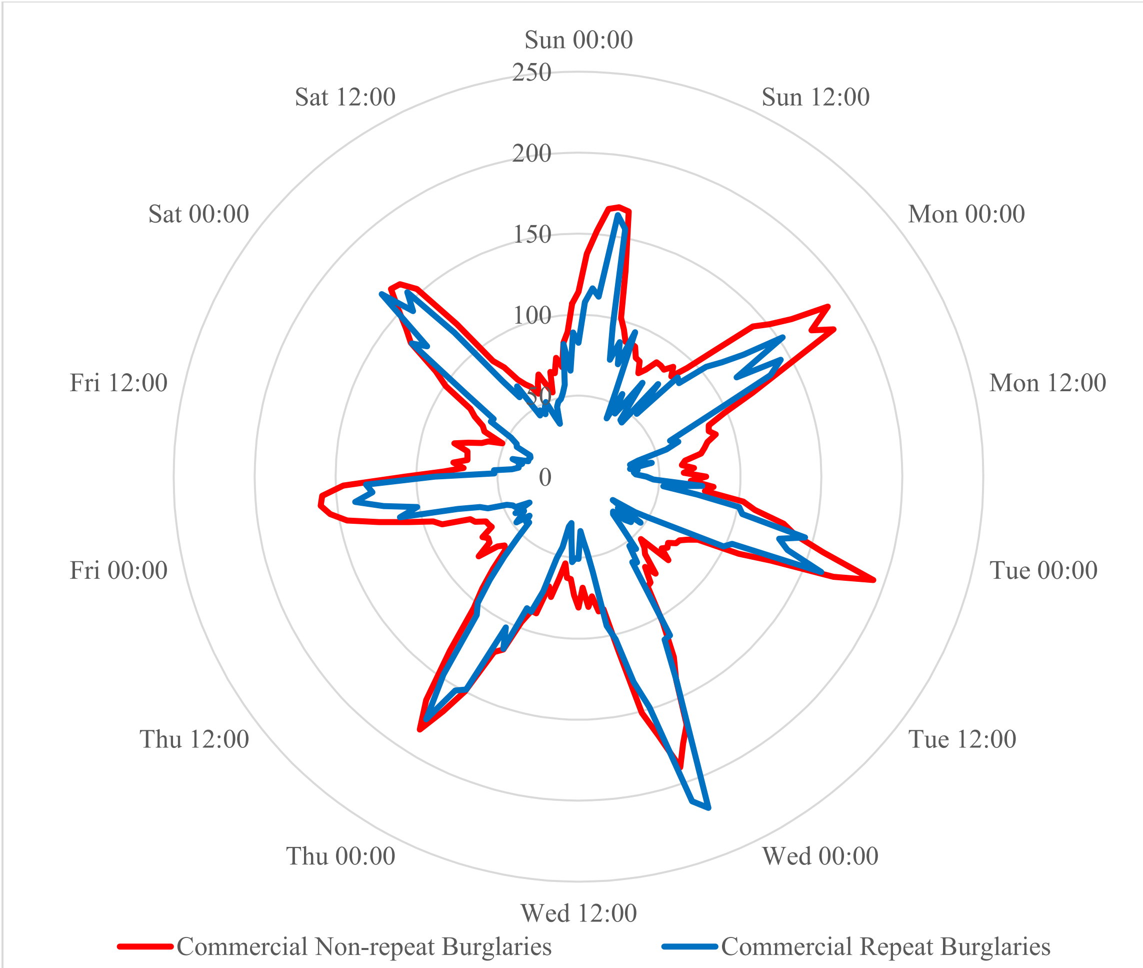

Figure 13: Comparison of Aoristic Occurrence Times for Commercial Burglaries by Repeat or Non-repeat

Comparison of Occurrence times for Commercial Alarms by Repeat or Non-repeat. Commercial repeat alarms were approximately 4.1% of all commercial alarms. As with residential repeat alarms, this is a significantly lower percentage than was expected. This detail, when combined with the lower percentage of commercial repeat burglaries, suggests that the distance used for calculating repeat incidents for commercial locations might need to be increased in this case.

Figure 14 shows the time patterns for commercial repeat alarms (in blue) and commercial non-repeat alarms (in red). The graph shows that the time pattern for commercial repeat alarms is similar to non-repeat commercial alarms but has larger differences than either the residential alarms or the commercial burglaries compared using the same categories. It has peaks during the weekdays in the same manner, though the peaks are not as wide, tending to increase and decrease over a shorter time span. In addition, the commercial repeat alarms show lows and peaks on the weekend in the same manner as during the week, while the commercial standalone alarms have much higher numbers as lows on weekends than their weekday lows.

These differences show that in commercial alarms, the repeat or near-repeat phenomenon affects the timing of when the alarms occur.

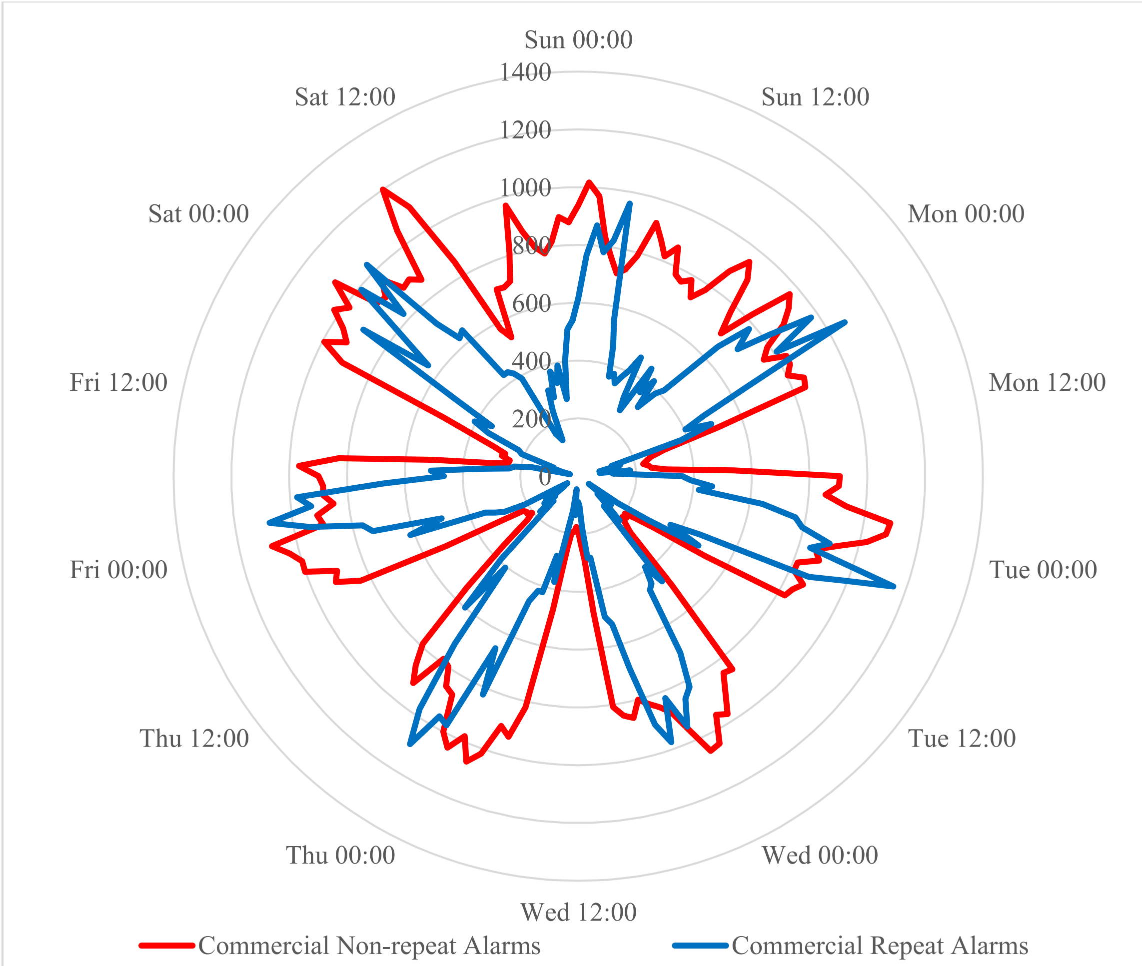

Figure 14: Comparison of Occurrence Times for Commercial Alarms by Repeat or Non-repeat

Chapter Conclusion

This chapter has examined the temporal patterns for alarms and burglaries when classified as repeat or non-repeat incidents and separated by the target type. The following sections compare the alarms and burglaries to each other, separated by target type.

Comparison of Occurrence Times for Residential Alarms and Burglaries by Repeat or Non-repeat. A comparison of the data in *Table 13* and *Table 15* shows that residential repeat alarms and residential repeat burglaries follow the same time pattern fairly closely. There are some differences, including the repeat alarms show a peak from 11:00 a.m. to noon, and a second peak from 1:00 p.m. to 2:00 p.m., but a lower number of incidents during the lunch hour, while the repeat burglaries show a higher peak during the lunch hour.

Figure 15 shows a graph comparing the temporal pattern for residential repeat alarms to the aoristic temporal pattern for residential repeat burglaries. The alarm pattern is shown in red and the burglary pattern is shown in blue. The two patterns show a general similarity, though there are a few differences. The most noticeable difference is that the burglaries show much wider peaks than the alarms. This may be an artifact of comparing the aoristic times of burglaries, where the precise time of occurrence is not known, to the actual time of occurrence for the alarms.

A comparison of the data in *Table 14* and *Table 16* also shows similar patterns for residential non-repeat burglaries and alarms. There is a difference with the non-repeat alarms showing a large peak on Saturday and on Sunday around lunchtime that the burglaries do not. In the case of non-repeat alarms, the pattern shows slightly fewer alarms on weekends than on weekdays but the daily pattern of starting to climb in the morning, peaking around lunch, and declining in frequency during the afternoon and evening. Residential non-repeat burglaries are comparatively low all weekend.

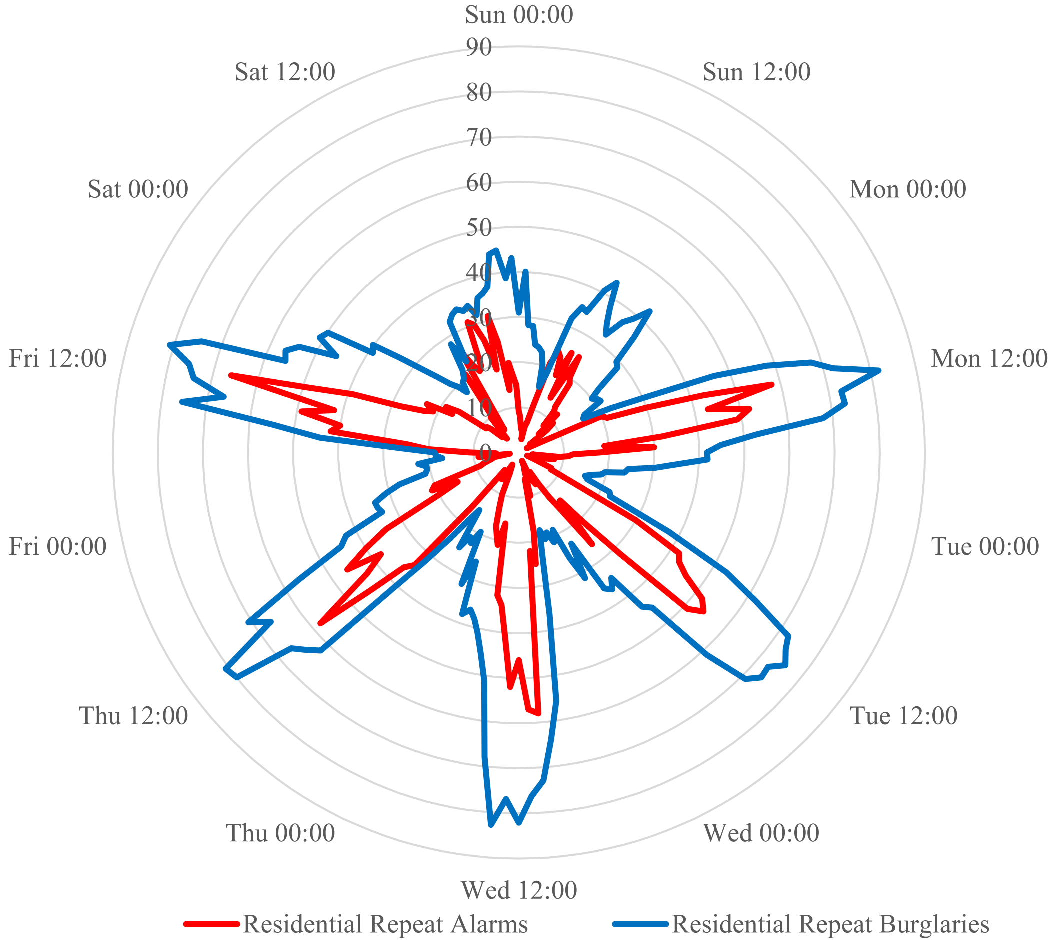

Figure 15: Comparison of Temporal Patterns for Residential Repeat Burglaries and Alarms

Figure 16 shows a graph comparing the temporal pattern for residential non-repeat alarms to the aoristic temporal pattern for residential repeat burglaries. The alarm pattern is shown in red and the burglary pattern is shown in blue. To keep the two patterns on approximately the same scale for ease of comparison, the number of burglaries per hour was multiplied by three. The two patterns show a general similarity, though there are a few differences. In this case, the alarms show the broader peaks, as opposed to case for the comparison of the repeat alarms and burglaries. Additionally, a much higher percentage of the alarms occur on weekends than do the burglaries.

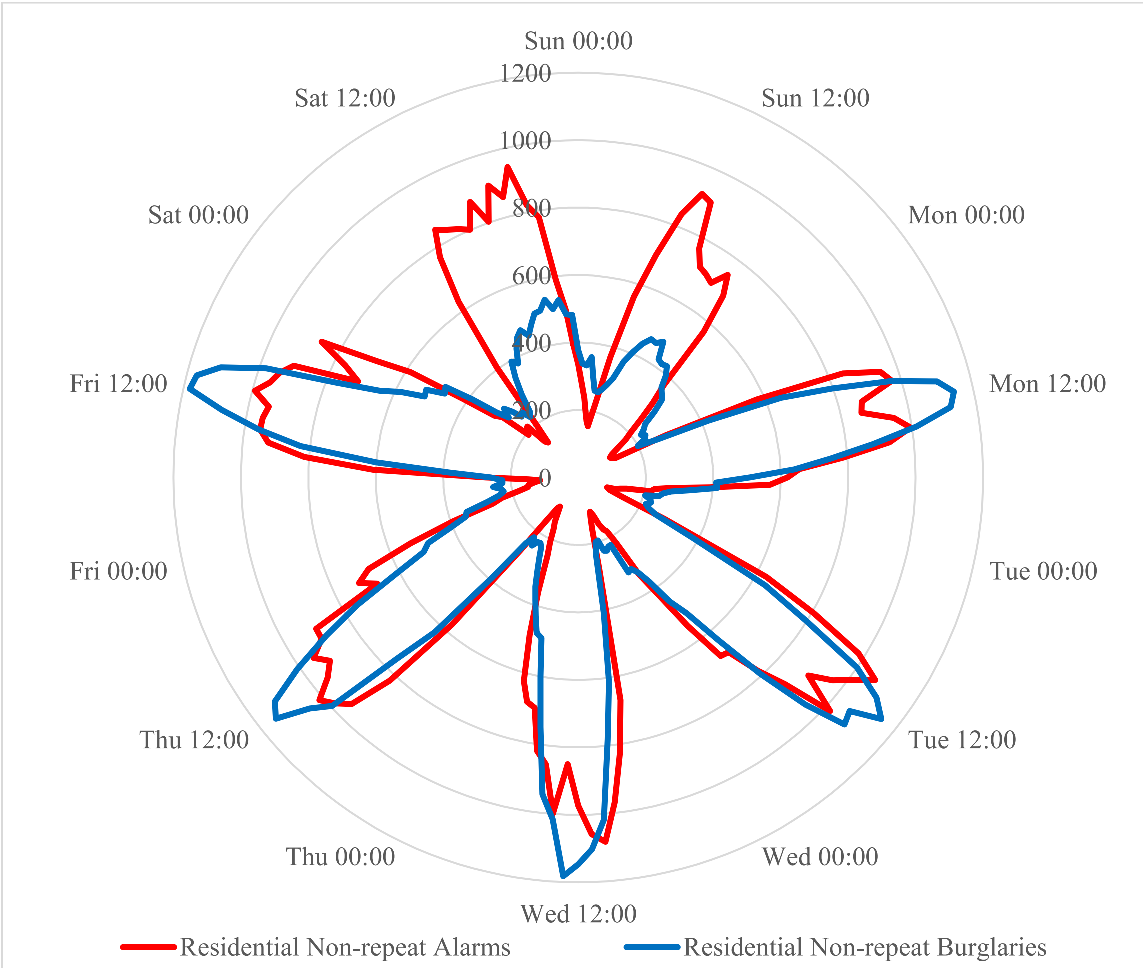

Figure 16: Comparison of Temporal Patterns for Residential Non-repeat Burglaries and Alarms

This review leads to the conclusion that the repeat and near-repeat phenomenon affects when both residential burglaries and alarms occur, though the effect is not as large on residential alarms. This supports the hypothesis made previously that the time it takes to decide to install an alarm system and have it installed in a residence is not being made within the time period where it would stop near-repeat burglaries.

Comparison of Occurrence Times for Commercial Alarms and Burglaries by Repeat or Non-repeat. A comparison of the data in *Table 17* and *Table 19* shows that commercial repeat alarms and commercial repeat burglaries follow the same basic time pattern, though there are a few differences. The most apparent difference is that the while commercial repeat alarms showed some variation in the sizes of the peaks, all peaks were relatively close in size. Commercial repeat burglaries had a large peak on Wednesday when compared to the other peaks.

Figure 17 shows a graphical comparison of the temporal patterns for commercial repeat burglaries and commercial repeat alarms. The temporal pattern for commercial repeat alarms is shown in red, while the pattern for burglaries is shown in blue. To keep the two patterns on approximately the same scale for ease of comparison, the number of burglaries per hour was multiplied by two. This graph makes it easy to see that there was more variation in the size of the peaks for repeat alarms than for repeat burglaries, though otherwise the two patterns are very similar. The graph also shows that there was some difference in the lows, with the burglary lows having minor increases during the day that do not show up with the alarms.

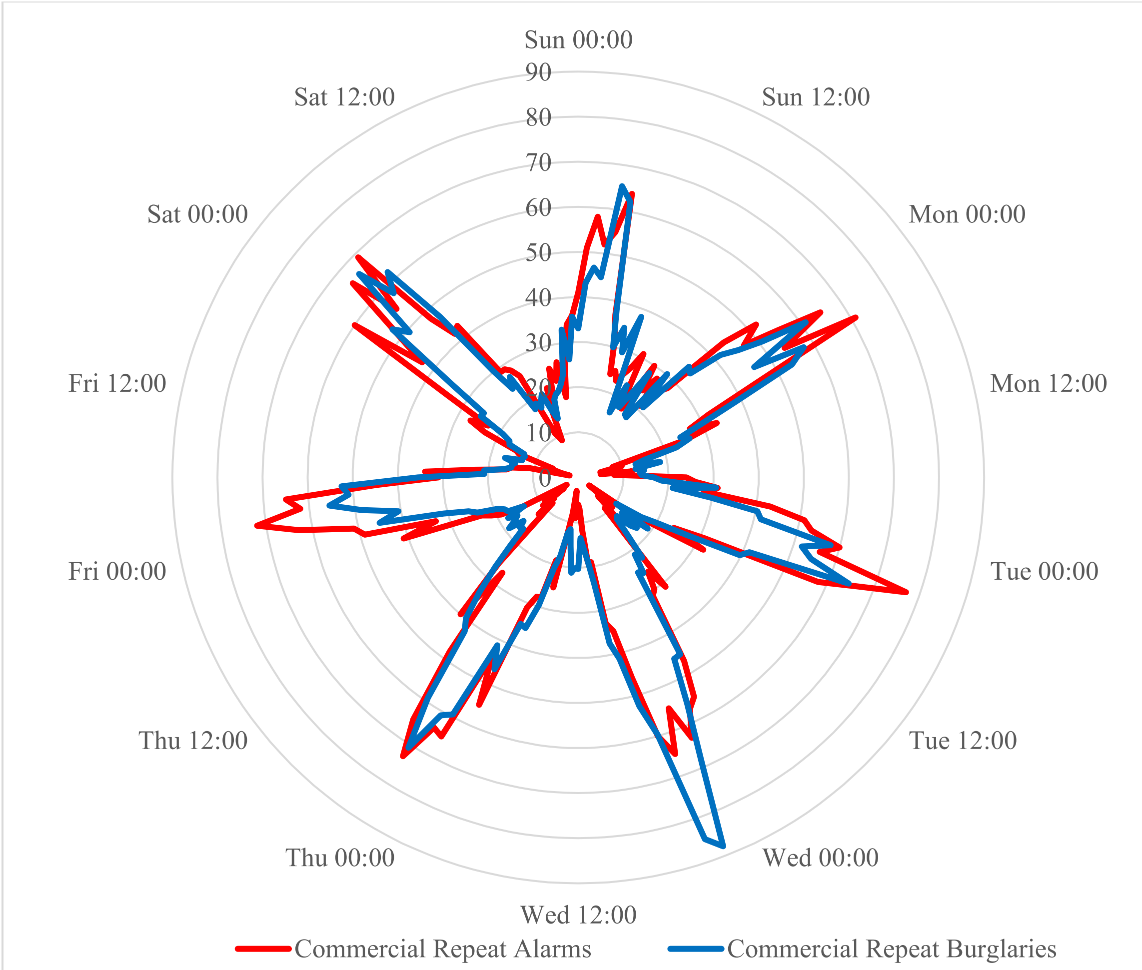

Figure 17: Comparison of Temporal Patterns for Commercial Repeat Burglaries and Alarms

A comparison of the data in *Table 18* and *Table 20* also shows similar patterns for commercial non-repeat burglaries and alarms. There is a difference with the non-repeat alarms showing the expected pattern of larger numbers occurring in the early morning hours and on weekends while the non-repeat burglaries had a large increase on Wednesday. The increase on Wednesday was not enough to make it more than on weekends as it did with repeat burglaries, but it was very close to the weekend amount.

Figure 18 shows a graph comparing the temporal patterns for commercial non-repeat alarms and burglaries. The pattern for alarms is shown in red while the burglary pattern is shown in blue. To keep the two patterns on approximately the same scale for ease of comparison, the number of burglaries per hour was multiplied by eight.

This graph shows that the alarms had higher numbers all weekend than occurred on lows during the week, while the burglaries did show distinct peaks and lows on the weekends. The graph also shows that the alarms tended to have broader peaks (spread over more time) than did the burglaries.

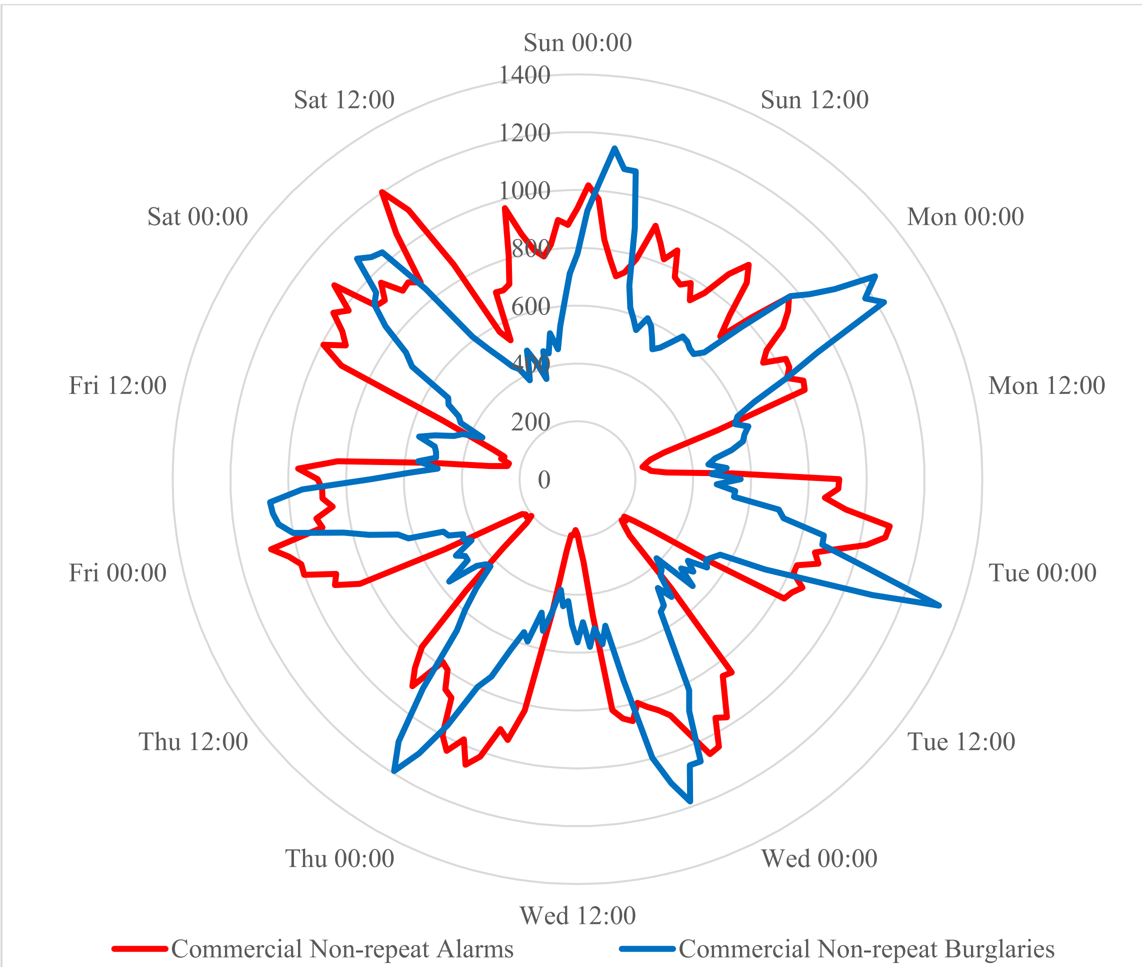

Figure 18: Comparison of Temporal Patterns for Commercial Non-repeat Burglaries and Alarms

This review leads to the conclusion that the repeat and near-repeat phenomenon is affecting when commercial burglaries and alarms occur.

Conclusion. When viewing burglaries and classifying them as repeat or non-repeat events, it has been shown that the timing of when these incidents occur is different. This is true whether the target type is commercial or residential, though for a better evaluation of the effect on commercial properties the distance involved may need to be changed. When examining alarms for the same effect, the time difference is also seen for both residential and commercial alarms. The time difference for alarms may be partially masked by the very low percentage of alarms that meet the definition of a repeat event.

In the case of residential alarms and burglaries, alarm times and burglary times have parallel patterns. In the case of commercial alarms, alarms and burglaries are only roughly similar in their temporal patterns. Interestingly, commercial repeat alarms have temporal patterns similar to all commercial burglaries, even non-repeat burglaries.

VII: HIGH, MEDIUM, AND LOW BURGLARY AREAS

In this chapter, the temporal patterns of burglaries and alarms will be compared based on the number of burglaries in the area. The review of the literature has shown that one of the factors affecting whether burglaries occur or not was if the location was in an area where there were a lot of burglaries and this comparison will determine if that same finding affects when the burglaries and alarms occur. The expected result of this analysis is the finding that the burglaries and alarms in an area will occur at different times based on the amount of burglary in the area. It is also expected to find that burglaries and alarms occur with similar time patterns.

This dissertation will use police districts to determine the area. The number of burglaries per district will be calculated for both commercial and residential burglaries. The districts will be grouped into three groups based on the lowest 25% of the districts in each target type being low burglary areas, the highest 25% of the districts in each target type being high burglary areas, and the middle 50% being mid-range burglary areas. The time patterns for the burglaries and alarms in each group will be calculated and compared to determine if the number of burglaries makes a difference in the occurrence time.

Districts may or may not have commercial burglaries or residential burglaries. A district may have residential alarms even if it has no residential burglaries and residential burglaries with no residential alarms. The same is true for commercial burglaries and alarms. If a district had no residential burglaries, it was not assigned to a group and the residential alarms are not counted in this study. The same rule was applied for commercial burglaries and alarms.

Table 21 shows the number of police patrol districts, the number of burglaries, and the number of alarms in each group, broken down by residential or commercial target type. This table shows that the high residential burglary group had almost five times as many residential burglaries as the low residential burglary group. The middle residential burglary group had almost seven times the number of burglaries as the low burglary area. The pattern for the number of residential alarms is slightly different with the high residential burglary group having only slightly more than three times the number of alarms as the low burglary group while the medium burglary group had more than five times as many alarms.

Table 21: Number of Burglaries, Alarms, and Districts per Level of Burglary Area

	Level of Burglaries	Number of Districts	Burglaries	Alarms	Alarms per Burglary
Residential	Low	34	2,647	9,935	3.75
Residential	Middle	62	18,193	55,484	3.05
Residential	High	33	14,573	31,173	2.14
Commercial	Low	32	1,674	16,844	10.06
Commercial	Middle	62	8,733	71,666	8.21
Commercial	High	32	6,211	39,137	6.30

The high commercial burglary group had just under four times as many burglaries as the low burglary group, though they had the same number of police districts. It also had only slightly more than twice as many alarms as the low burglary group. The middle commercial burglary group had more than five times as many burglaries and slightly more than four times as many alarms as the low burglary group.

Aoristic Occurrence Times for Burglaries in Low Residential Burglary Areas

There were 2,647 burglaries in the 34 districts that make up the low residential burglary areas in San Antonio. *Table 22* shows the aoristic times for when burglaries occur in these areas. The time pattern is similar to the time pattern for residential burglaries in middle residential burglary areas as shown in *Table 23*, with most burglaries happening during the week and the number of burglaries peaking between 11:00 a.m. and 2:00 p.m. There is a difference with the peak number of burglaries, with a larger percentage of the peak occurring on weekends than in middle residential burglary areas. The peak on Friday also shows a longer time period for the peak than the peak in middle residential burglary areas.

Table 22: Aoristic Occurrence Time for Low Residential Burglary Area

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
2400-0059	13.3	8.4	8.7	7.1	11.0	9.9	11.0	69.4
0100-0159	13.8	9.3	6.6	7.1	7.7	10.8	9.9	65.1
0200-0259	9.4	11.1	7.6	7.5	6.5	8.3	11.0	61.4
0300-0359	11.3	8.9	9.4	10.0	9.6	10.1	6.9	66.2
0400-0459	11.6	7.9	8.5	8.4	7.3	6.9	6.4	57.0
0500-0559	9.1	8.4	9.1	7.0	6.5	7.8	8.7	56.5
0600-0659	8.9	11.9	8.1	7.1	11.0	7.2	7.1	61.3
0700-0759	12.8	13.9	9.5	12.7	10.2	14.1	8.2	81.3
0800-0859	10.3	21.1	16.1	18.5	14.7	16.3	10.8	107.8
0900-0959	8.2	21.3	23.3	21.4	20.5	20.3	11.3	126.3
1000-1059	15.0	23.0	29.4	24.2	21.9	23.3	12.8	149.5
1100-1159	14.2	25.7	34.0	23.2	22.3	26.8	13.4	159.5
1200-1259	15.7	31.9	29.3	26.9	25.5	28.6	14.0	171.9
1300-1359	15.4	29.6	30.9	29.8	26.0	27.9	12.3	171.9
1400-1459	16.2	27.1	30.0	25.1	27.2	26.6	19.0	171.3
1500-1559	17.1	21.3	30.7	22.3	22.8	27.8	14.1	156.0
1600-1659	12.4	21.2	25.4	21.1	17.7	23.8	12.1	133.8
1700-1759	11.9	16.3	17.7	20.5	15.5	27.2	14.4	123.5
1800-1859	16.7	18.6	16.4	15.1	19.0	21.7	16.9	124.4
1900-1959	15.1	12.8	14.1	16.2	14.9	29.1	21.1	123.3
2000-2059	16.7	13.1	13.9	13.2	11.8	28.2	18.0	114.8
2100-2159	13.5	11.0	12.1	16.5	13.5	19.0	20.6	106.2
2200-2259	8.5	11.3	13.0	11.5	11.7	19.6	13.8	89.5
2300-2359	12.3	12.0	14.0	14.7	11.9	13.2	20.8	98.9
Total	309.1	397.3	417.7	387.1	366.6	454.6	314.6	n=2,647

Figure 19 shows the graphical representation of the time pattern for burglaries in low residential burglary areas in red and for middle residential burglaries in blue. To keep the two patterns on approximately the same scale for ease of comparison, the number of burglaries per hour in the low residential burglary areas was multiplied by eight. This graph shows that the patterns are similar, with the noted difference of the numbers on weekends being higher for low residential burglary areas. It also shows that the peak on Friday evening is wider than for middle residential burglary areas. The visual comparison emphasizes the differences noted for weekends and in the weekday peaks also.

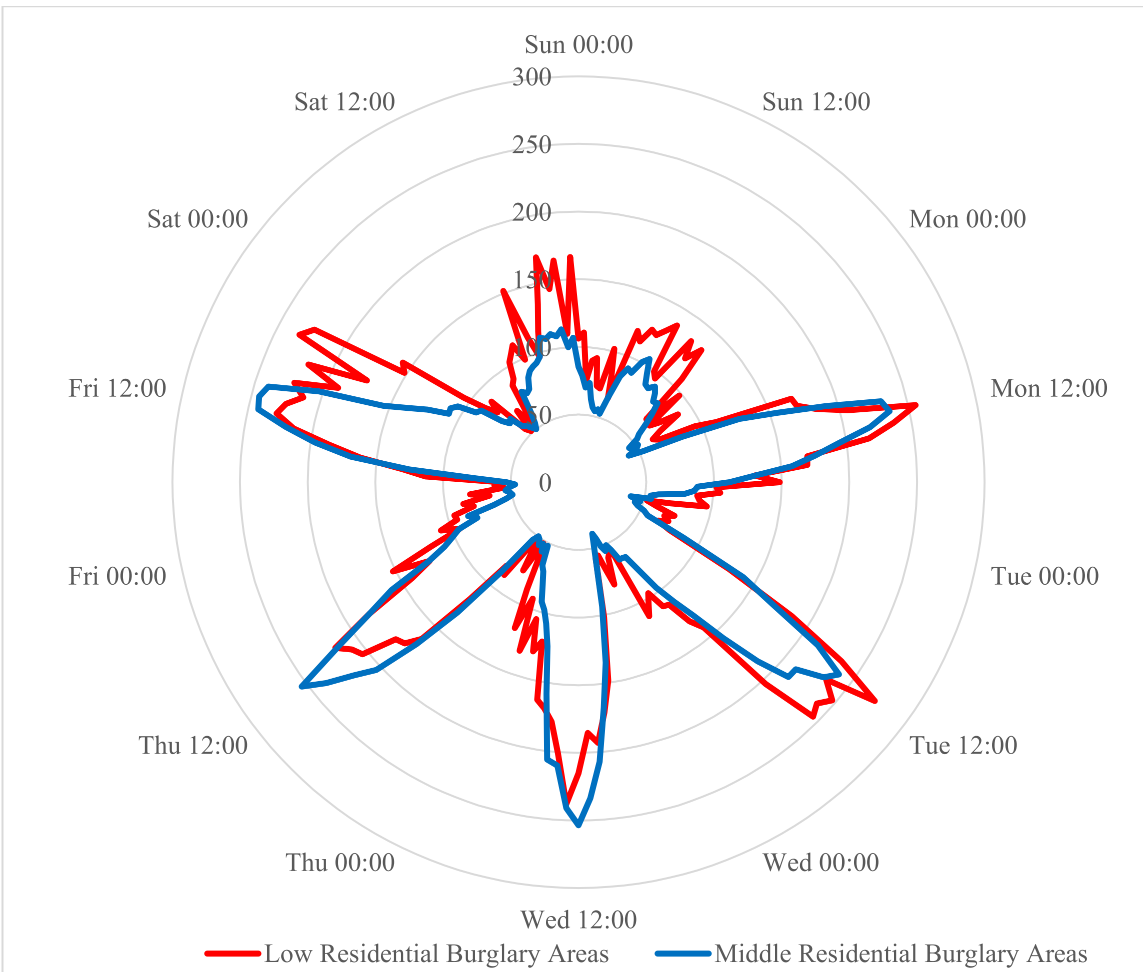

Figure 19: Comparison of Aoristic Temporal Patterns for Burglaries in Low and Middle Residential Burglary Areas

Aoristic Occurrence Times for Burglaries in Middle Residential Burglary Areas

There were 18,193 burglaries in the 62 districts that were in the middle burglary area for residential burglaries. *Table 23* shows the aoristic occurrence times for when during the week these burglaries occurred. The time pattern for the middle burglary areas was very similar to the high residential burglary areas time pattern as shown in *Table 24*.

Table 23: Aoristic Occurrence Time for Medium Residential Burglary Area

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
2400-0059	85.4	57.0	55.1	55.5	52.2	54.6	72.4	432.2
0100-0159	78.9	53.7	40.0	50.9	57.9	49.5	66.8	397.7
0200-0259	70.2	45.1	47.9	54.6	52.4	51.1	68.7	390.0
0300-0359	73.7	52.0	44.2	50.3	55.0	54.3	58.6	388.0
0400-0459	61.8	49.4	47.0	43.7	51.0	51.3	56.8	361.1
0500-0559	56.4	42.1	52.8	39.4	49.7	46.8	53.4	340.6
0600-0659	53.8	53.1	56.6	55.0	54.4	53.3	50.1	376.3
0700-0759	55.7	83.7	87.9	93.5	87.6	76.0	54.3	538.7
0800-0859	53.0	127.9	140.5	134.9	131.3	125.4	62.0	775.0
0900-0959	66.7	155.5	168.9	167.6	169.1	169.4	79.0	976.2
1000-1059	83.9	191.1	214.1	207.2	203.9	196.9	75.9	1,173.1
1100-1159	91.8	231.2	239.2	233.7	219.1	220.1	77.7	1,312.8
1200-1259	89.8	235.7	231.5	253.6	238.2	242.6	85.8	1,377.2
1300-1359	100.6	219.3	211.9	241.0	254.3	244.4	89.7	1,361.1
1400-1459	105.1	194.3	211.5	209.9	213.2	239.8	92.0	1,265.8
1500-1559	95.0	175.9	187.2	206.2	181.8	203.1	93.5	1,142.6
1600-1659	87.5	158.2	157.5	158.0	159.5	154.9	97.1	972.6
1700-1759	86.4	130.9	130.0	123.5	125.7	137.3	110.5	844.2
1800-1859	90.5	111.5	113.2	107.3	109.8	123.9	108.6	764.8
1900-1959	86.8	88.0	96.9	97.7	101.4	108.3	111.4	690.5
2000-2059	81.1	85.9	77.8	92.5	94.9	109.1	108.9	650.3
2100-2159	82.7	78.5	65.3	80.2	79.1	105.1	113.7	604.5
2200-2259	73.8	59.7	64.7	70.9	85.4	91.5	100.0	545.9
2300-2359	65.4	54.0	64.7	66.9	64.6	89.3	106.6	511.7
Total	1,876.2	2,733.6	2,806.2	2,894.2	2,891.3	2,997.9	1,993.5	n=18,193

Figure 20 shows the graphical representation of the comparison of occurrence times for medium residential burglary areas to high residential burglary areas. In this graph, the pattern for the high residential burglary areas is shown in red and the pattern

for the middle residential burglary areas is shown in blue. This graph shows that the two had very similar patterns with some differences in the shape of the peak.

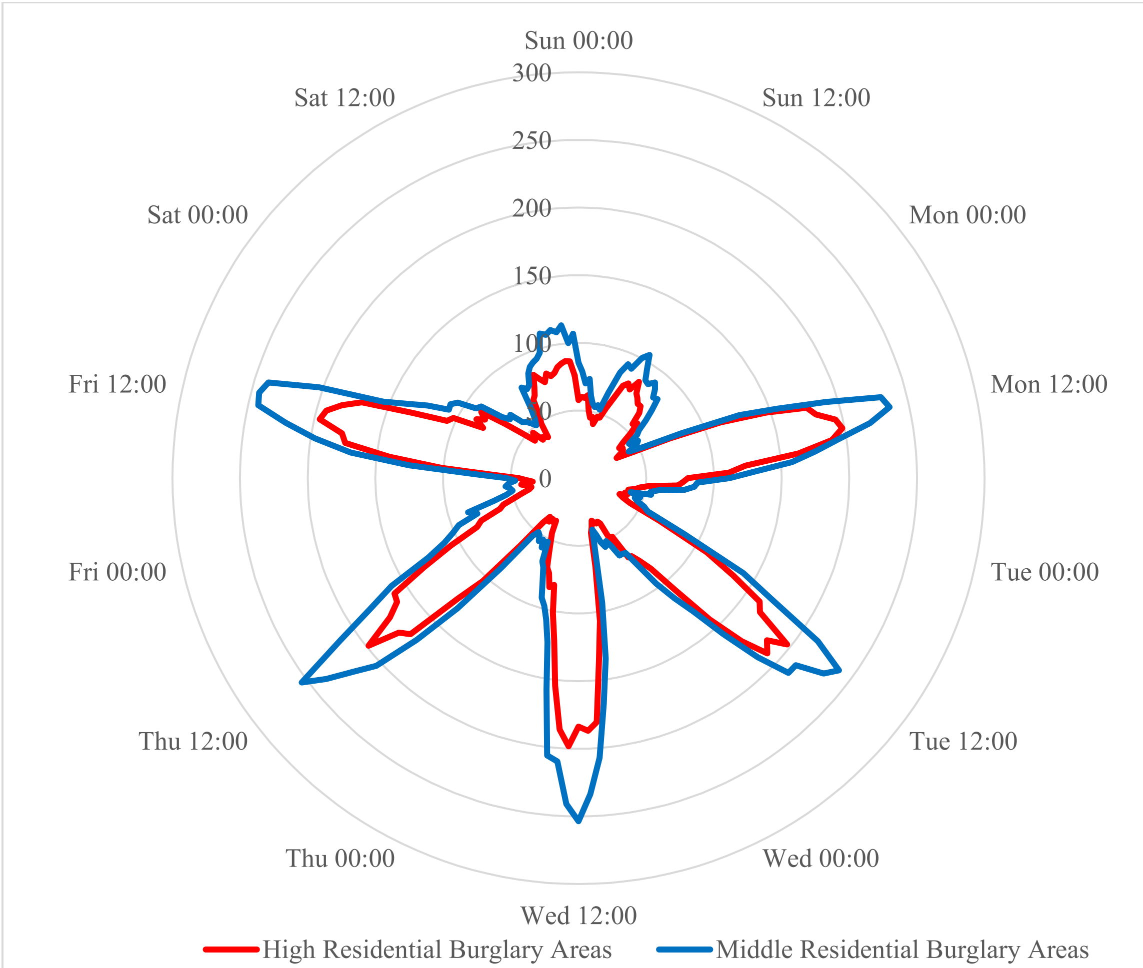

Figure 20: Comparison of Aoristic Temporal Patterns for Burglaries in Middle and High Residential Burglary Areas

Aoristic Occurrence Times for Burglaries in High Residential Burglary Areas

There were 14,573 residential burglaries reported in the 33 districts that make up the high burglary areas. *Table 24* shows the aoristic time pattern for when during the week these burglaries occurred. Comparing this table with *Table 23* shows that the temporal pattern for residential burglaries in high residential burglary areas is similar to the pattern for low residential burglary areas with similar differences on Friday and weekends as those noted when low and middle residential burglary areas were compared.

Table 24: Aoristic Occurrence Time for High Residential Burglary Area

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
2400-0059	57.7	42.0	37.8	37.2	45.0	37.3	53.2	310.2
0100-0159	60.1	37.4	40.8	35.1	35.5	35.4	42.5	286.8
0200-0259	59.6	39.5	36.1	36.0	37.5	38.2	45.2	292.0
0300-0359	61.7	38.8	37.9	35.0	35.7	42.5	47.5	299.1
0400-0459	50.3	35.1	32.4	33.0	38.7	33.9	38.7	262.2
0500-0559	45.4	31.9	35.8	37.9	35.6	38.7	40.2	265.5
0600-0659	46.3	44.3	42.2	41.4	41.7	44.2	39.3	299.5
0700-0759	41.3	73.6	67.9	66.9	65.5	62.8	37.7	415.7
0800-0859	47.4	112.5	109.4	106.8	103.9	101.6	48.7	630.4
0900-0959	47.3	147.1	135.0	135.3	125.5	140.8	54.2	785.2
1000-1059	56.0	176.4	161.9	180.8	169.4	174.3	66.9	985.7
1100-1159	64.2	181.6	166.6	186.9	174.9	177.8	69.1	1,021.1
1200-1259	75.8	194.6	197.3	183.7	198.5	196.1	75.1	1,121.0
1300-1359	79.1	198.3	183.6	198.3	173.1	192.9	83.2	1,108.7
1400-1459	75.6	189.4	190.2	186.3	162.2	182.7	78.9	1,065.2
1500-1559	84.1	163.4	170.4	154.4	160.5	169.7	75.2	977.7
1600-1659	75.8	123.7	142.4	121.0	131.5	131.9	80.9	807.2
1700-1759	73.3	111.1	108.9	101.4	106.7	106.0	78.1	685.6
1800-1859	70.3	80.8	85.6	81.0	83.1	102.6	79.7	583.2
1900-1959	70.2	77.4	76.1	83.4	78.4	79.6	83.5	548.7
2000-2059	65.9	73.7	69.8	73.5	62.1	87.1	85.6	517.8
2100-2159	56.7	52.1	69.2	69.9	59.0	81.4	87.1	475.4
2200-2259	59.5	46.1	49.8	59.4	49.1	87.0	86.7	437.6
2300-2359	50.4	42.9	58.8	51.7	43.4	68.3	76.0	391.5
Total	1,474.1	2,313.7	2,305.9	2,296.4	2,216.6	2,413.0	1,553.3	n=14,573

Figure 21 shows a graphical comparison of the aoristic occurrence time patterns for high residential burglary areas and low residential burglary areas. The red line shows the pattern for the high burglary area while the blue line shows the pattern for the low residential burglary areas. To keep the two patterns on approximately the same scale for ease of comparison, the number of burglaries per hour in the low residential burglary areas pattern were multiplied by six. Examination of this graph shows that the two patterns are similar, except for the previously noted differences for low residential burglary areas on Friday evening and through the weekend.

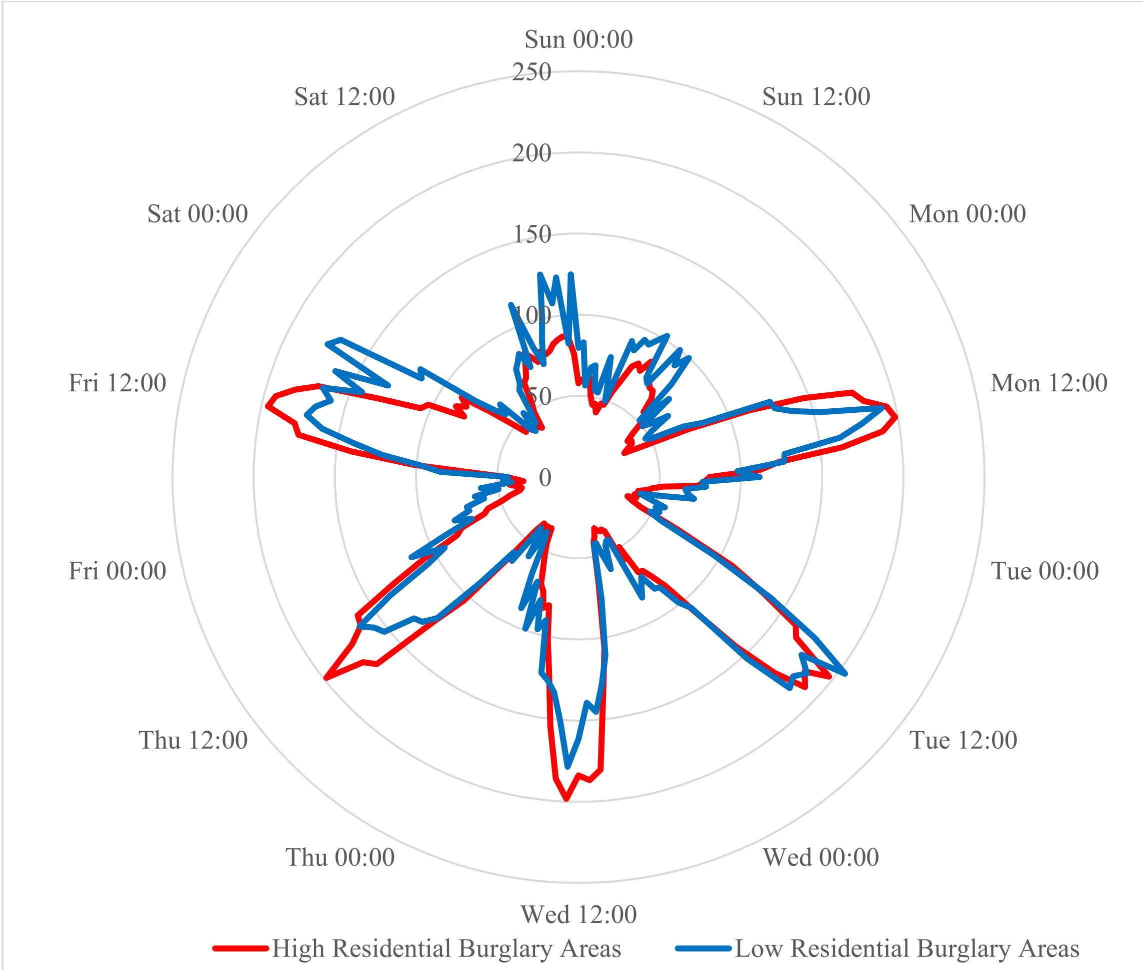

Figure 21: Comparison of Aoristic Temporal Patterns for Burglaries in High and Low Residential Burglary Areas

Occurrence Times for Alarms in Low Residential Burglary Areas

There were 9,935 residential burglary alarms in the 34 districts that make up the low residential burglary areas in San Antonio. *Table 25* shows the distribution of when these alarms occurred during the week. A review of the table data shows that the temporal pattern is similar to the pattern for alarms in middle residential areas, as shown in *Table 26*. There are differences in the patterns of the peaks, and the Tuesday peak for low burglary areas was one of the lowest peaks while it was one of the highest peaks in the middle burglary areas.

Table 25: Occurrence Time for Alarms in Low Residential Burglary Area

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
2400-0059	40	30	14	21	17	17	28	167
0100-0159	56	23	9	15	19	26	21	169
0200-0259	32	16	22	19	22	18	20	149
0300-0359	20	15	12	16	15	20	30	128
0400-0459	23	13	11	17	9	15	17	105
0500-0559	14	14	15	18	17	14	15	107
0600-0659	24	29	34	28	29	38	23	205
0700-0759	48	62	69	65	56	64	45	409
0800-0859	71	104	84	69	92	80	57	557
0900-0959	79	113	104	105	108	93	92	694
1000-1059	81	109	107	124	129	97	85	732
1100-1159	114	73	95	117	110	94	97	700
1200-1259	103	80	91	124	107	110	88	703
1300-1359	63	99	87	73	89	114	85	610
1400-1459	71	104	99	91	113	99	91	668
1500-1559	69	83	78	93	97	107	79	606
1600-1659	64	77	71	79	84	81	83	539
1700-1759	89	49	69	83	66	66	90	512
1800-1859	79	68	60	83	74	83	91	538
1900-1959	64	62	57	64	71	80	101	499
2000-2059	33	36	38	47	61	87	82	384
2100-2159	37	33	32	40	44	75	57	318
2200-2259	32	26	29	20	33	36	48	224
2300-2359	22	26	25	39	31	26	43	212
Total	1,328	1,344	1,312	1,450	1,493	1,540	1,468	n=9,935

Figure 22 shows a graphical representation of the comparison of occurrence time patterns for alarms in low and middle residential burglary areas. To keep the two patterns on approximately the same scale for ease of comparison, the number of alarms per hour for the low burglary areas was multiplied by four. The alarms in the low residential burglary areas are shown in red and the middle residential burglary areas are shown in blue. This graph shows that the two time patterns are similar but there are differences in the peaks of the pattern. In particular, the highest peak in the low burglary area occurred

on Thursday, but it occurred on Tuesday in the middle residential burglary areas. Tuesday was one of the lowest peaks in the pattern for the low residential burglary areas.

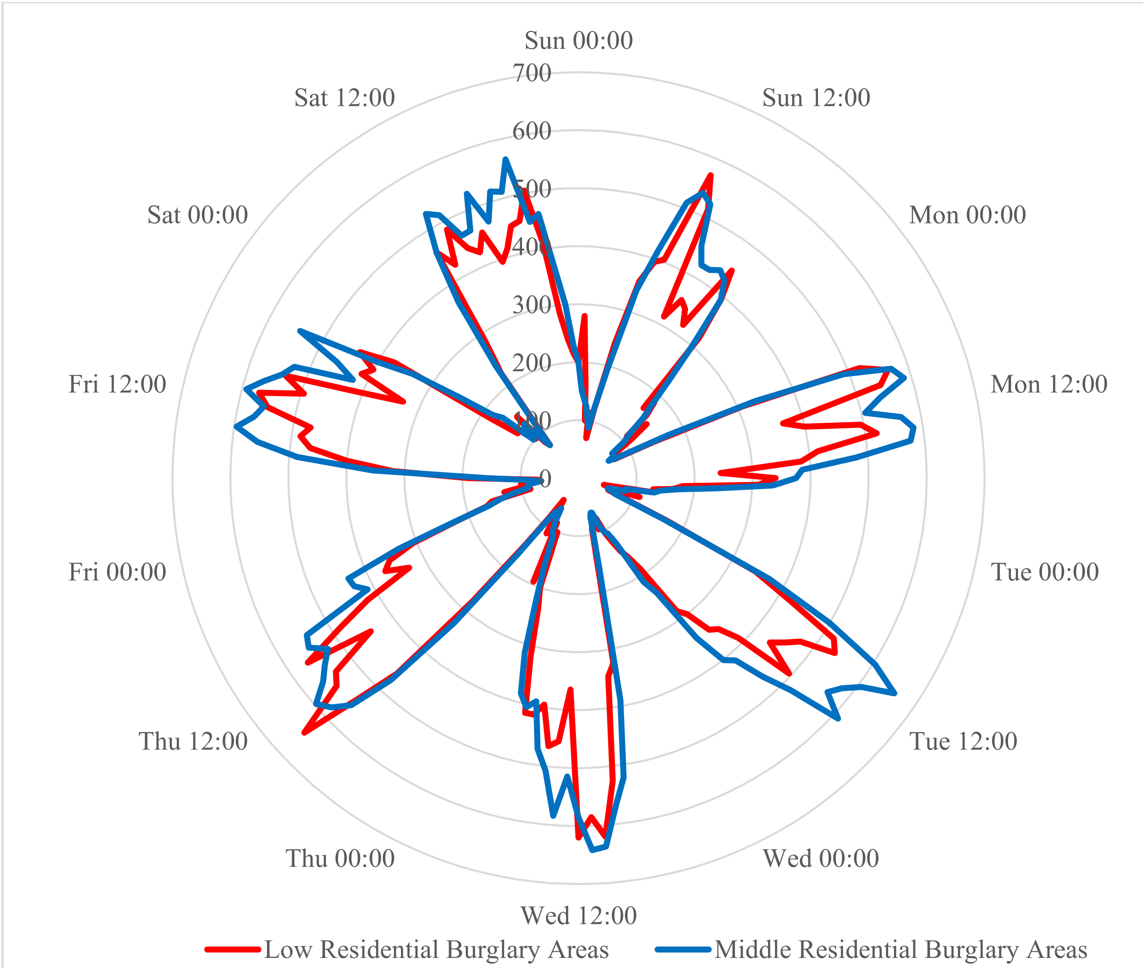

Figure 22: Comparison of Temporal Patterns for Alarms in Low and Middle Residential Burglary Areas

Occurrence Times for Alarms in Middle Residential Burglary Areas

There were 55,484 residential burglary alarms in the 62 districts that make up the middle residential burglary areas in San Antonio. *Table 26* shows the distribution of when these alarms occurred during the week. A comparison of the data in the table to the data in *Table 27* shows that the times tended to occur in a similar temporal pattern to the pattern for when alarms in high residential burglary areas occurred.

Table 26: Occurrence Time for Alarms in Medium Residential Burglary Area

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
2400-0059	200	101	83	104	103	112	167	870
0100-0159	152	72	84	92	87	88	102	677
0200-0259	136	73	61	64	60	88	125	607
0300-0359	124	71	53	63	68	81	133	593
0400-0459	102	60	63	69	72	64	94	524
0500-0559	88	77	68	95	92	89	75	584
0600-0659	126	172	162	163	167	158	121	1,069
0700-0759	197	333	372	390	330	355	240	2,217
0800-0859	340	491	500	522	475	486	367	3,181
0900-0959	417	571	604	570	554	557	459	3,732
1000-1059	510	587	659	637	581	596	526	4,096
1100-1159	537	539	606	642	597	569	513	4,003
1200-1259	524	507	581	585	563	556	464	3,780
1300-1359	453	566	566	515	544	593	466	3,703
1400-1459	424	584	610	584	523	568	527	3,820
1500-1559	424	576	517	508	549	541	469	3,584
1600-1659	434	481	467	472	541	526	517	3,438
1700-1759	424	386	415	392	411	424	511	2,963
1800-1859	394	375	401	405	429	462	564	3,030
1900-1959	299	335	343	384	433	543	450	2,787
2000-2059	226	238	239	315	333	402	461	2,214
2100-2159	179	171	211	219	223	338	363	1,704
2200-2259	153	143	129	162	162	245	300	1,294
2300-2359	115	133	108	109	139	183	227	1,014
Total	6,978	7,642	7,902	8,061	8,036	8,624	8,241	n=55,484

Figure 23 shows a graphical representation of the comparison between the time pattern for the alarms in the medium and high residential burglary areas. To keep the scale of the two patterns the same for easier comparison, the number of alarms per hour for the high residential burglary areas was multiplied by two. The alarms in the medium residential burglary areas are shown in blue while the alarms in high residential burglary areas are shown in red. This graph makes it clear that the patterns are very similar, with the differences only in the exact shape of the peaks.

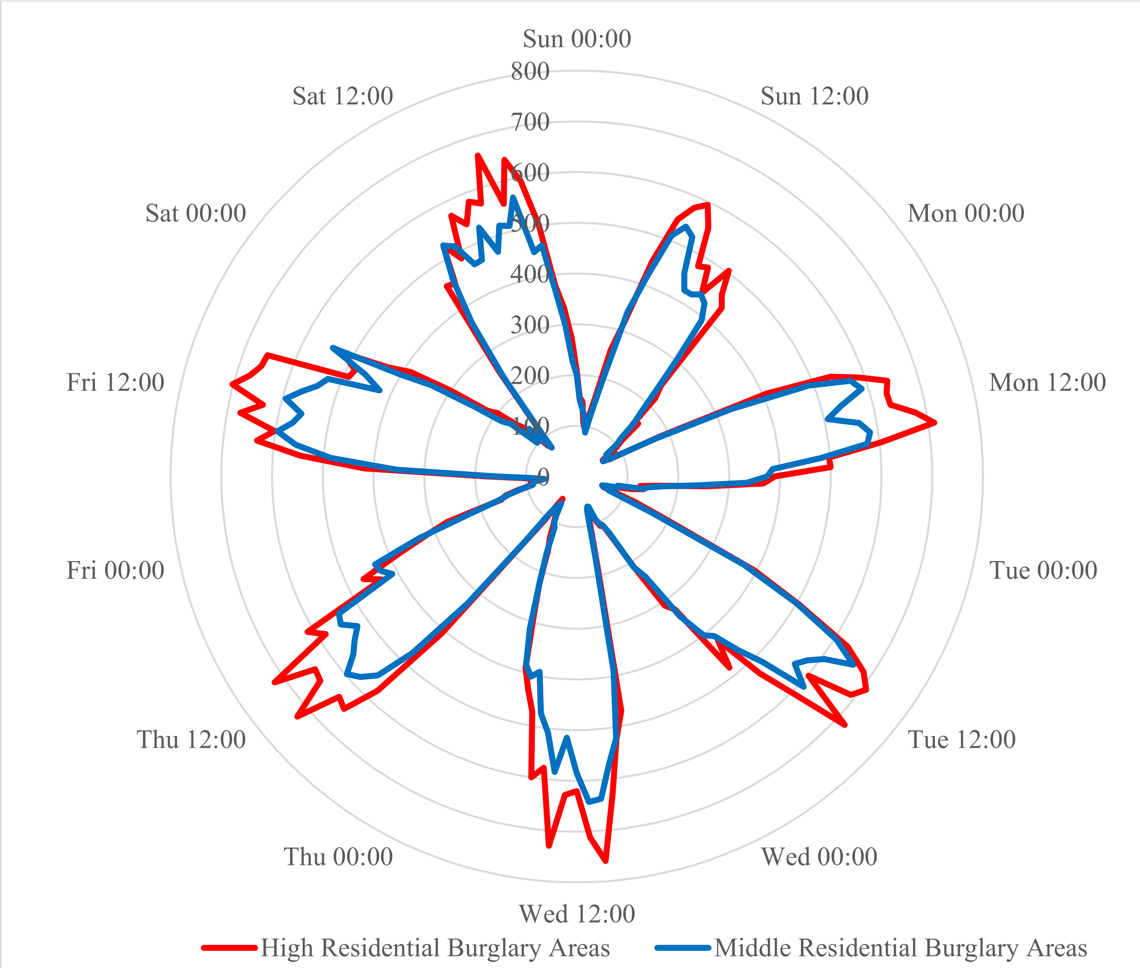

Figure 23: Comparison of Temporal Patterns for Alarms in Middle and High Residential Burglary Areas

Occurrence Times for Alarms in High Residential Burglary Areas

There were 31,173 residential burglary alarms in the 32 districts that make up the high residential burglary areas in San Antonio. *Table 27* shows the distribution of when these alarms occurred during the week. When compared to the data in *Table 25*, the differences between the temporal patterns for the alarms in low and high residential burglary areas are similar to the differences between low and middle residential burglary areas.

Table 27: Occurrence Time for Alarms in High Residential Burglary Area

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
2400-0059	104	57	56	54	53	59	100	483
0100-0159	78	48	41	48	45	44	79	383
0200-0259	74	36	35	40	41	46	70	342
0300-0359	55	30	29	32	26	40	55	267
0400-0459	49	44	28	39	34	40	41	275
0500-0559	56	36	62	53	55	49	50	361
0600-0659	76	91	98	95	85	89	63	597
0700-0759	129	204	198	235	204	209	129	1,308
0800-0859	160	269	253	262	288	273	227	1,732
0900-0959	224	295	315	315	324	317	225	2,015
1000-1059	272	320	342	380	319	301	263	2,197
1100-1159	289	316	354	356	363	337	243	2,258
1200-1259	297	317	345	310	323	317	285	2,194
1300-1359	277	339	301	314	320	351	271	2,173
1400-1459	239	356	360	365	360	337	291	2,308
1500-1559	243	302	304	289	292	329	285	2,044
1600-1659	219	249	265	300	306	327	331	1,997
1700-1759	252	250	213	236	217	245	278	1,691
1800-1859	229	195	241	215	233	242	320	1,675
1900-1959	219	184	163	195	193	261	296	1,511
2000-2059	122	128	154	143	160	216	251	1,174
2100-2159	109	80	104	112	135	193	189	922
2200-2259	75	63	70	77	78	150	167	680
2300-2359	80	67	55	66	72	109	137	586
Total	3,927	4,276	4,386	4,531	4,526	4,881	4,646	n=31,173

Figure 24 shows the graphical comparison of the temporal patterns for alarms in high and low residential burglary areas. To keep the scale of the two patterns the same for easier comparison, the number of alarms per hour for the low residential burglary areas was multiplied by three. The alarms in the low residential burglary areas are shown in blue while the alarms in high residential burglary areas are shown in red. This graph shows that the two patterns are similar, but that the pattern for high residential burglary areas tends to stay at the peak for a longer period of time, even though the increase begins and the decrease ends at approximately the same times as for low residential burglary areas.

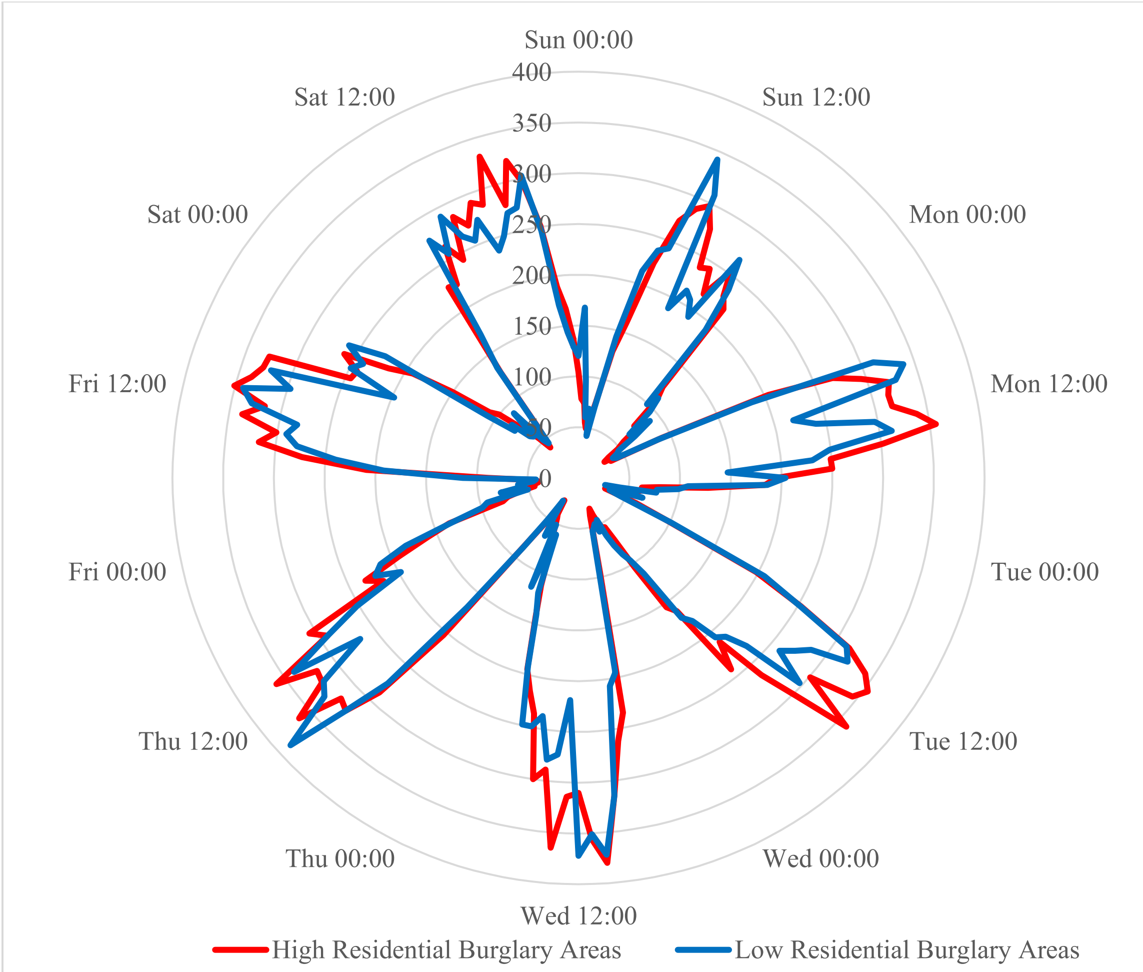

Figure 24: Comparison of Temporal Patterns for Alarms in High and Low Residential Burglary Areas

Aoristic Occurrence Times for Burglaries in Low Commercial Burglary Areas

There were 1,674 burglaries in the 32 districts that make up the low commercial burglary areas in San Antonio. *Table 28* shows the aoristic times for when burglaries occur in these areas. When compared to the aoristic times for commercial burglaries in middle commercial burglary areas as shown in *Table 29*, the times generally follow the same pattern for both type of areas. The primary differences are in the way the numbers at the peak and which days seem to have the highest peak numbers. For low burglaries areas, the peak times tend to have multiple peaks while the middle burglary areas tend to have a single peak. Low burglary areas tend to have the highest peaks on Wednesday and Sunday while middle burglary areas have the highest peaks on Tuesday, Wednesday, and Thursday.

Table 28: Aoristic Occurrence Time for Low Commercial Burglary Area

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
2400-0059	11.1	12.2	12.0	12.0	15.4	18.2	16.9	97.8
0100-0159	11.5	16.7	15.0	18.1	18.5	14.6	13.4	107.7
0200-0259	20.6	19.7	12.9	21.4	18.2	14.1	16.7	123.5
0300-0359	20.2	15.9	17.4	20.8	14.8	18.7	15.5	123.2
0400-0459	16.6	16.9	12.2	20.4	13.7	19.4	15.0	114.2
0500-0559	18.7	20.1	16.3	16.5	14.1	15.2	19.3	120.2
0600-0659	17.3	12.1	8.9	11.9	10.9	10.0	14.0	85.0
0700-0759	8.6	8.6	7.5	9.3	9.8	9.6	5.7	59.1
0800-0859	7.2	7.1	8.2	7.5	6.9	7.1	7.8	51.8
0900-0959	8.9	3.9	5.7	5.4	7.4	6.7	5.9	43.9
1000-1059	12.0	5.5	5.9	9.4	9.0	5.2	6.2	53.2
1100-1159	9.5	8.4	7.1	7.5	5.4	4.2	7.1	49.2
1200-1259	7.9	6.1	7.0	7.7	8.2	6.6	6.4	49.7
1300-1359	7.2	6.9	5.4	7.5	5.5	8.4	9.1	49.9
1400-1459	5.0	3.7	6.8	5.3	6.0	6.6	6.4	39.8
1500-1559	4.7	3.8	5.6	5.0	5.4	8.4	5.9	38.7
1600-1659	8.4	5.8	6.0	5.7	6.4	6.7	5.7	44.7
1700-1759	7.2	7.2	5.4	10.3	4.7	4.9	6.5	46.3
1800-1859	7.6	6.7	4.8	8.4	4.8	7.2	5.9	45.3
1900-1959	8.4	8.7	4.3	8.9	7.8	8.0	9.3	55.5
2000-2059	8.9	8.4	7.8	10.8	9.0	7.5	7.0	59.3
2100-2159	9.9	5.0	10.9	9.9	10.2	8.0	9.2	63.0
2200-2259	10.1	9.5	10.9	9.5	10.5	9.3	8.4	68.2
2300-2359	14.9	12.0	12.8	13.1	12.7	9.5	9.7	84.8
Total	262.2	230.7	216.7	262.2	235.1	234.1	233.0	n=1,674

Figure 25 shows the graphical representation of the time pattern comparing low commercial burglary areas in red and middle commercial burglary areas in blue. To keep the patterns on approximately the same scale for ease of comparison, the number of burglaries per hour in the low commercial burglary areas pattern were multiplied by five. This graph shows that the patterns are similar, with the above noted differences.

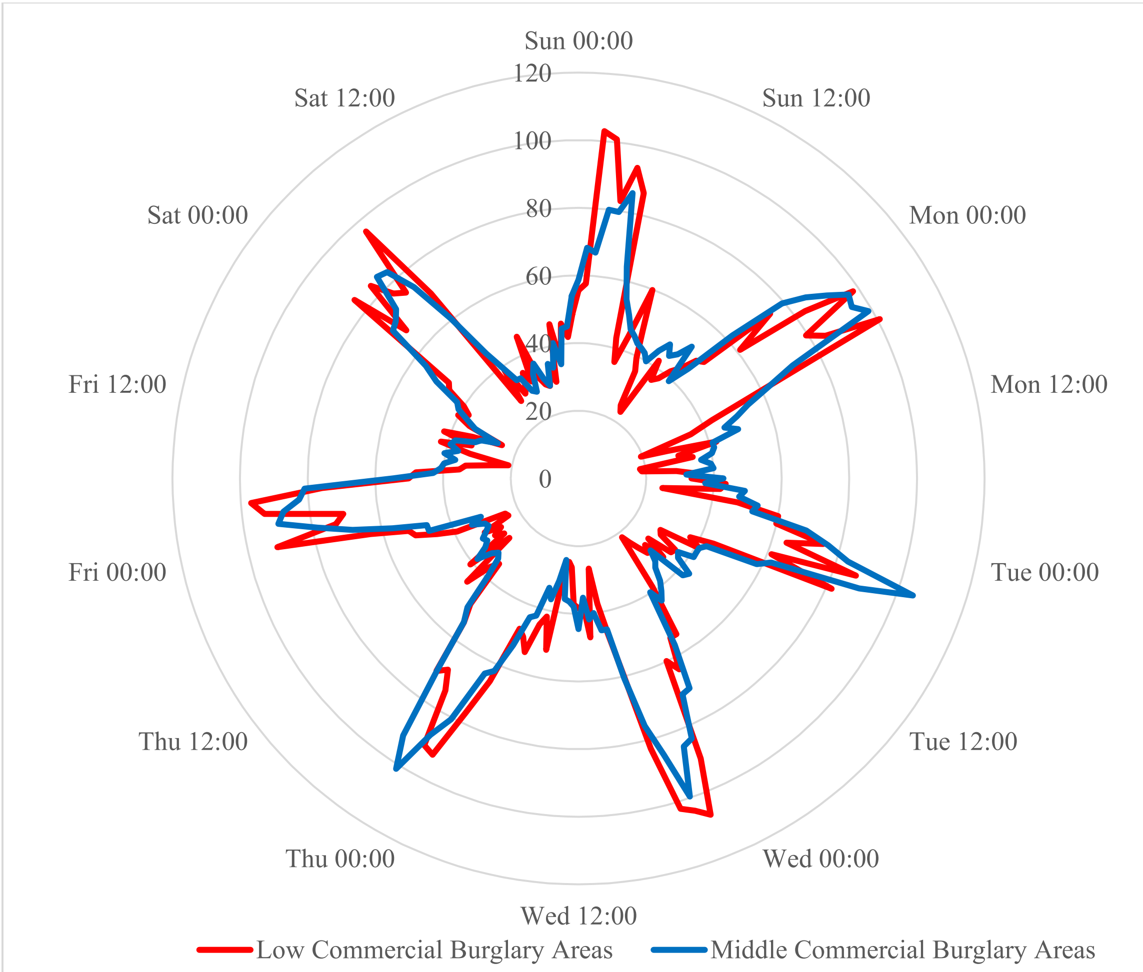

Figure 25: Comparison of Aoristic Temporal Patterns for Low and Middle Commercial Burglary Areas

Aoristic Occurrence Times for Burglaries in Medium Commercial Burglary Areas

There were 8,733 burglaries in the 62 districts that were in the medium burglary area for commercial burglaries. *Table 29* shows the aoristic occurrence times for when during the week these burglaries occurred.

When the occurrence times for burglaries in middle commercial burglary areas are compared to the occurrence times for burglaries in high commercial burglary area (shown in *Table 30*), they appear to be very similar times.

Table 29: Aoristic Occurrence Time for Medium Commercial Burglary Area

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
2400-0059	58.8	85.8	69.0	70.8	64.0	68.5	70.2	487.1
0100-0159	68.3	91.2	76.4	83.8	80.6	78.5	71.2	549.8
0200-0259	67.0	96.5	83.4	85.1	87.5	89.7	73.6	582.7
0300-0359	80.0	95.3	104.7	99.6	101.4	87.8	84.3	653.1
0400-0459	79.7	98.9	89.0	85.4	92.0	82.7	83.2	611.0
0500-0559	85.9	71.5	62.1	75.7	69.7	81.0	74.6	520.5
0600-0659	64.2	62.0	58.5	60.6	54.3	54.8	60.4	414.9
0700-0759	54.8	54.5	42.8	45.4	50.2	43.0	45.8	336.7
0800-0859	50.6	50.3	41.1	45.4	39.2	40.8	39.3	306.8
0900-0959	46.7	45.7	41.1	40.1	33.6	40.0	34.3	281.4
1000-1059	45.3	49.4	41.2	41.8	32.3	36.9	34.1	280.9
1100-1159	43.5	41.0	36.6	35.3	33.9	40.3	29.3	259.9
1200-1259	42.8	41.2	37.6	44.5	38.2	36.5	28.4	269.2
1300-1359	41.9	40.1	43.1	37.9	34.3	39.1	33.6	270.1
1400-1459	39.9	36.6	42.1	36.5	32.6	38.1	36.4	262.3
1500-1559	44.6	39.4	30.0	35.9	33.4	32.4	31.3	247.0
1600-1659	48.0	40.1	33.4	24.4	31.5	30.9	28.7	236.8
1700-1759	45.0	31.9	34.8	30.8	30.0	26.0	35.1	233.5
1800-1859	47.0	42.9	38.6	36.6	30.7	33.9	33.6	263.3
1900-1959	51.4	37.5	41.3	33.4	34.4	37.3	40.8	276.0
2000-2059	39.2	49.3	43.7	42.5	31.0	40.9	34.2	280.8
2100-2159	45.8	47.8	39.8	43.4	46.8	42.3	44.6	310.4
2200-2259	62.1	53.6	56.9	52.9	46.9	50.8	45.0	368.2
2300-2359	79.4	52.2	70.2	62.1	56.9	56.0	54.1	430.8
Total	1,331.9	1,354.7	1,257.3	1,250.1	1,185.2	1,208.1	1,145.8	n=8,733

Figure 26 shows the graphical representation of the comparison of temporal patterns for middle and high commercial burglary areas. The pattern for high commercial burglary areas is shown in red and the pattern for middle commercial burglary areas is shown in blue. This graph shows that the two had very similar patterns. There is a difference in the size of the peaks on Saturday and Sunday, which are higher compared to the rest of the week in high burglary areas than middle commercial burglary areas.

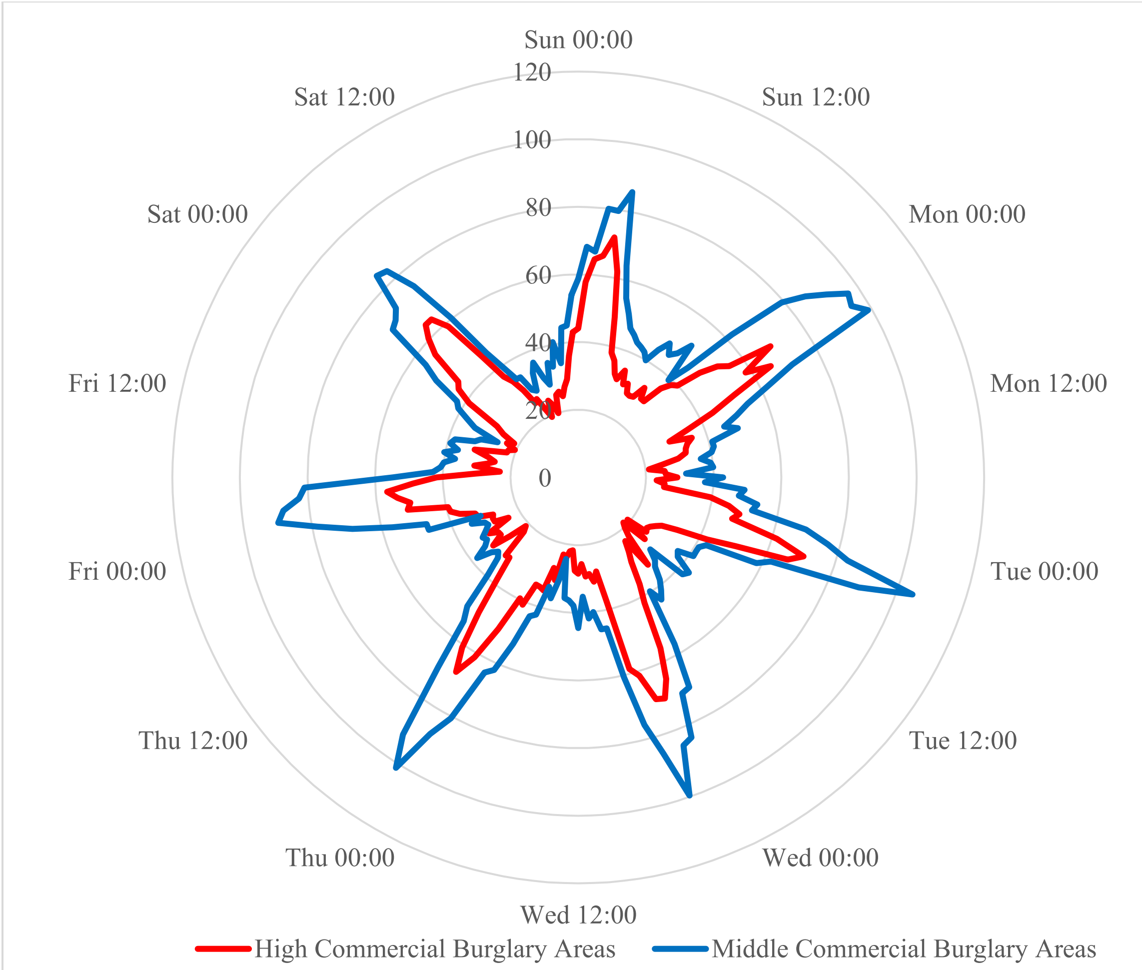

Figure 26: Comparison of Aoristic Temporal Patterns for Medium and High Commercial Burglary Areas

Aoristic Occurrence Times for Burglaries in High Commercial Burglary Areas

There were 6,211 commercial burglaries reported in the 32 districts that make up the high burglary areas. *Table 30* shows the aoristic occurrence times for when during the week these burglaries occurred.

This occurrence times are similar to the occurrence times for burglaries in low commercial burglary areas, but there are differences. In high burglary areas, there are more burglaries that occur on the weekend, so that the low numbers are higher than low numbers on other days. This does not happen in the low burglary areas, where the weekend lows are approximately the same lows as weekdays.

Table 30: Aoristic Occurrence Time for High Commercial Burglary Area

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
2400-0059	44.1	52.6	48.9	56.0	39.6	39.5	45.3	326.1
0100-0159	57.9	55.5	47.1	65.0	50.7	51.3	55.8	383.2
0200-0259	64.6	68.8	61.4	70.2	61.3	50.2	60.4	437.0
0300-0359	66.0	58.4	70.6	69.4	67.9	53.8	63.8	449.9
0400-0459	71.8	65.8	66.6	61.4	60.9	56.7	63.8	446.8
0500-0559	61.9	52.2	50.8	58.6	49.6	48.9	58.9	380.9
0600-0659	48.6	44.1	42.3	37.1	38.3	41.8	46.0	298.2
0700-0759	38.1	35.1	33.1	28.3	31.1	30.3	37.1	233.0
0800-0859	36.1	29.0	28.5	31.1	31.5	23.3	34.3	213.8
0900-0959	32.5	35.6	27.0	28.8	22.7	31.0	30.4	207.9
1000-1059	31.2	33.7	25.7	29.4	21.1	27.2	25.3	193.7
1100-1159	34.5	32.9	25.1	25.7	26.7	25.2	26.2	196.3
1200-1259	30.6	32.6	25.7	28.5	32.2	27.3	22.1	199.1
1300-1359	31.4	30.1	19.2	27.6	28.5	31.8	19.5	187.9
1400-1459	28.7	25.2	26.8	21.6	28.6	26.3	24.4	181.6
1500-1559	28.5	21.1	18.8	22.0	31.1	22.3	22.6	166.3
1600-1659	28.8	25.6	20.3	24.1	23.8	22.1	19.9	164.6
1700-1759	32.9	26.0	22.9	23.2	27.9	20.4	25.2	178.5
1800-1859	29.8	29.3	33.0	31.1	28.0	23.4	26.0	200.6
1900-1959	29.7	23.2	23.4	27.7	27.4	21.4	24.5	177.3
2000-2059	35.9	25.6	26.6	34.9	31.7	25.5	27.1	207.3
2100-2159	38.7	25.5	29.4	34.2	32.2	28.4	29.2	217.7
2200-2259	40.0	39.5	36.4	34.1	36.6	39.0	36.0	261.5
2300-2359	47.5	45.3	42.0	41.1	39.0	43.9	42.9	301.7
Total	989.6	912.5	851.5	911.0	868.6	810.9	866.8	n=6,211

Figure 27 shows a graphical comparison of the occurrence time patterns for high and low commercial burglary areas. The red line shows the pattern for the high burglary area while the blue line shows the pattern for low commercial burglary areas. To keep the two patterns on approximately the same scale for ease of comparison, the number of burglaries per hour in the low commercial burglary areas pattern is multiplied by three. The visual examination of this graph shows that patterns are similar with the previously noted differences. It also shows that there are differences in the shapes of the peak, with

the high burglary area tending to have a single point for a peak, while the low burglary area tends to have multiple points and dips within the peak.

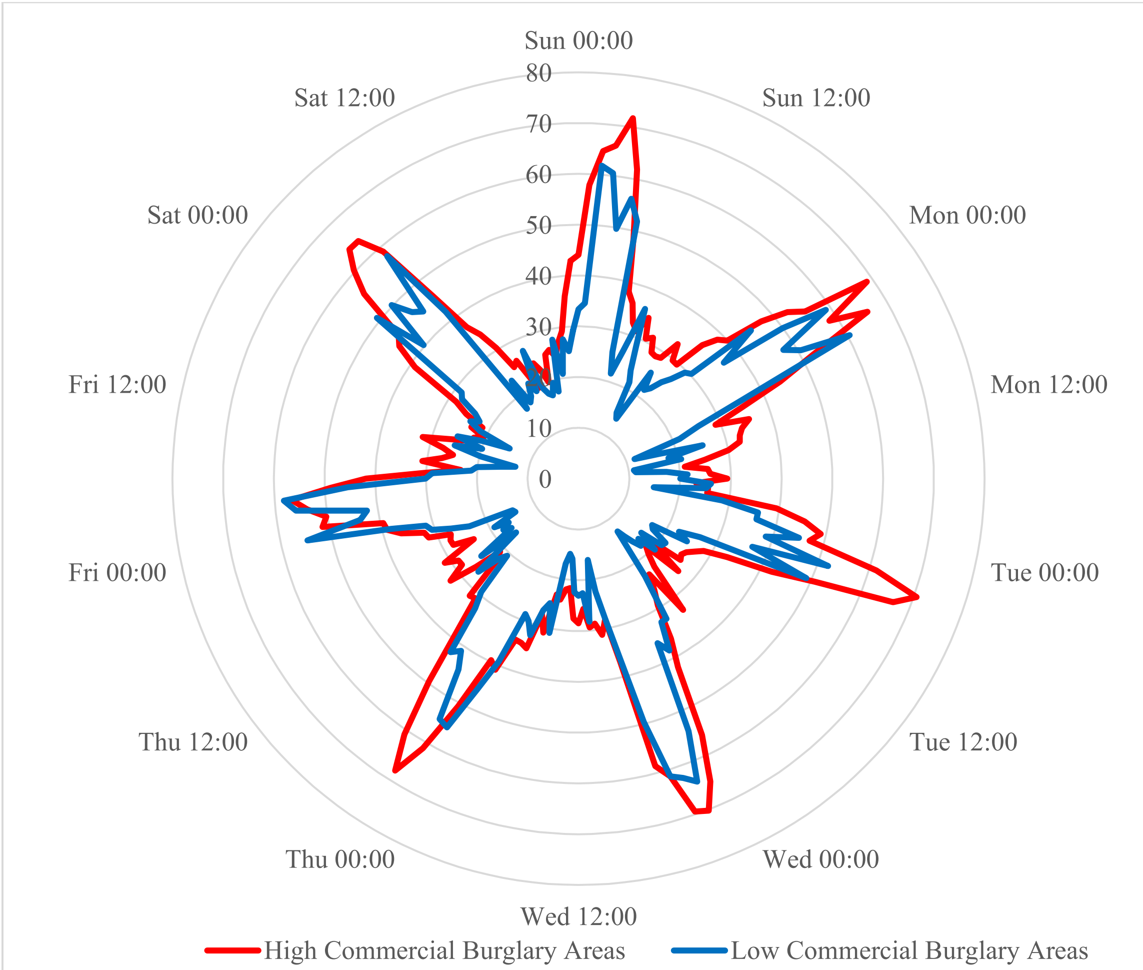

Figure 27: Comparison of Aoristic Temporal Patterns for Burglaries in High and Low Commercial Burglary Areas

Occurrence Times for Alarms in Low Commercial Burglary Areas

There were 16,844 commercial burglary alarms in the 32 districts that make up the low commercial burglary areas in San Antonio. *Table 31* shows the distribution of when these alarms occurred during the week. A review of the table data shows that the times tended to occur at the same time as the time for alarms in middle commercial burglary areas, as shown in *Table 32*. There are some differences in the peak numbers of alarms (the low burglary area alarms tend to have narrower peaks than alarms in middle burglary areas) but the peaks tend to occur at the same time for both areas. Alarms in low burglary areas also tend to have more variation in the number of alarms per hour on weekends than is seen in the times for middle commercial burglary areas.

Table 31: Occurrence Time for Alarms in Low Commercial Burglary Area

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
2400-0059	95	140	128	139	132	163	176	973
0100-0159	142	153	144	145	142	126	137	989
0200-0259	133	107	131	133	125	123	147	899
0300-0359	120	136	131	126	127	133	133	906
0400-0459	97	125	123	141	117	125	119	847
0500-0559	94	123	143	126	112	141	131	870
0600-0659	92	103	122	122	138	120	108	805
0700-0759	121	107	110	115	121	138	171	883
0800-0859	135	104	134	117	102	92	190	874
0900-0959	116	60	86	70	84	58	155	629
1000-1059	122	37	54	37	41	39	126	456
1100-1159	129	29	28	30	30	21	66	333
1200-1259	94	30	20	14	23	25	61	267
1300-1359	83	22	28	22	17	25	88	285
1400-1459	111	21	24	26	28	30	83	323
1500-1559	86	31	25	24	26	39	107	338
1600-1659	101	37	34	30	31	47	117	397
1700-1759	124	69	69	63	79	64	131	599
1800-1859	135	103	112	108	107	121	103	789
1900-1959	150	106	127	116	107	125	111	842
2000-2059	109	116	128	114	114	118	102	801
2100-2159	108	125	132	156	143	128	108	900
2200-2259	92	136	123	145	147	123	128	894
2300-2359	126	153	127	130	159	136	114	945
Total	2,715	2,173	2,283	2,249	2,252	2,260	2,912	n=16,844

Figure 28 shows a graphical representation of the two occurrence time patterns for comparison. The temporal pattern for the alarms in the low commercial burglary areas is shown in red while the pattern for alarms in middle burglary areas is show in blue. To keep the two patterns on approximately the same scale for ease of comparison, the

number of alarms per hour in the low commercial burglary areas are multiplied by four. This graph clearly shows the differences between the two patterns mentioned above.

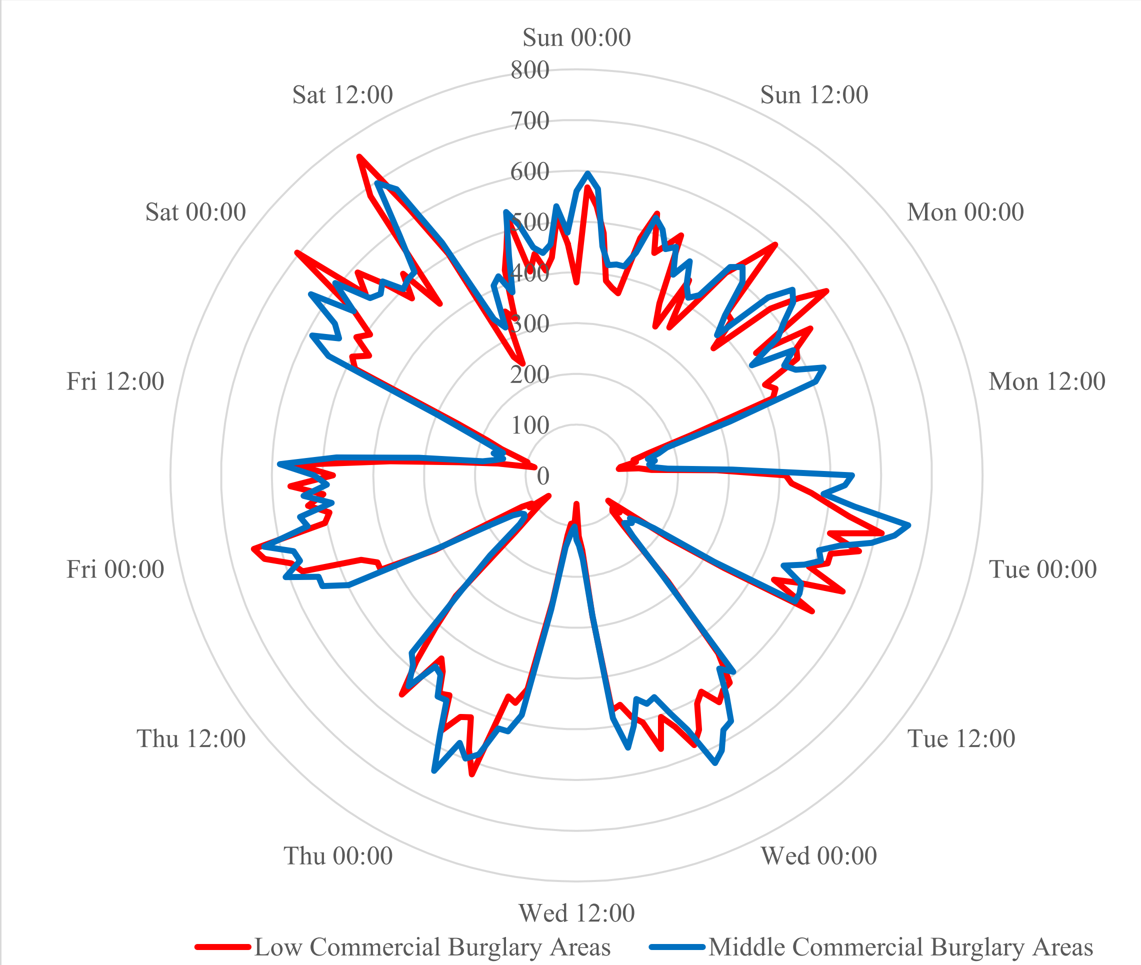

Figure 28: Comparison of Temporal Patterns for Alarms in Low and Middle Commercial Burglary Areas

Occurrence Times for Alarms in Middle Commercial Burglary Areas

There were 71,666 commercial burglary alarms in the 62 districts that make up the middle commercial burglary areas in San Antonio. *Table 32* shows the distribution of when during the week these alarms occurred. A comparison of the data in the table to the data in *Table 33* shows that the times tended to occur at the same times as when alarms in high commercial burglary areas occurred.

Table 32: Occurrence Time for Alarms in Middle Commercial Burglary Area

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
2400-0059	560	546	596	629	646	631	608	4,216
0100-0159	595	508	536	547	575	539	536	3,836
0200-0259	566	480	500	503	512	551	526	3,638
0300-0359	454	408	510	463	514	485	540	3,374
0400-0459	419	493	482	471	475	539	501	3,380
0500-0559	423	463	445	456	468	492	509	3,256
0600-0659	422	479	491	506	531	517	512	3,458
0700-0759	454	531	497	546	494	585	586	3,693
0800-0859	531	506	497	484	477	474	697	3,666
0900-0959	513	320	320	275	319	312	666	2,725
1000-1059	479	186	185	167	232	187	529	1,965
1100-1159	491	168	150	139	147	162	348	1,605
1200-1259	439	144	135	127	131	148	323	1,447
1300-1359	477	157	144	101	128	169	408	1,584
1400-1459	434	145	138	108	133	151	421	1,530
1500-1559	413	149	133	121	148	181	382	1,527
1600-1659	430	180	163	143	194	223	452	1,785
1700-1759	510	307	257	269	298	297	537	2,475
1800-1859	525	543	495	484	498	542	506	3,593
1900-1959	502	529	473	522	546	589	457	3,618
2000-2059	430	488	525	522	546	540	443	3,494
2100-2159	391	552	572	582	607	562	458	3,724
2200-2259	515	661	579	599	570	633	532	4,089
2300-2359	561	638	613	575	577	545	479	3,988
Total	11,534	9,581	9,436	9,339	9,766	10,054	11,956	n=71,666

Figure 29 shows a graphical representation of the comparison between the time pattern for alarms in middle and high commercial burglary areas. The alarms in the medium commercial burglary areas are shown in blue while the high burglary area pattern is shown in blue. To keep the two patterns on approximately the same scale for ease of comparison, the number of alarms per hour in the high commercial burglary areas are multiplied by two. This graph makes it clear that the occurrence times are very similar patterns with differences primarily in the shape of the peaks. One additional difference

shown in this graph is that the highest number of alarms in high burglary areas occurs on Tuesday night, as opposed to Saturday morning for the middle burglary area.

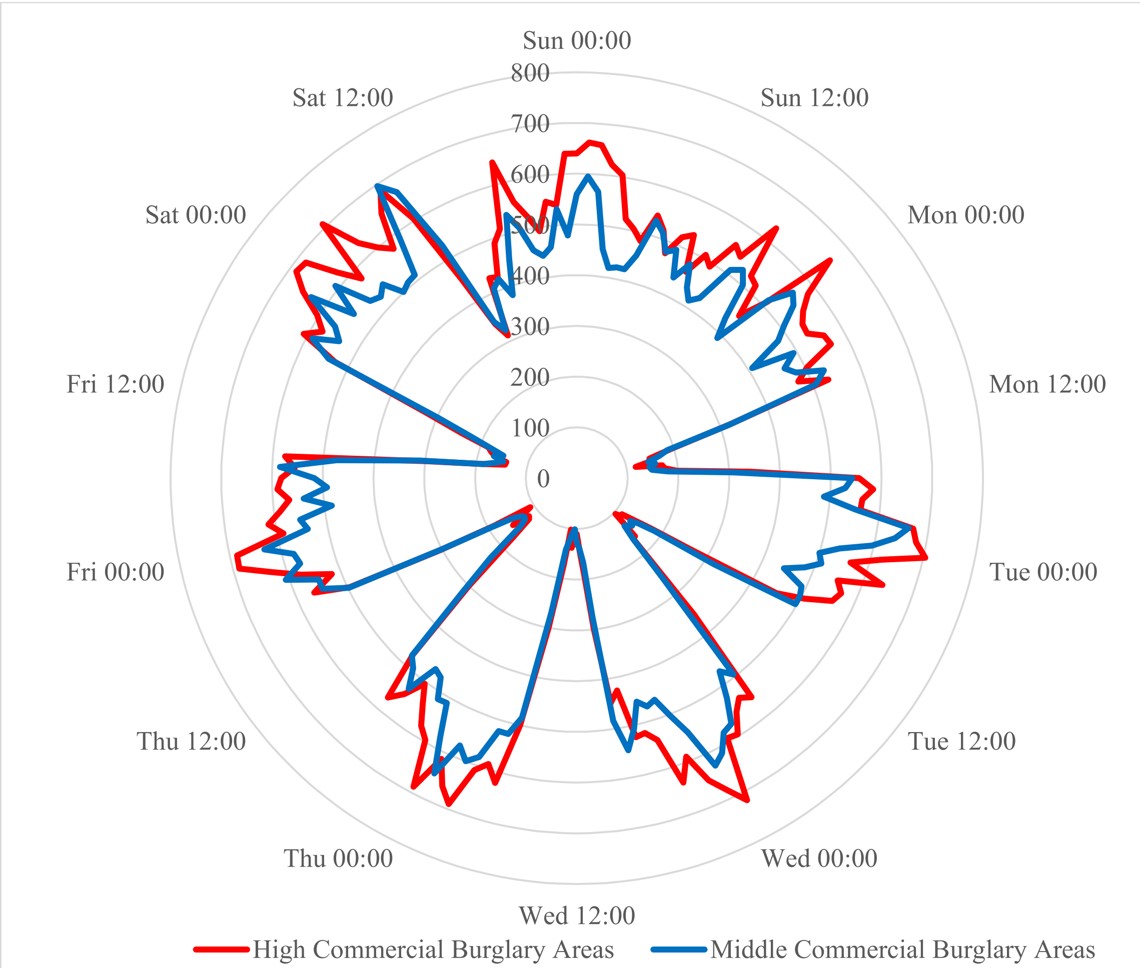

Figure 29: Comparison of Temporal Patterns for Alarms in Medium and High Commercial Burglary Areas

Occurrence Times for Alarms in High Commercial Burglary Areas

There were 39,137 commercial burglary alarms in the 32 districts that make up the high commercial burglary areas in San Antonio. *Table 33* shows the distribution of when these alarms occurred during the week. When compared to the times for alarms in low commercial burglary areas, as shown in *Table 31*, the patterns are generally similar but they have the same differences noted in the comparison of low and middle commercial burglary areas.

Table 33: Occurrence Time for Alarms in High Commercial Burglary Area

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
2400-0059	320	291	352	341	307	343	341	2,295
0100-0159	331	277	311	325	344	294	311	2,193
0200-0259	329	269	282	295	298	307	289	2,069
0300-0359	311	268	319	318	288	294	354	2,152
0400-0459	302	281	276	270	269	284	316	1,998
0500-0559	260	283	284	260	252	295	300	1,934
0600-0659	252	252	279	262	272	291	289	1,897
0700-0759	242	238	254	213	285	278	324	1,834
0800-0859	271	266	227	224	237	288	343	1,856
0900-0959	259	159	131	149	150	149	302	1,299
1000-1059	238	97	88	95	85	93	226	922
1100-1159	259	74	69	72	62	72	172	780
1200-1259	266	74	57	55	60	71	156	739
1300-1359	230	59	57	60	78	83	215	782
1400-1459	254	85	52	69	65	88	213	826
1500-1559	246	87	81	51	54	92	245	856
1600-1659	278	99	81	87	93	122	257	1,017
1700-1759	271	171	177	150	152	162	322	1,405
1800-1859	315	278	276	250	248	264	279	1,910
1900-1959	263	292	269	311	282	304	262	1,983
2000-2059	259	282	279	295	259	289	246	1,909
2100-2159	226	281	298	305	288	302	274	1,974
2200-2259	255	335	296	345	314	326	270	2,141
2300-2359	329	340	359	331	344	343	320	2,366
Total	6,566	5,138	5,154	5,133	5,086	5,434	6,626	n=39,137

Figure 30 shows the graphical comparison of the time patterns for alarms in high and low commercial burglary areas. The pattern for alarms in low commercial burglary areas is shown in blue while the pattern for alarms in high burglary areas is shown in red. This graph confirms the impression from the data table comparison that the patterns are very similar with the same differences as noted for comparing low to middle burglary area alarm temporal patterns.

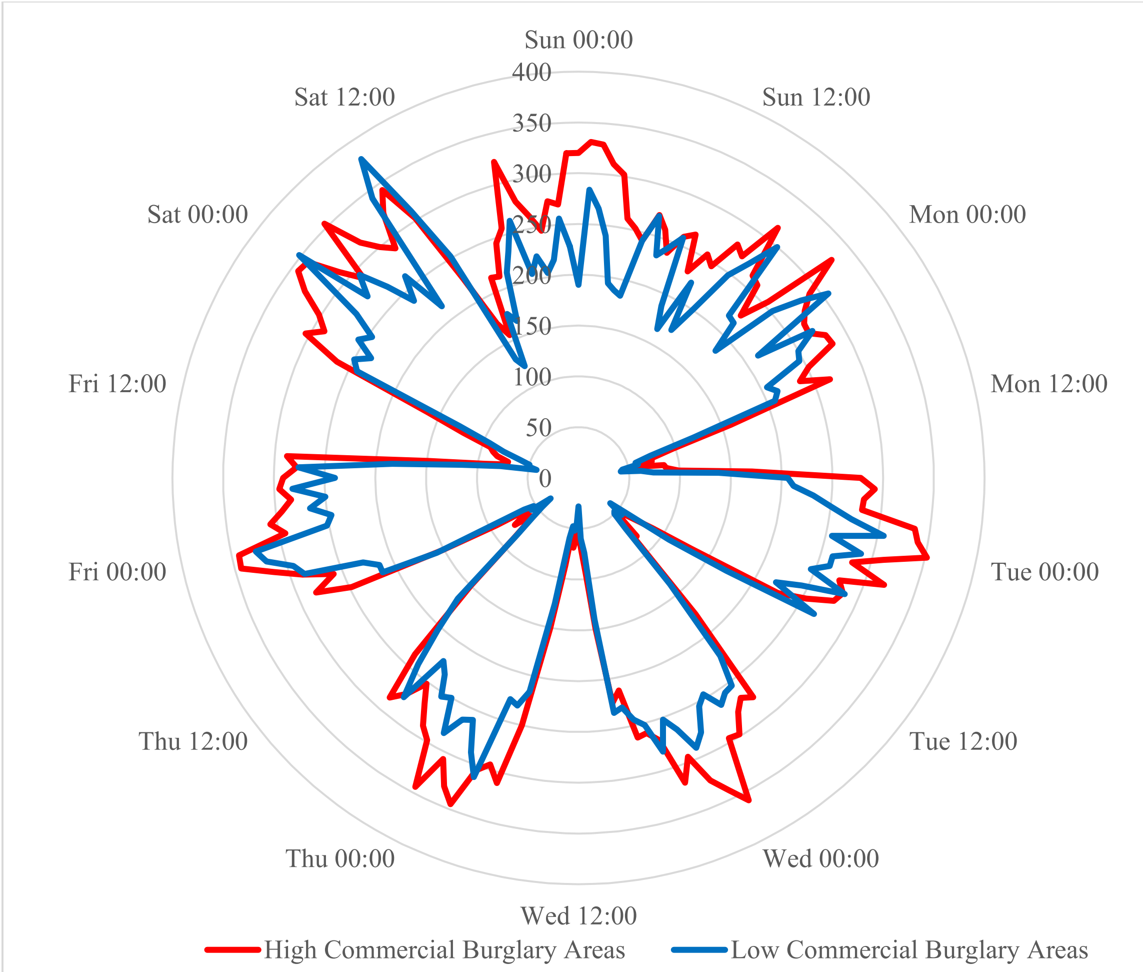

Figure 30: Comparison of Temporal Pattern of Alarms in Low and High Commercial Burglary Areas

Discussion

Comparison of Aoristic Occurrence Times for Residential Burglaries by High, Middle, or Low Burglary Areas. Approximately half the residential burglaries (51.4%) occurred in middle residential burglary areas. Another 41.2% occurred in high burglary areas, while the remaining 7.4% occurred in low burglary areas. While residential burglaries in all three areas tended to occur at generally the same time patterns as each other, there is a noticeable difference in the low burglary area.

Residential burglaries in the low burglary areas tended to see peaks on Friday and Saturday evenings that did not occur in other areas. The Sunday noon peak also tended to be higher than other areas, while the remaining peaks tended to be lower. *Figure 19* showed the comparison of temporal patterns for burglaries in low and middle residential burglary areas, *Figure 20* showed the comparison of temporal patterns for burglaries in middle and high residential burglary areas, and *Figure 21* showed the comparison of temporal patterns for burglaries in low and high residential burglary areas.

The study of the tables and graphs lead to the conclusion that the level of residential burglary in an area affects when they occur. If the number of burglaries is higher than the lowest 25th percentile, there is only a very slight effect. However, for the low burglary area the effect on time of occurrence is more pronounced. It appears that the primary difference in timing for low residential burglary areas is that a higher percentage of the burglaries occur during the weekends, beginning on Friday evenings.

Comparison of Occurrence Times for Residential Alarms by High, Middle, or Low Burglary Areas. Over half the residential alarms (57.4%) occurred in middle residential burglary areas. Another third (32.3%) occurred in high burglary areas, while the remaining 10.3% occurred in low burglary areas. While residential alarms in all three areas tended to occur at generally the same times, there is a slight difference in the low burglary area. The difference for alarms is very slight when compared to the difference for burglaries in the low burglary area from middle and high burglary areas. Low burglary areas tended to have more burglaries on weekends while they had an even larger percentage of the alarms during the same time period.

Figure 22 showed the comparison of temporal patterns for alarms in low and middle residential burglary areas, *Figure 23* showed the comparison of temporal patterns for alarms in middle and high residential burglary areas, and *Figure 24* showed the comparison of temporal patterns for burglaries in low and high residential burglary areas.

One visible difference is that alarms in the low residential burglary area tend to have lower peak numbers as a percentage of alarms than alarms in either medium or high burglary areas. There is also a difference in the shapes of the peaks that appears more pronounced in the low burglary areas.

The study of the tables and graphs lead to the conclusion that the level of residential burglary in an area does have an effect on when residential alarms occur. If the number of burglaries is above the lowest 25th percentile, it is a very slight effect. However, the effect on alarms in the low burglary area is more pronounced, with differences in the shapes of the peaks and a slightly greater percentage of the alarms occurring on Sunday than in high or middle burglary areas.

Comparison of Aoristic Occurrence Times for Commercial Burglaries by High, Middle, or Low Burglary Areas. Approximately half the commercial burglaries (52.6%) occurred in middle commercial burglary areas. Another 37.4% occurred in high burglary areas, while the remaining 10.1% occurred in low burglary areas (numbers do not total to 100 due to rounding). While commercial burglaries in all three areas tended to occur at generally the same times as each other, there is a slight difference in the low burglary area.

Commercial burglaries in the low burglary areas tended to have a higher percentage of the burglaries occur on Wednesdays than occurred in middle or high burglary areas. The number of burglaries in low burglary areas also had a higher peak number on Sundays while they were elevated in other areas but not as high as the weekday peaks. *Figure 25* showed the comparison of temporal patterns for burglaries in low and middle commercial burglary areas, *Figure 26* showed the comparison of temporal patterns for burglaries in middle and high commercial burglary areas, and *Figure 27* showed the comparison of temporal patterns for burglaries in low and high commercial burglary areas.

The study of the tables, graphs, and correlations lead to the conclusion that the number of commercial burglaries in an area influences when they occur. There are noticeable differences in the occurrence time of burglaries between low, medium and high commercial burglary areas. The difference is strongest for the low burglary areas as demonstrated with the Wednesday and weekend peaks.

Comparison of Occurrence Times for Commercial Alarms by High, Medium, or Low Burglary Area. Over half the commercial alarms (56.1%) occurred in medium commercial burglary areas. Almost a third (30.7%) occurred in high burglary areas, while the remaining 13.2% occurred in low burglary areas. Commercial alarms in all three areas tended to occur at generally the same time patterns as each other and as the time pattern for all commercial alarms. There is a slight difference for alarms in the low burglary areas but the difference is less than the difference for burglaries in the low burglary areas when compared to burglaries in middle and high commercial burglary areas.

The difference for commercial alarms in the low burglary areas is that the number of alarms per day appear to be closer to each other from day to day during the week. The commercial burglaries in the medium and high burglary areas tended to see larger percentage differences in their Tuesday through Friday totals than the low burglary areas.

Figure 28 showed the comparison of temporal patterns for alarms in low and middle commercial burglary areas, *Figure 29* showed the comparison of temporal patterns for alarms in middle and high commercial burglary areas, and *Figure 30* showed the comparison of temporal patterns for burglaries in low and high commercial burglary areas.

The study of the tables, graphs, and correlations lead to the conclusion that the level of commercial burglary in an area effects when commercial alarms occur. The effect is smaller for alarms in medium and high burglary areas than for alarms in low burglary areas, as seen by the amount of day-to-day variation in the alarm temporal patterns.

Chapter Conclusion

In this chapter, the occurrence time patterns for residential alarms and burglaries have been compared based on the level of residential burglary in the areas. The occurrence time patterns for commercial alarms and burglaries when classified by the number of commercial burglaries in the area have also been reviewed. The following sections compare the alarms and burglaries to each other, separated by target type.

Comparison of Occurrence Times for Residential Alarms and Burglaries by High, Medium, or Low Residential Burglary Area. A comparison of the data in *Table 22* and *Table 25* shows that residential alarms and residential burglaries in low burglary areas follow the same time pattern fairly closely. There are some differences, including the alarms appear to increase in number each day from Sunday through Friday while the burglaries have a larger number on Tuesdays.

Figure 31 shows a graphical representation of the comparison of the patterns for alarm occurrence times and aoristic residential burglary occurrence times for low residential burglary areas. To keep the two patterns on approximately the same scale for ease of comparison, the number of burglaries per hour in the burglary pattern was multiplied by four. The temporal pattern for burglaries is shown in red and the pattern for alarms is shown in blue. This graph shows that the two patterns are similar, but that the burglaries did not have the peaks on Saturday and Sunday that the alarms had. The peak on Tuesday is also smaller than on other days for the alarms, but is the highest peak for the burglaries.

A comparison of the data in *Table 23* and *Table 26* also shows similar patterns for residential burglaries and alarms in middle residential burglary areas. There is a difference in the daily pattern with alarms appearing to peak earlier in the day (approximately 10:00 a.m.) than the burglaries peak (approximately 12:00 noon).

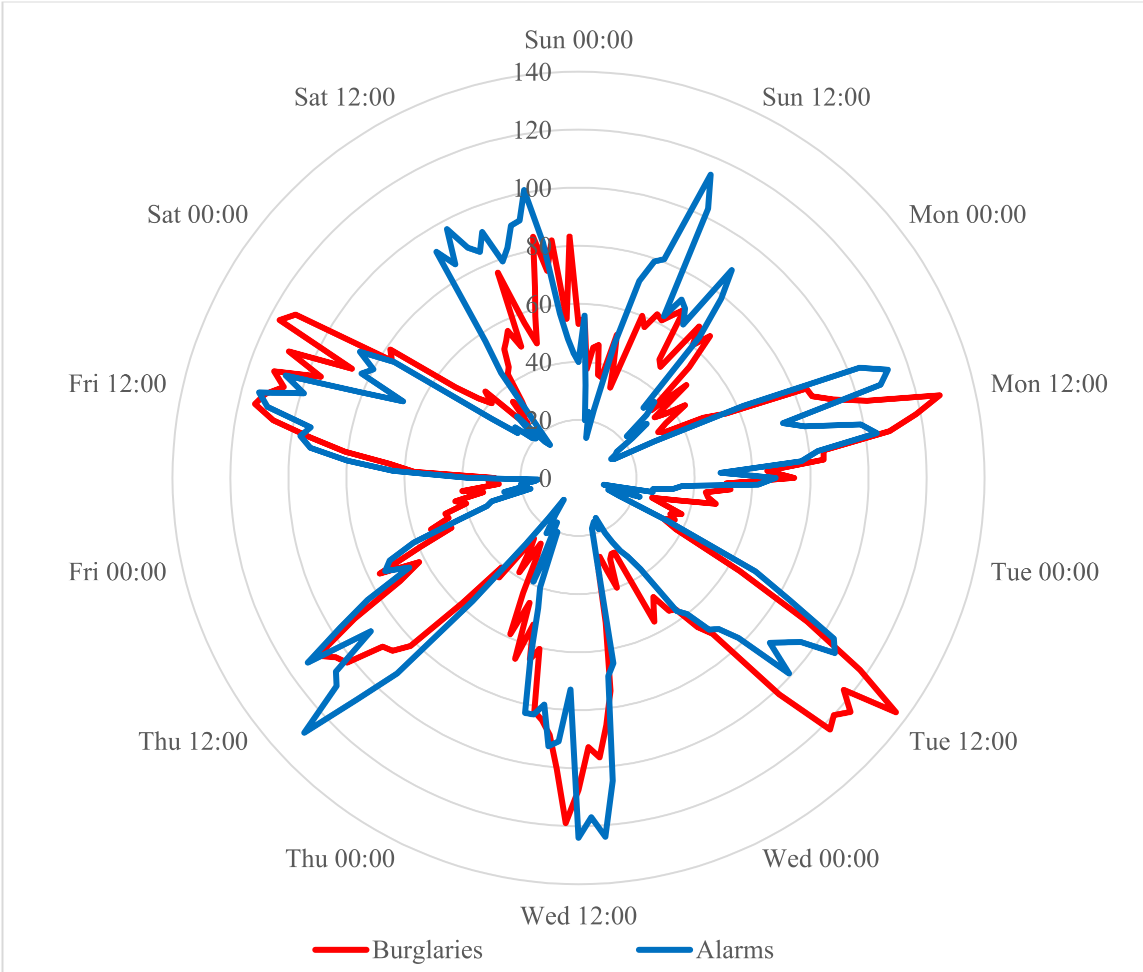

Figure 31: Comparison of the Aoristic Burglary Temporal Pattern to the Alarm Occurrence Temporal Pattern for Low Residential Burglary Areas

Figure 32 shows a graphical representation of the comparison of the patterns for alarm occurrence times and aoristic residential burglary occurrence times for middle residential burglary areas. To keep the two patterns on approximately the same scale for ease of comparison, the number of burglaries per hour in the burglary pattern was multiplied by three. The temporal pattern for burglaries is shown in red and the pattern for alarms is shown in blue. This graph shows that the two patterns are similar, but that the burglaries did not have the peaks on Saturday and Sunday that the alarms had.

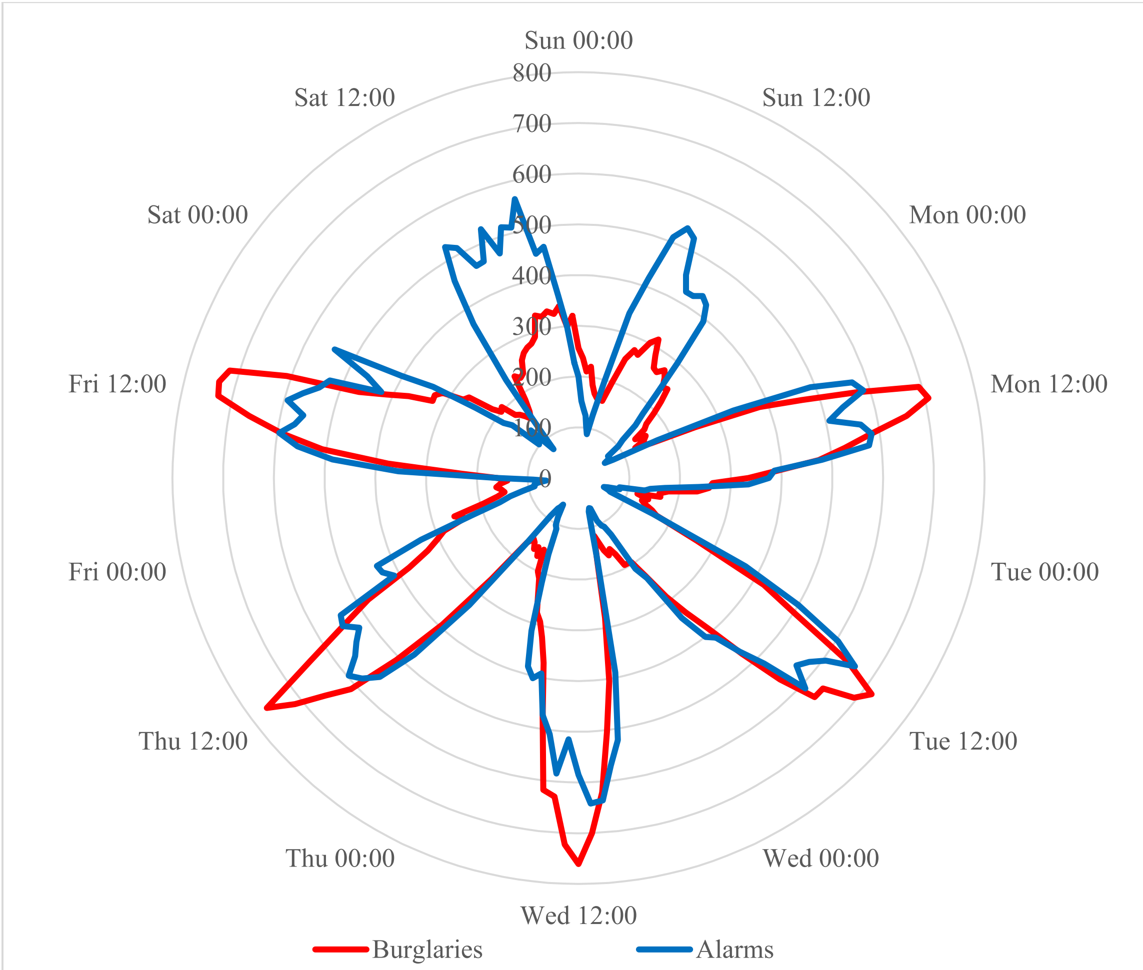

Figure 32: Comparison of the Aoristic Burglary Temporal Pattern to the Alarm Occurrence Temporal Pattern for Middle Residential Burglary Areas

A comparison of the data in *Table 24* and *Table 27* also shows similar patterns for residential burglaries and alarms in high residential burglary areas. The high burglary area alarms and burglaries show the same difference in time of day that the medium burglary areas do, but they also show a difference in the numbers per day. The burglaries tend to have more on Monday, then show gradually decreasing numbers until Thursday, with a sharp increase to a maximum number occurring on Friday. The alarms tend to climb gradually through the week to a peak on Friday.

Figure 33 shows a graphical representation of the comparison of the patterns for alarm occurrence times and aoristic residential burglary occurrence times for high residential burglary areas. To keep the two patterns on approximately the same scale for ease of comparison, the number of burglaries per hour in the burglary pattern was multiplied by two. The temporal pattern for burglaries is shown in red and the pattern for alarms is shown in blue. This graph shows that the two patterns are similar, with a similar difference as shown in the graph for middle residential burglary areas: the burglaries did not have the peaks on Saturday and Sunday that the alarms had.

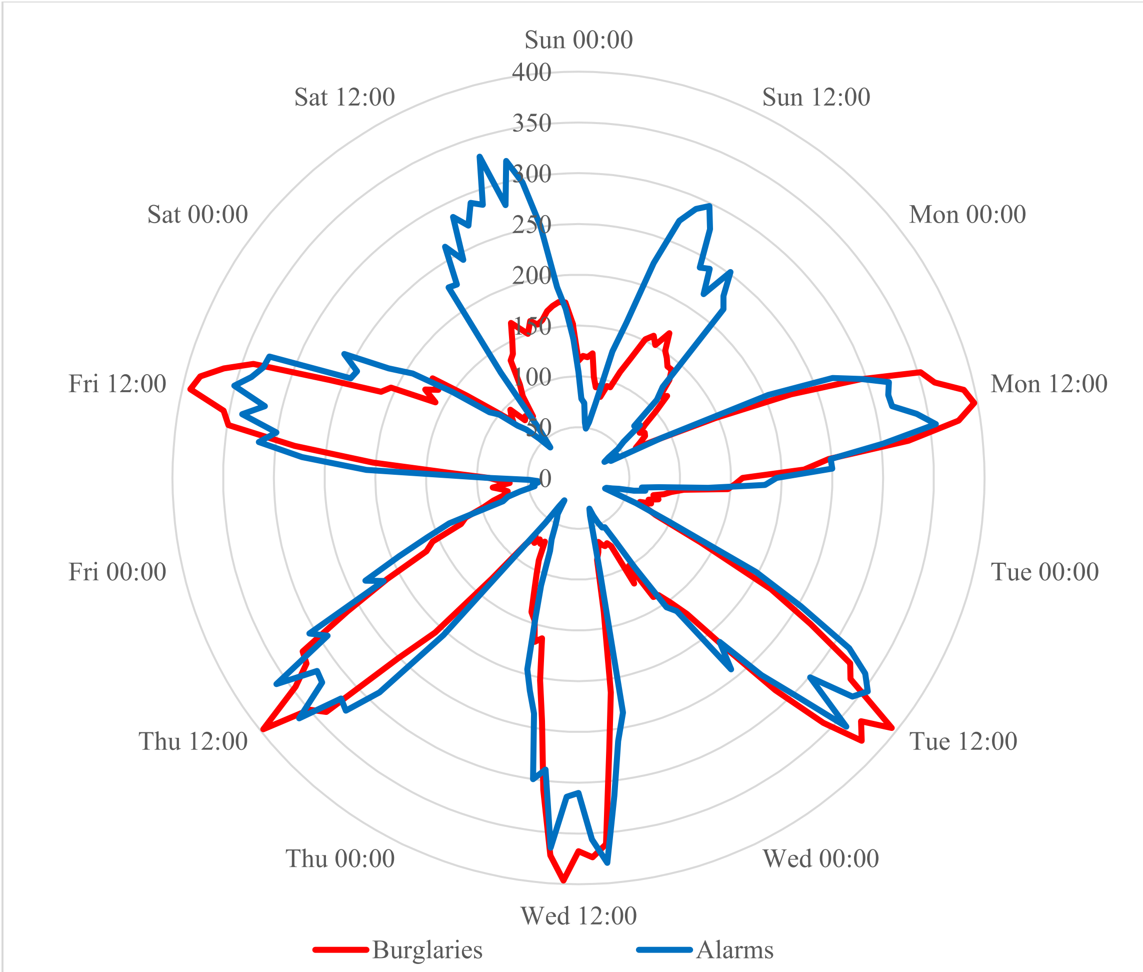

Figure 33: Comparison of the Aoristic Burglary Temporal Pattern to the Alarm Occurrence Temporal Pattern for High Residential Burglary Areas

Comparison of Occurrence Times for Commercial Alarms and Burglaries by High, Medium, or Low Commercial Burglary Area. A comparison of the data in *Table 28* and *Table 31* shows that commercial alarms and commercial burglaries in low burglary areas follow similar time patterns. There are some differences, including the alarms appear to increase in number earlier and stay increased later than burglaries. There is also a larger number of burglaries on Wednesday while the alarms have peak numbers on weekends and do not show as high a Wednesday peak. The alarms also show a pattern of having more alarms per hour on weekends (Saturday evening through Monday morning) while the burglaries show distinct peaks and lower non-peak numbers on weekends.

Figure 34 shows a graphical representation of the comparison of the patterns for alarm occurrence times and aoristic commercial burglary occurrence times for low commercial burglary areas. To keep the two patterns on approximately the same scale for ease of comparison, the number of burglaries per hour in the burglary pattern was multiplied by eight. The temporal pattern for burglaries is shown in red and the pattern for alarms is shown in blue. This graph shows that the two patterns are similar and emphasizes the weekend differences between them. The Wednesday peak difference is also shown, as is the difference in the width of the peaks.

A comparison of the data in *Table 29* and *Table 32* also shows similar patterns for commercial burglaries and alarms in the middle commercial burglary areas. There is a difference in the daily pattern with alarms appearing to peak earlier in the day (approximately 1:00 a.m.) than the burglaries peak (approximately 3:00 a.m.). There is also a difference where the number of occurrences have a higher number on Friday, Saturday, and Sunday while the burglaries show this increase plus a larger number on Monday.

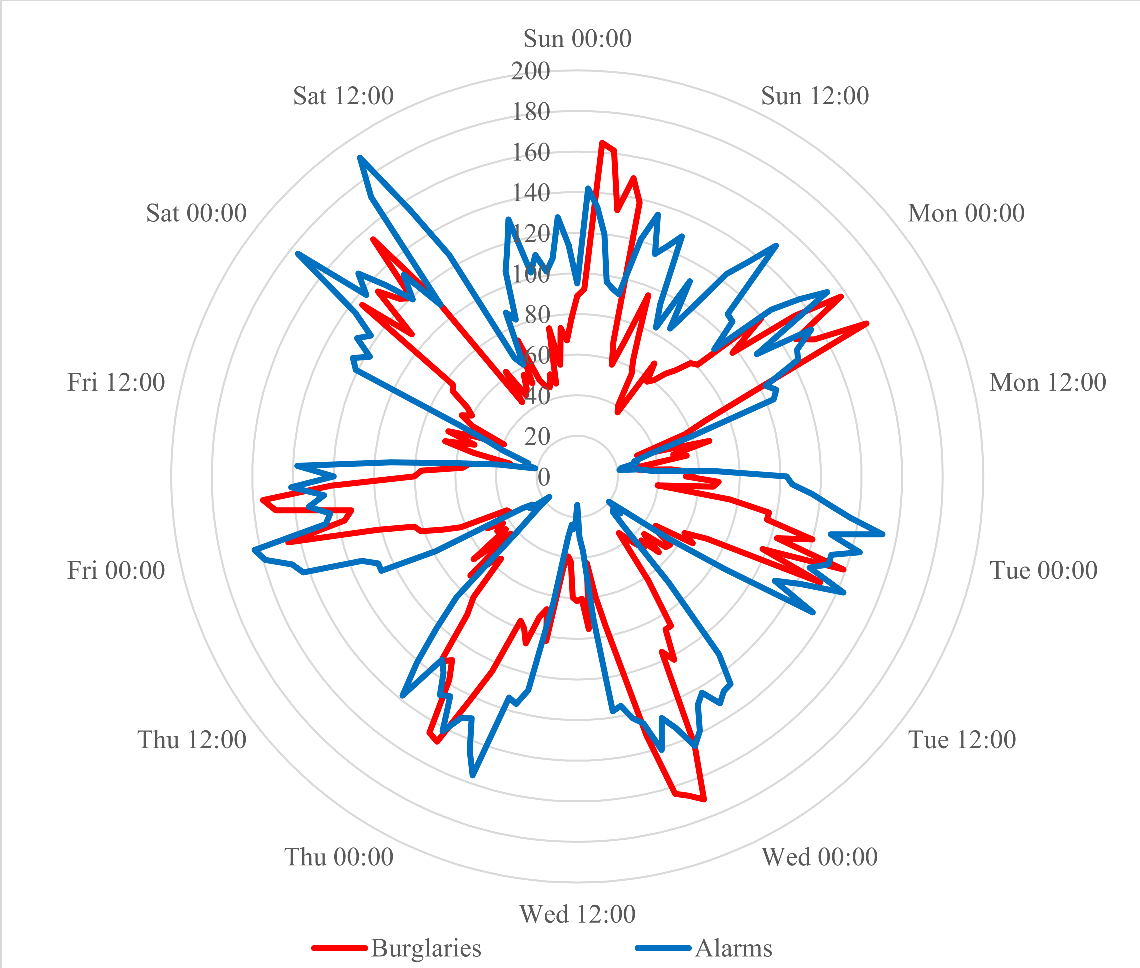

Figure 34: Comparison of the Aoristic Burglary Temporal Pattern to the Alarm Occurrence Temporal Pattern for Low Commercial Burglary Areas

Figure 35 shows a graphical representation of the comparison of the patterns for alarm occurrence times and aoristic commercial burglary occurrence times for middle commercial burglary areas. To keep the two patterns on approximately the same scale for ease of comparison, the number of burglaries per hour in the burglary pattern was multiplied by seven. The temporal pattern for burglaries is shown in red and the pattern for alarms is shown in blue. This graph shows that the two patterns are similar and shows the weekend differences between them, along with the differences in the width of the peaks.

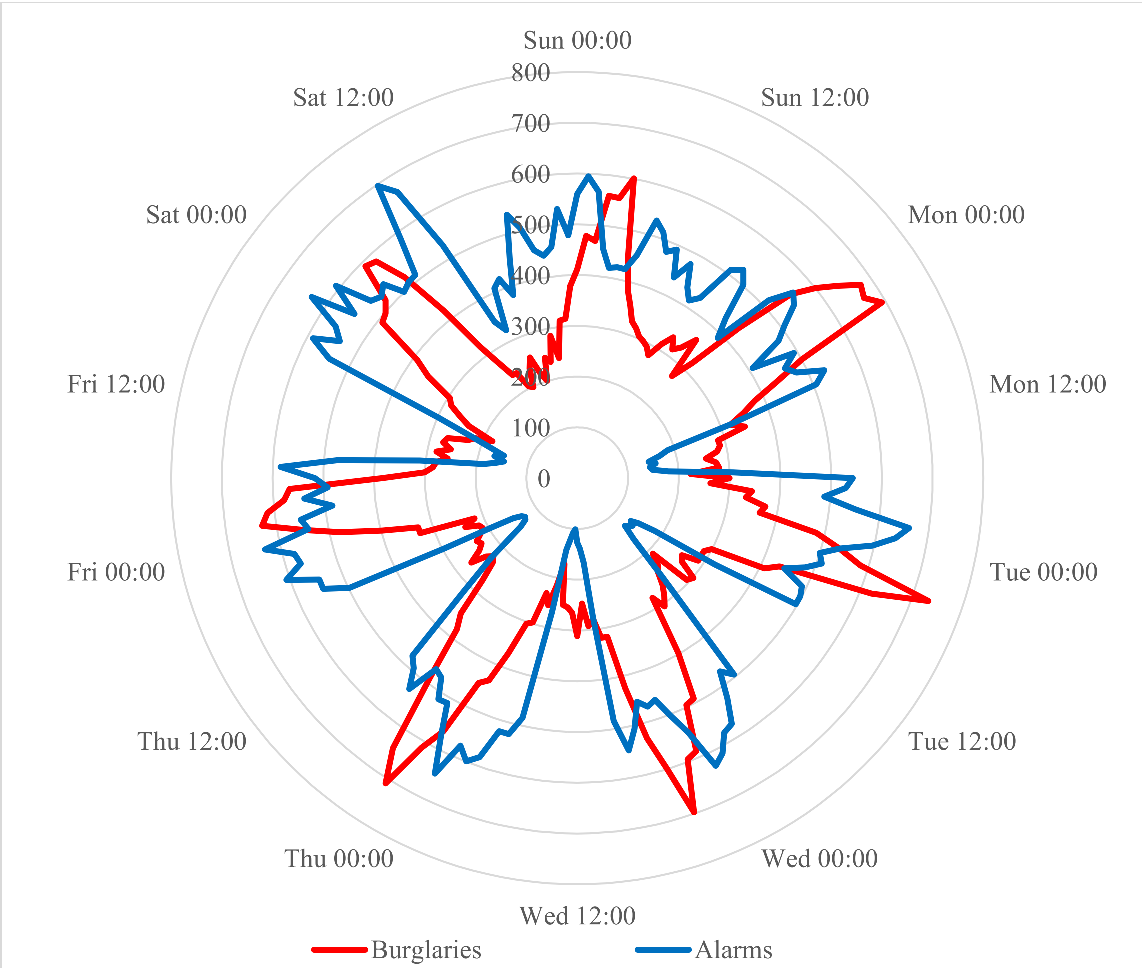

Figure 35: Comparison of the Aoristic Burglary Temporal Pattern to the Alarm Occurrence Temporal Pattern for Middle Commercial Burglary Areas

A comparison of the data in *Table 30* and *Table 33* also shows similar patterns for commercial burglaries and alarms in high commercial burglary areas. The high burglary area alarms and burglaries show similar differences in time of day and day of week to the low burglary areas occurrence times. There tend to be more burglaries on Sunday and Wednesday, while the alarms tend to show a peak on weekends (Friday, Saturday, and

Sunday). The alarm times tend to show peak numbers between 11:00 p.m. and 1:00 a.m. while the burglaries tend to have peak numbers later in the morning (between 3:00 and 5:00 a.m.).

Figure 35 shows a graphical representation of the comparison of the patterns for alarm occurrence times and aoristic commercial burglary occurrence times for middle commercial burglary areas. To keep the two patterns on approximately the same scale for ease of comparison, the number of burglaries per hour in the burglary pattern was multiplied by seven. The temporal pattern for burglaries is shown in red and the pattern for alarms is shown in blue. This graph shows that the two patterns are similar and shows the weekend differences between them, along with the differences in the width of the peaks.

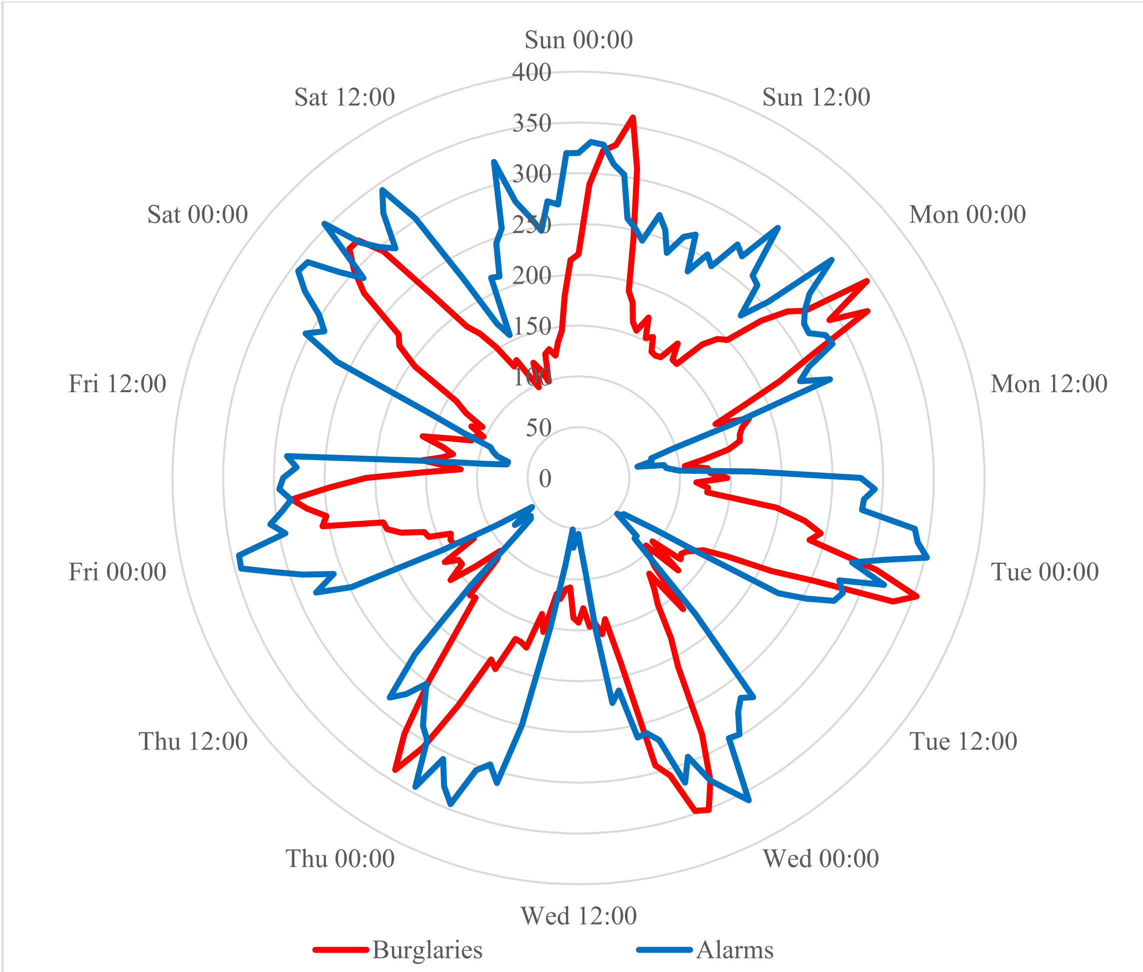

Figure 36: Comparison of the Aoristic Burglary Temporal Pattern to the Alarm Occurrence Temporal Pattern for High Commercial Burglary Areas

Conclusion. When viewing burglaries and classifying them by the level of burglary in the area, it has been shown that there are differences in when these incidents occur. This is true whether the target type is commercial or residential. When examining alarms for the same effect, the time difference is also seen for residential and commercial alarms.

In the case of residential alarms and burglaries, alarm times and police-coded burglary times are closely parallel. In the case of commercial alarms, the patterns are similar but not as much.

VIII: PROXIMITY OF SCHOOLS

In this chapter, burglary and alarm occurrence temporal patterns will be examined for differences based on the proximity to the nearest school. The review of the literature has shown that one of the factors affecting whether burglaries occur or not was the proximity of a public high school and this examination will determine if that same finding affects when the burglaries or alarms occur. The result expected from this analysis is the finding that burglaries and alarms occur at different times based on the proximity of the incident to the nearest school.

In this dissertation, the term "public school" is defined as any publicly funded school that teaches grades 9 through 12. This includes what are normally thought of as public schools and also charter schools. The straight-line distance between the burglary or alarm and the nearest school will be used. The distance is calculated within the ArcGIS Pro database system after plotting the addresses on a map. The distance is calculated for each incident separately and then the groups are broken down by target type and distance. The distances will be grouped into three groups based on the lowest 25% of the distances in each target type being near a school, the highest 25% of the distances in each target type being far from a school, and the middle 50% being mid-distance from a school. The time patterns for the burglaries and alarms in each group will be calculated and compared to determine if the distance from a school makes a difference in the occurrence time.

Table 34 shows the shortest and longest distance for each group, as well as the number of incidents in each group. The shortest distance for the near group is the shortest distance found in the records. The longest distance for the far group is the longest distance found in the records. The other distances are the cutoff points based on the percentile rankings for all distances involved. All distances are measured in feet and rounded to the nearest foot.

Table 34: Distances from Schools and Number of Burglaries and Alarms per Distance Group

	Distance Group	Minimum Burglary Distance	Maximum Burglary Distance	Minimum Alarm Distance	Maximum Alarm Distance	Number of Burglaries	Number of Alarms
Residential	Near	74	2,872	24	3,475	8,860	24,154
Residential	Mid-Distance	2,873	6,678	3,476	8,813	17,720	48,306
Residential	Far	6,679	183,533	8,814	41,496	8,860	24,153
Commercial	Near	8	2,700	11	2,735	4,238	31,996
Commercial	Mid-Distance	2,701	6,706	2,736	7,353	9,183	63,978
Commercial	Far	6,707	149,174	7,354	83,316	3,231	31,992

Aoristic Occurrence Times for Residential Burglaries that are Near Schools

There were 8,860 residential burglaries near schools. The distance ranged from a minimum of 74 feet to a maximum of 2,872 feet.

Table 35 shows the occurrence times for residential burglaries near schools. Comparing this data with the data in *Table 36* shows that burglaries close to schools tend to occur at similar times as residential burglaries that are mid-distance from schools. Most residential burglaries near schools happen during the work week (Monday through Friday) with the largest number of burglaries occurring on Friday. They also show similar daily patterns, with burglaries increasing beginning around 7:00 a.m., peaking around 12:00 noon., and dropping to a low around 6:00 a.m. There is a difference where the peak hour for burglaries near schools happens on Mondays while the peak hour for mid-distance is on Thursday.

Table 35: Aoristic Occurrence Time for Residential Burglaries Near Schools

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
2400-0059	38.4	24.4	24.5	26.7	22.2	28.8	35.9	200.8
0100-0159	41.6	26.3	20.7	25.0	25.4	22.0	31.2	192.2
0200-0259	32.4	25.3	22.3	23.4	27.2	21.4	34.4	186.4
0300-0359	39.2	20.8	25.9	19.9	30.6	29.9	32.5	198.7
0400-0459	30.4	25.1	22.7	21.7	26.9	27.3	30.8	184.9
0500-0559	30.3	20.3	26.0	22.9	26.1	22.8	27.5	175.9
0600-0659	25.1	22.1	24.9	24.2	25.5	23.3	23.9	168.9
0700-0759	27.7	40.5	39.1	42.8	44.1	36.6	24.3	255.2
0800-0859	26.8	63.9	60.1	65.5	60.5	64.5	31.1	372.3
0900-0959	30.0	83.4	85.7	83.8	77.0	83.8	33.4	477.1
1000-1059	39.6	99.5	105.4	100.7	97.2	97.8	35.3	575.5
1100-1159	41.1	98.3	102.3	114.4	105.0	101.8	35.7	598.5
1200-1259	46.2	120.6	107.0	114.5	103.4	117.3	46.1	655.1
1300-1359	40.9	126.2	101.6	111.2	105.9	114.7	50.7	651.4
1400-1459	48.4	103.1	107.4	93.9	100.9	107.8	46.5	608.0
1500-1559	48.3	90.1	98.3	92.7	91.6	99.8	47.9	568.6
1600-1659	40.0	74.7	86.0	69.1	68.4	77.3	48.3	463.7
1700-1759	44.9	58.8	71.9	50.5	51.4	74.4	57.2	409.1
1800-1859	46.0	54.2	58.0	50.7	60.1	67.1	50.6	386.8
1900-1959	44.7	45.4	51.8	48.7	43.5	58.7	57.6	350.4
2000-2059	44.7	45.0	43.8	45.1	40.0	68.9	53.1	340.5
2100-2159	41.6	34.3	38.6	39.4	36.4	57.6	55.8	303.6
2200-2259	35.7	28.3	30.0	36.6	43.0	49.2	51.5	274.4
2300-2359	30.9	22.1	37.8	36.4	36.8	44.6	53.7	262.3
Total	914.6	1,352.4	1,391.7	1,359.8	1,349.3	1,497.0	995.1	n=8860

Figure 37 is a graphical representation of the comparison of the aoristic temporal patterns of residential burglaries near and mid-distance from schools. To keep the patterns on approximately the same scale for ease of comparison, the number of burglaries per hour in the group near schools was multiplied by two. The burglaries near schools are shown with the red line and mid-distance burglaries are shown with the blue line. This comparison clearly shows that the burglaries near schools generally occur at the same time as the mid-distance residential burglaries. It shows the mentioned differences in the peak numbers on Monday and Thursday.

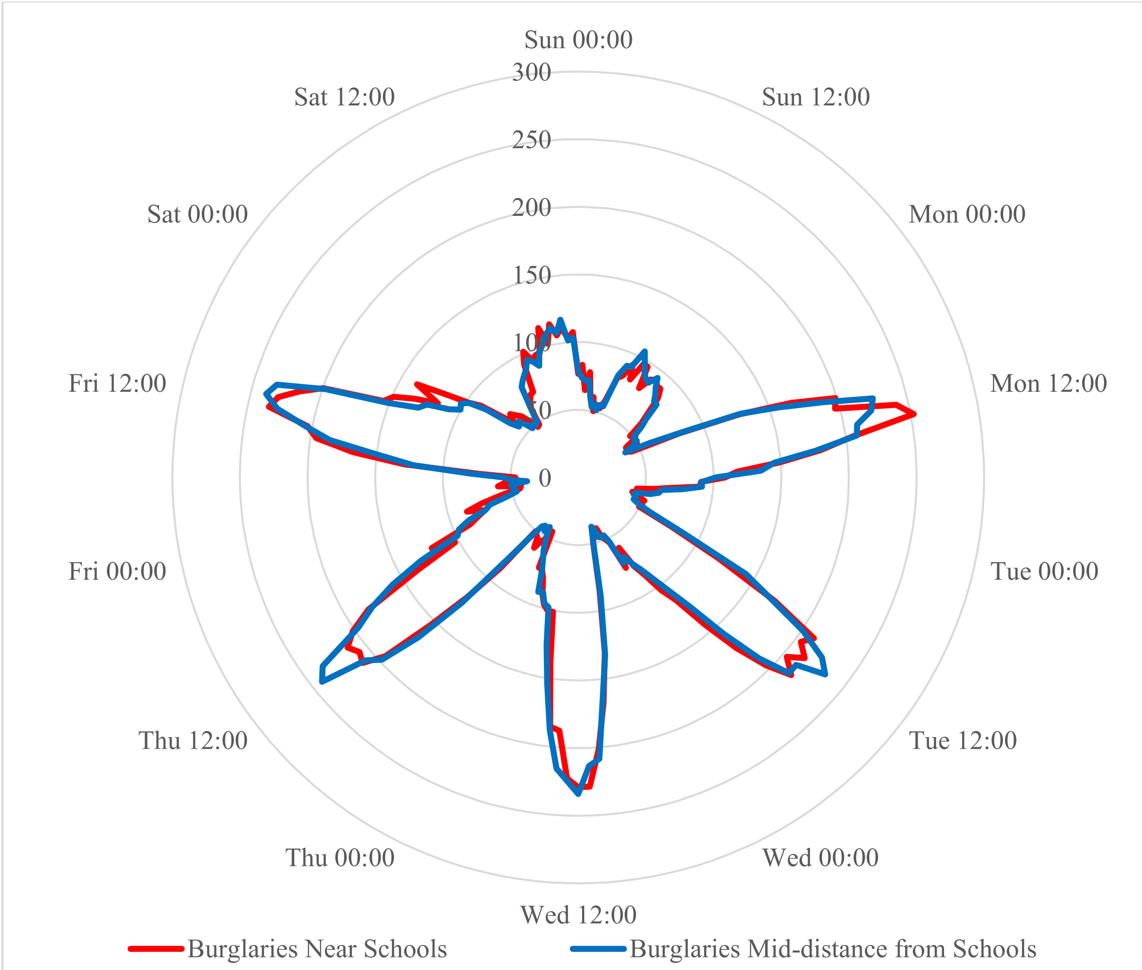

Figure 37: Comparison of Aoristic Temporal Patterns for Residential Burglaries Near and Mid-distance from Schools

Aoristic Occurrence Times for Residential Burglaries that are Mid-Distance from Schools

There were 17,720 residential burglaries that were mid-distance from schools. The distance ranged from a minimum of 2,873 feet to a maximum of 6,678 feet.

Table 36 shows the aoristic occurrence times for residential burglaries mid-distance from schools. Comparing this data with the data in *Table 37* shows that burglaries mid-distance from schools also tend to occur at similar times as burglaries that are far from schools. As with the residential burglaries near schools, the burglaries that occur at mid-distance or far from schools occur during the daytime hours during the week (Monday through Friday), with the largest number occurring on Friday. There is a difference in which day has the single peak number of burglaries occur, with mid-distance burglaries peaking on Friday and burglaries far from school peaking on Wednesday. In addition, the residential burglaries on Friday that are far from schools occur at a slightly earlier time of day than those mid-distance from schools.

Table 36: Aoristic Occurrence Time for Residential Burglaries Mid-Distance from Schools

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
2400-0059	78.8	59.5	54.7	52.3	58.9	46.6	64.2	415.1
0100-0159	73.5	51.2	43.9	46.5	51.3	47.9	57.7	372.0
0200-0259	71.9	50.0	43.0	47.6	42.3	49.3	60.5	364.7
0300-0359	72.1	51.0	45.3	46.8	46.8	49.9	56.0	368.0
0400-0459	59.6	46.1	43.9	40.2	43.2	38.0	49.8	320.9
0500-0559	52.9	39.4	48.7	37.8	44.9	49.1	52.1	324.8
0600-0659	55.8	59.1	58.3	51.4	53.9	55.1	49.6	383.2
0700-0759	51.5	84.2	88.3	88.8	78.6	79.7	51.3	522.4
0800-0859	56.1	128.8	142.9	132.9	126.5	122.0	63.1	772.3
0900-0959	55.8	157.0	167.2	162.5	167.2	149.2	78.7	937.5
1000-1059	81.1	189.0	201.2	208.7	198.1	185.7	82.1	1,145.9
1100-1159	90.0	225.4	223.9	213.2	207.2	205.4	85.4	1,250.6
1200-1259	90.6	222.0	233.5	234.0	242.3	228.3	88.9	1,339.6
1300-1359	105.4	209.7	212.2	224.4	234.9	238.8	94.9	1,320.4
1400-1459	98.4	208.3	212.6	215.8	197.0	232.9	92.1	1,257.0
1500-1559	91.8	176.3	188.7	187.8	179.9	197.8	87.5	1,109.8
1600-1659	88.4	145.3	157.0	154.5	158.7	151.1	97.6	952.7
1700-1759	87.1	135.2	124.9	126.2	131.3	128.9	101.6	835.1
1800-1859	94.0	101.7	106.3	98.4	98.9	124.2	108.2	731.6
1900-1959	87.6	91.1	93.1	96.4	96.2	108.0	112.5	684.9
2000-2059	83.8	91.7	82.4	88.5	86.8	100.3	108.0	641.6
2100-2159	79.4	77.1	75.7	89.6	72.6	102.5	117.4	614.2
2200-2259	79.1	62.2	67.9	73.1	68.2	97.7	101.4	549.6
2300-2359	66.6	60.6	71.6	65.2	54.5	84.3	103.3	506.0
Total	1,851.4	2,722.0	2,787.3	2,782.5	2,740.2	2,873.0	1,963.6	n=17,720

Figure 38 is a graphical representation of the comparison of the aoristic temporal patterns of residential burglaries mid-distance and far from schools. To keep the patterns

on approximately the same scale for ease of comparison, the number of burglaries per hour in the group far from schools was multiplied by two. The burglaries far from schools are shown with the red line and mid-distance burglaries are shown with the blue line. This comparison shows that the burglaries far from schools generally occur at the same time as the mid-distance residential burglaries. It shows the mentioned differences in the peak numbers on Wednesday and Friday.

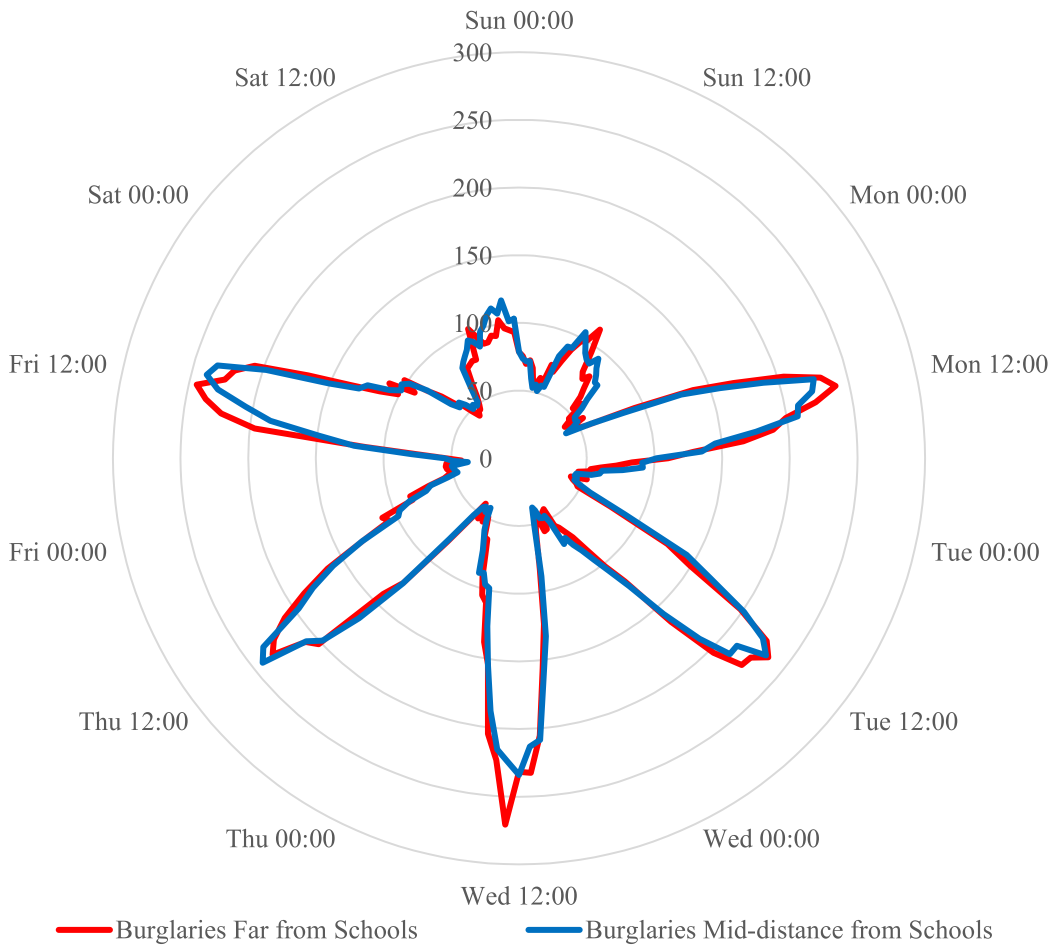

Figure 38: Comparison of Aoristic Temporal Patterns for Residential Burglaries Mid-Distance and Far from Schools

Aoristic Occurrence Times for Residential Burglaries that are Far from Schools

There were 8,860 residential burglaries that occurred far from schools. The distance ranged from a minimum of 6,679 feet to a maximum of 183,533.

Table 37 shows the aoristic occurrence times for residential burglaries far from schools. Comparing this data with the data in *Table 35* shows that burglaries far from schools also tend to occur at similar times as burglaries that are near schools. Residential burglaries that occur far from schools tend to have higher peak numbers on Tuesday, Wednesday, and Thursday than do burglaries near school. On these days, burglaries far from schools also appear to have a shaper peak (a single hour with a peak number as opposed to a couple hours with very similar peak numbers) than do burglaries near schools.

Table 37: Aoristic Occurrence Time for Residential Burglaries Far from Schools

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
2400-0059	39.2	23.5	22.4	20.9	27.1	26.4	36.5	196.2
0100-0159	37.8	23.0	22.8	21.6	24.4	25.8	30.3	185.9
0200-0259	34.9	20.5	26.3	28.2	27.0	27.0	30.0	193.8
0300-0359	36.4	28.0	20.2	28.6	22.9	27.2	24.6	188.0
0400-0459	33.7	21.4	21.3	23.2	26.9	26.9	21.4	174.9
0500-0559	27.8	22.8	23.0	23.7	20.8	21.3	22.8	162.2
0600-0659	28.2	28.3	24.0	27.9	27.7	26.9	23.0	186.0
0700-0759	30.7	46.5	38.3	41.6	40.6	37.3	24.6	259.5
0800-0859	27.9	69.1	63.3	61.9	63.0	57.7	27.4	370.2
0900-0959	36.5	84.0	74.6	78.0	70.9	98.3	32.4	474.7
1000-1059	34.4	102.3	99.1	102.8	101.0	111.3	38.2	589.0
1100-1159	39.2	115.3	113.7	116.3	104.0	117.8	39.0	645.3
1200-1259	44.5	119.9	117.8	115.8	116.4	122.1	39.9	676.4
1300-1359	48.8	111.6	112.9	135.4	112.6	112.4	39.7	673.4
1400-1459	50.1	99.7	112.2	111.8	104.7	109.9	51.4	639.7
1500-1559	56.1	94.5	101.6	102.4	93.7	103.4	47.5	599.2
1600-1659	47.4	83.1	82.5	76.9	81.7	83.7	44.2	499.5
1700-1759	39.7	64.5	60.0	69.1	65.2	67.4	44.4	410.2
1800-1859	37.5	55.0	51.1	54.7	53.0	57.0	46.5	354.9
1900-1959	39.9	41.8	42.1	52.3	55.0	50.5	46.0	327.7
2000-2059	35.3	36.1	35.3	45.7	42.1	55.2	51.6	301.3
2100-2159	32.0	30.3	32.3	37.7	42.6	45.5	48.3	268.6
2200-2259	27.1	26.7	29.6	32.1	35.0	51.2	47.5	249.3
2300-2359	30.8	26.3	28.2	31.8	28.6	41.9	46.6	234.1
Total	895.8	1,374.2	1,354.7	1,440.3	1,386.9	1,504.3	903.8	n=8,860

Figure 39 is a graphical representation of the comparison of the aoristic temporal patterns for residential burglaries that are near and far from schools. The burglaries far from schools are shown with the red line and residential burglaries near schools are shown with the blue line. This comparison shows the generally similar patterns but also shows the differences in the peaks that was discussed above.

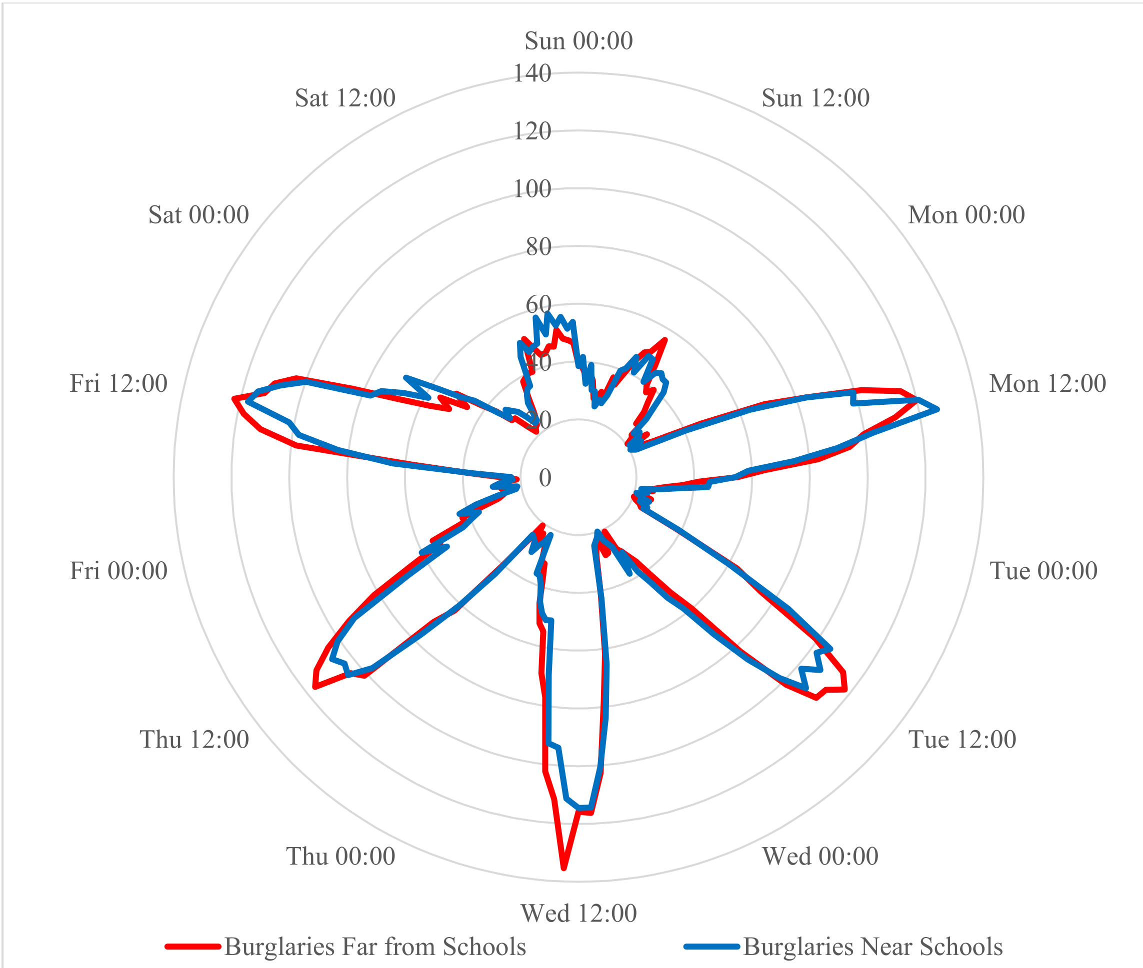

Figure 39: Comparison of Aoristic Temporal Patterns for Residential Burglaries Near and Far from Schools

Occurrence Times for Residential Alarms that are Near Schools

There were 24,154 residential alarms that occurred near schools. The distance ranged from a minimum of 24 feet to a maximum of 3,475 feet.

Table 38 shows the occurrence times for residential alarms near schools. Comparing this data with the data in *Table 39* shows that residential alarms near schools tend to occur at similar times as residential alarms that are mid-distance from schools occur. Most residential alarms near schools happen during the work week (Monday through Friday) with more alarms occurring on Friday than any other day.

In general, residential alarms decrease from midnight until about 4:00 a.m. There is a slow increase from 5:00 a.m. until the numbers start climbing rapidly around 7:00 a.m. to a peak at approximately 10:00 a.m. Residential alarms then start slowly decreasing. There is a slight climb around 2:00 p.m. before the slow decrease resumes until around midnight. The rate of decrease increases at around 7:00 p.m. Alarms near schools stay low a little later in the morning, starting their increase at around 6:00 a.m., as opposed to alarms at a mid-distance from schools where the increase starts at approximately 5:00 a.m.

Table 38: Occurrence Time for Residential Alarms Near Schools

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
2400-0059	85	50	45	35	56	47	75	393
0100-0159	75	36	36	49	40	34	62	332
0200-0259	66	28	31	36	34	40	65	300
0300-0359	48	36	27	31	19	39	44	244
0400-0459	49	31	29	21	34	34	43	241
0500-0559	41	30	33	39	34	35	43	255
0600-0659	61	78	75	80	61	65	52	472
0700-0759	92	143	163	182	150	165	117	1,012
0800-0859	139	225	227	242	208	241	167	1,449
0900-0959	156	251	276	241	223	250	180	1,577
1000-1059	205	262	268	294	231	232	236	1,728
1100-1159	224	210	252	262	276	249	223	1,696
1200-1259	232	216	245	228	249	246	190	1,606
1300-1359	196	250	205	221	241	264	203	1,580
1400-1459	176	271	251	263	245	234	207	1,647
1500-1559	185	229	213	227	239	229	192	1,514
1600-1659	191	203	196	230	226	223	241	1,510
1700-1759	180	179	188	181	162	172	239	1,301
1800-1859	168	172	198	174	201	189	214	1,316
1900-1959	143	141	161	171	160	214	215	1,205
2000-2059	94	86	111	145	146	192	191	965
2100-2159	96	69	91	93	115	137	156	757
2200-2259	84	61	59	68	64	122	142	600
2300-2359	55	63	49	56	61	66	104	454
Total	3,041	3,320	3,429	3,569	3,475	3,719	3,601	n=24,154

Figure 40 shows the graphical representation of the comparison of temporal patterns for residential alarms near schools (in red) and mid-distance alarms (in blue). To

keep the two patterns on approximately the same scale for ease of comparison, the number of alarms per hour for alarms near schools is multiplied by two. The graph shows that the alarms in the two areas follow the same basic time pattern. There are some clear differences near the peaks. One of the flaws of radial graphs is that the low points tend to get obscured by being compressed to a smaller radius, so the differences in when the two increases start is not easily seen in the graph.

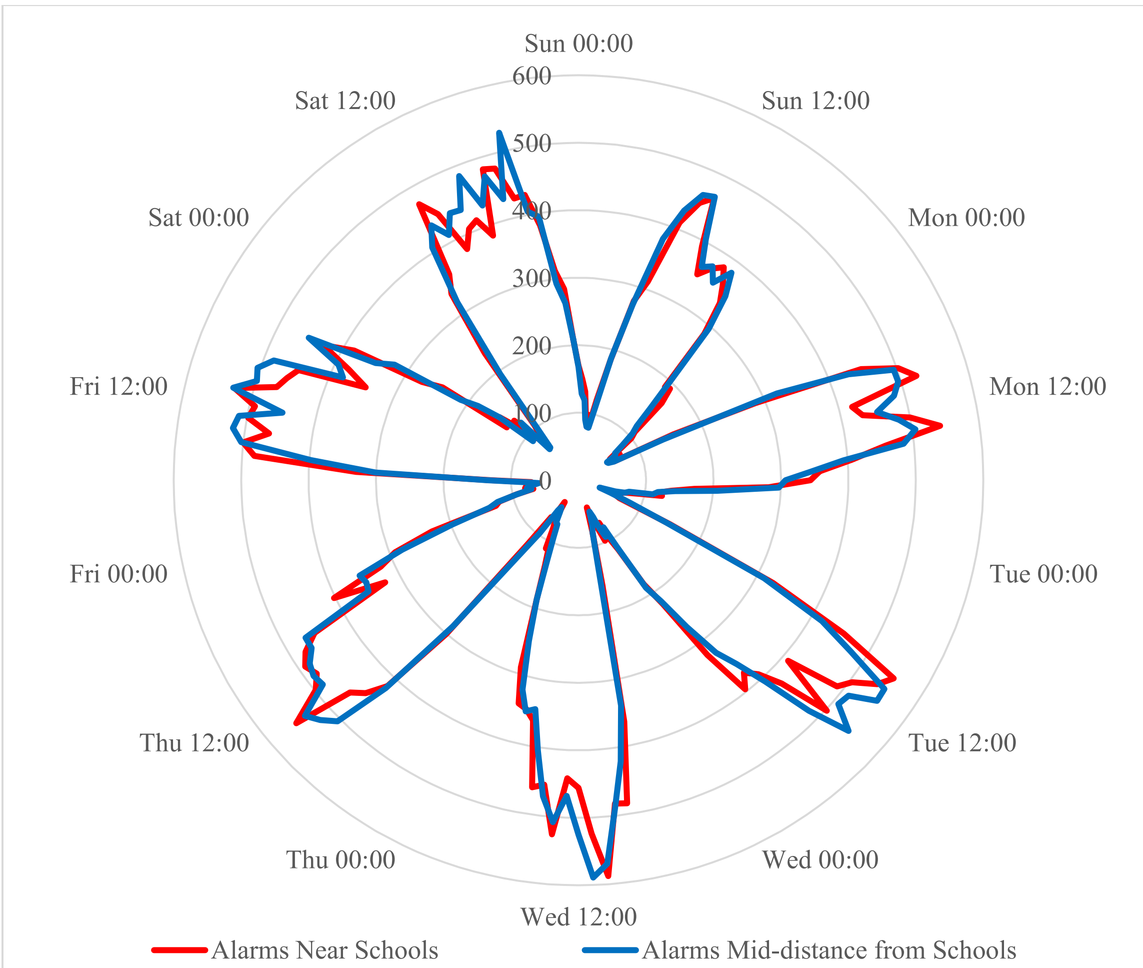

Figure 40: Comparison of Temporal Patterns for Residential Alarms Near and Mid-Distance from Schools

Occurrence Times for Residential Alarms that are Mid-Distance from Schools

There were 48,306 residential alarms that occurred near schools. The distance ranged from a minimum of 3,476 feet to a maximum of 8,813 feet.

Table 39 shows the occurrence times for residential alarms that occur at a mid-distance from schools. Comparing this data with the data in *Table 40* shows that residential alarms that occur at a mid-distance and far from schools also tend to occur at similar times. Most residential alarms, both those that occur at a mid-distance and far from schools, happen during the work week (Monday through Friday) and more alarms occur on Friday than any other day.

Residential alarms that occur at a mid-distance from schools differ from those far from schools primarily in when the hour with the most alarms occur. For alarms mid-distance from schools, that peak number is on Wednesday while it is on Tuesday and Friday for alarms that occur far from schools.

Table 39: Occurrence Time for Residential Alarms Mid-Distance from Schools

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
2400-0059	168	83	77	93	72	95	149	737
0100-0159	128	67	71	78	71	71	89	575
0200-0259	119	66	57	58	55	77	97	529
0300-0359	90	50	33	49	47	71	121	461
0400-0459	80	51	51	70	54	59	63	428
0500-0559	79	59	84	80	97	80	64	543
0600-0659	109	139	144	130	146	135	96	899
0700-0759	187	321	311	340	285	301	196	1,941
0800-0859	272	430	417	421	420	398	319	2,677
0900-0959	379	495	476	486	505	503	407	3,251
1000-1059	429	496	549	570	522	518	436	3,520
1100-1159	461	484	550	589	535	512	411	3,542
1200-1259	466	454	512	525	485	450	439	3,331
1300-1359	404	483	508	468	488	530	437	3,318
1400-1459	365	505	546	508	482	499	484	3,389
1500-1559	374	485	483	471	467	504	431	3,215
1600-1659	354	394	407	405	467	485	471	2,983
1700-1759	382	345	359	345	352	381	431	2,595
1800-1859	349	307	327	351	349	395	528	2,606
1900-1959	296	297	270	321	354	452	405	2,395
2000-2059	197	206	217	249	281	347	395	1,892
2100-2159	150	144	188	188	199	322	293	1,484
2200-2259	118	119	114	126	138	211	263	1,089
2300-2359	106	112	79	92	124	185	208	906
Total	6,062	6,592	6,830	7,013	6,995	7,581	7,233	n=48,306

Figure 41 shows the graphical representation of the comparison of temporal patterns for residential alarms mid-distance from schools (in blue) and far from schools (in red). To keep the two patterns on approximately the same scale for ease of comparison, the number of alarms per hour in the group that occurred far from schools is multiplied by two. The graph clearly shows that the two groups of alarms follow the same basic time pattern. The graph also shows that the alarms far from schools tend to have the very peak slightly earlier than the alarms that are mid-distance from schools.

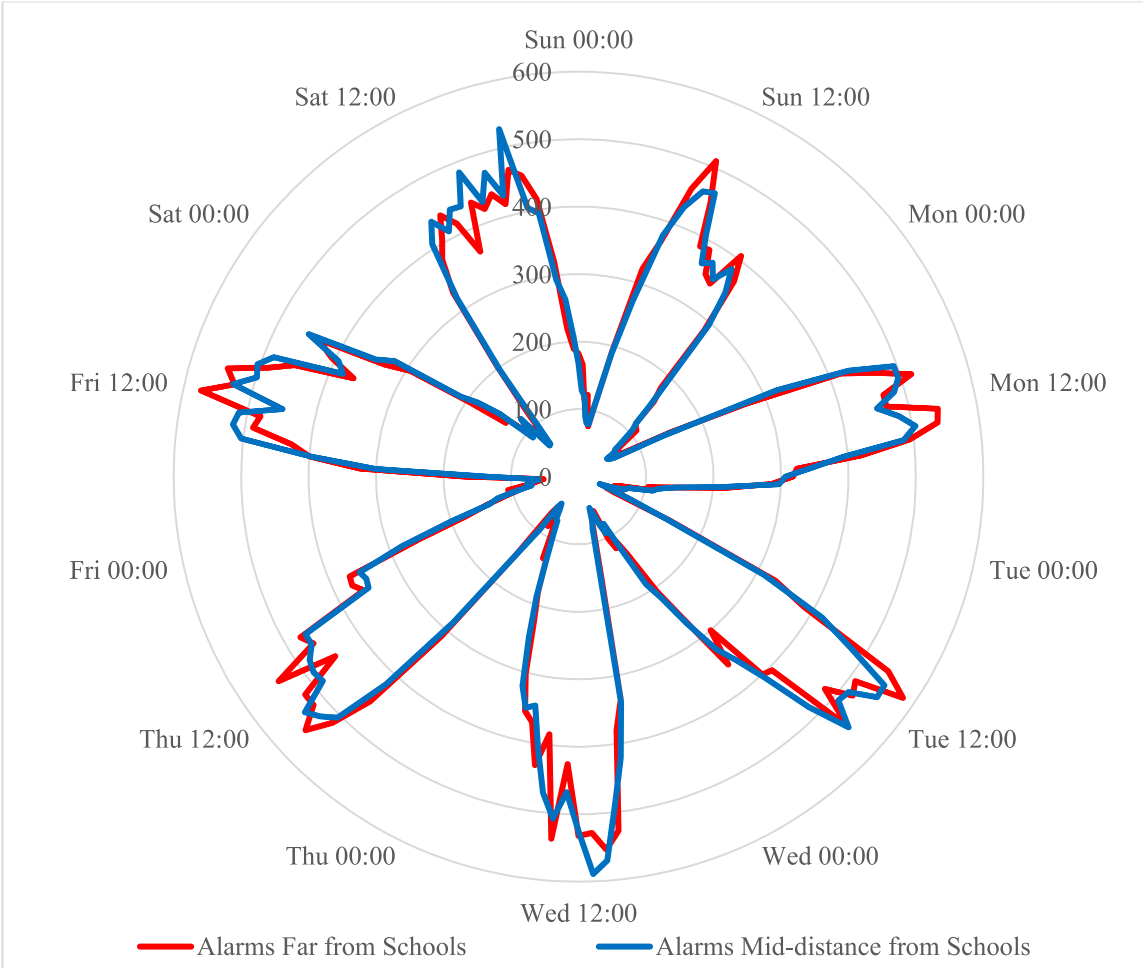

Figure 41: Comparison of Temporal Patterns for Residential Alarms Mid-Distance and Far from Schools

Occurrence Times for Residential Alarms that are Far from Schools

There were 24,153 residential alarms that occurred far from schools. The distance ranged from a minimum of 8,814 feet to a maximum of 41,496 feet.

Table 40 shows the occurrence times for residential alarms far from schools. Comparing this data with the data in *Table 38* shows that residential alarms that occur far from schools tend to occur at similar times as alarms near schools. Most residential alarms, both near and far from schools, happen during the work week (Monday through Friday) and the day when most alarms occur is Friday.

Table 40: Occurrence Time for Residential Alarms Far from Schools

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
2400-0059	91	55	31	51	45	46	71	390
0100-0159	83	41	27	28	40	53	51	323
0200-0259	57	31	30	29	34	35	53	269
0300-0359	61	30	34	31	43	31	53	283
0400-0459	45	35	22	34	27	26	46	235
0500-0559	38	38	28	47	33	37	33	254
0600-0659	56	76	75	76	74	85	59	501
0700-0759	96	135	165	168	156	162	102	984
0800-0859	161	209	193	190	227	200	165	1,345
0900-0959	185	233	271	264	258	214	190	1,615
1000-1059	229	258	291	277	276	244	202	1,777
1100-1159	255	234	255	264	259	240	219	1,726
1200-1259	226	234	260	266	259	287	208	1,740
1300-1359	193	271	241	213	224	264	182	1,588
1400-1459	194	269	272	269	269	272	218	1,763
1500-1559	177	247	203	192	232	244	210	1,505
1600-1659	173	210	200	216	238	226	219	1,482
1700-1759	203	162	150	185	180	182	209	1,271
1800-1859	185	159	178	178	186	203	233	1,322
1900-1959	143	143	132	151	185	218	227	1,199
2000-2059	90	110	103	112	127	166	208	916
2100-2159	79	71	68	91	88	147	160	704
2200-2259	58	52	55	65	71	98	110	509
2300-2359	56	51	60	66	57	67	95	452
Total	3,134	3,354	3,344	3,463	3,588	3,747	3,523	n=24,153

The alarms that happen far from schools have a slight difference in the daily occurrence time pattern, especially at the peak times. On most days of the week, the peak number of alarms occurs earlier for alarms that are far from schools than when those near schools occur.

Figure 42 shows the graphical representation of the comparison of temporal patterns for residential alarms far from schools (in red) and near schools (in blue). The graph clearly shows that the two types of alarms follow the same basic time pattern. As with the chart for alarms that occurred mid-distance from schools, the largest observable differences in this graph are all differences in the peak times of occurrence.

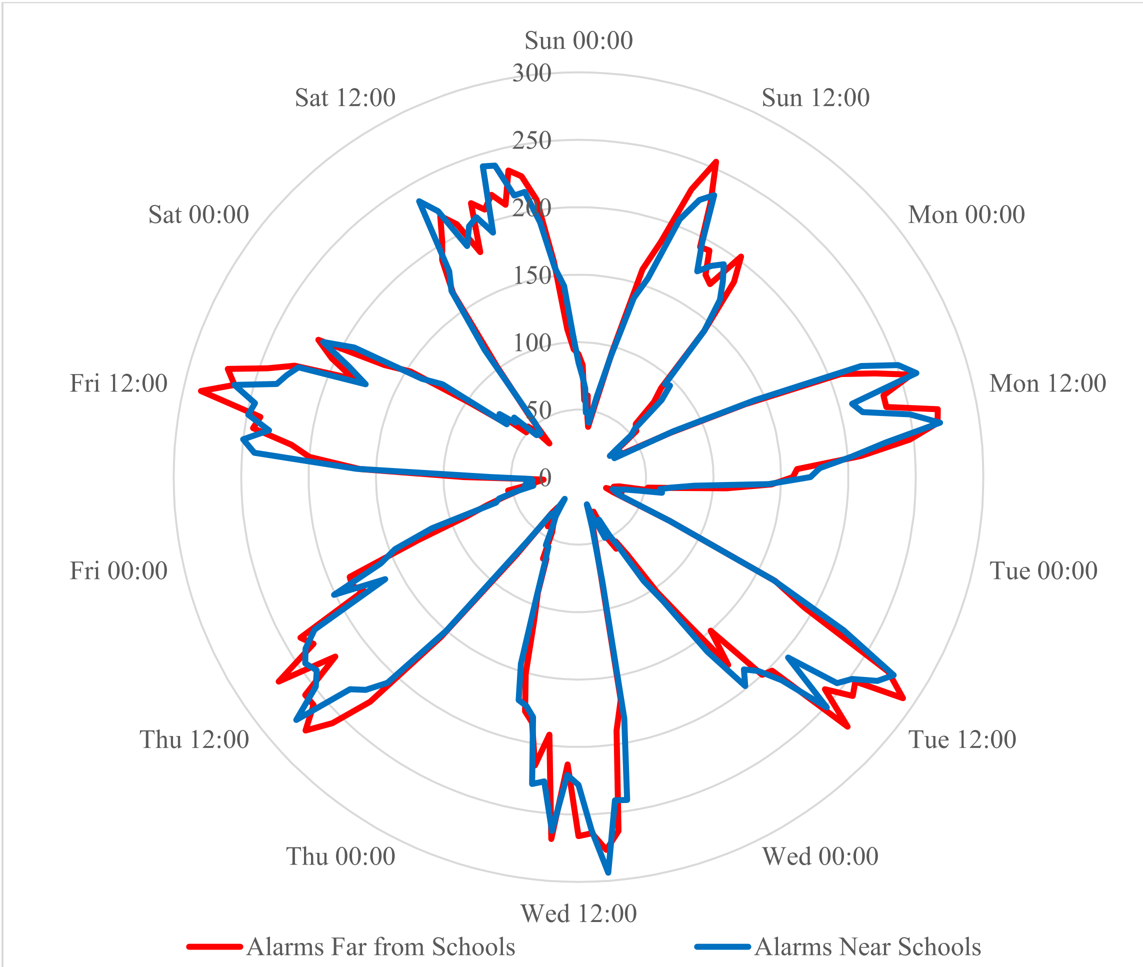

Figure 42: Comparison of Temporal Patterns for Residential Alarms Near and Far from Schools

Aoristic Occurrence Times for Commercial Burglaries that are Near Schools

There were 4,238 commercial burglaries that occurred near schools. The distance ranged from a minimum of eight feet to a maximum of 2700 feet. If a school is burglarized, it would be coded as a commercial burglary. There may be a slight difference in the way the addresses of the school are listed and geocoded between the address list from the police department and the address list from the Texas Education Agency. Commercial burglaries listed at close distances from schools, such as the 8 feet minimum are probably burglaries of the schools themselves.

Table 41 shows the aoristic occurrence times for commercial burglaries near schools. Comparing this data with the data in *Table 42* shows that commercial burglaries that occur near schools tend to occur at similar times as commercial burglaries that occur mid-distance from schools. Most commercial burglaries, both that occur near or mid-distance from schools, happen on weekends (Friday evening through Monday morning) with the highest daily number of burglaries occurring on Sunday.

The burglaries that happen near schools have a slight difference in the daily occurrence time pattern. There appears to be a difference in the exact peak times and in which days have the highest peak numbers. Burglaries near schools have the highest peak on Tuesday mornings followed by Thursday mornings. Burglaries that occur at mid-distance have their peak numbers on Monday, Wednesday, and Sunday mornings.

Table 41: Aoristic Occurrence Time for Commercial Burglaries Near Schools

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
2400-0059	32.0	43.1	29.4	32.9	29.2	32.8	31.1	230.5
0100-0159	35.8	34.9	36.1	47.0	39.3	33.9	38.1	265.1
0200-0259	42.5	44.2	33.0	38.4	46.0	41.3	39.8	285.2
0300-0359	38.5	36.8	58.1	47.2	49.1	45.8	41.5	317.0
0400-0459	46.9	42.4	46.0	40.1	39.2	46.4	40.3	301.4
0500-0559	34.1	42.1	36.0	38.6	37.3	34.6	35.7	258.5
0600-0659	32.3	33.0	29.2	29.2	24.6	30.9	30.8	209.9
0700-0759	27.2	25.0	18.7	20.4	24.0	24.8	19.4	159.6
0800-0859	23.9	20.2	21.6	18.8	19.6	18.8	23.2	146.2
0900-0959	22.7	20.0	20.4	17.3	19.7	18.1	16.5	134.7
1000-1059	17.5	20.6	17.4	21.3	19.4	18.4	14.5	129.0
1100-1159	19.1	18.8	18.3	20.1	17.0	18.3	18.3	129.9
1200-1259	20.0	18.6	13.6	22.3	19.1	18.5	15.6	127.7
1300-1359	20.9	14.5	14.5	16.4	17.3	17.8	14.1	115.6
1400-1459	19.9	13.1	16.6	15.2	15.2	17.6	19.1	116.7
1500-1559	21.0	13.7	13.4	12.4	15.3	12.5	15.0	103.3
1600-1659	19.8	14.4	18.2	15.1	16.9	13.5	14.4	112.3
1700-1759	20.2	18.3	16.1	15.4	15.6	16.2	15.2	117.0
1800-1859	24.7	20.2	22.8	20.3	18.6	15.3	15.5	137.4
1900-1959	27.6	19.6	19.6	17.6	22.1	17.1	17.6	141.2
2000-2059	25.0	24.6	18.7	28.4	20.8	20.4	16.6	154.4
2100-2159	26.0	21.7	20.3	22.7	26.8	19.1	24.7	161.2
2200-2259	29.2	31.8	31.6	21.4	27.4	22.3	19.7	183.4
2300-2359	43.8	28.3	28.1	30.0	21.8	24.1	24.4	200.6
Total	670.7	619.7	597.8	608.4	601.5	578.8	561.1	n=4,238

Figure 43 shows the graphical representation of the comparison of the temporal patterns for commercial burglaries near schools (in red) and mid-distance from schools (in blue). To keep the two patterns on approximately the same scale for ease of comparison, the number of burglaries per hour in the areas near schools was multiplied by two. The graph shows that burglaries in the two areas follow similar time patterns. There are visible differences in the peak times of occurrence and in the lows. The burglaries near schools have lower low numbers low than do the burglaries mid-distance from schools.

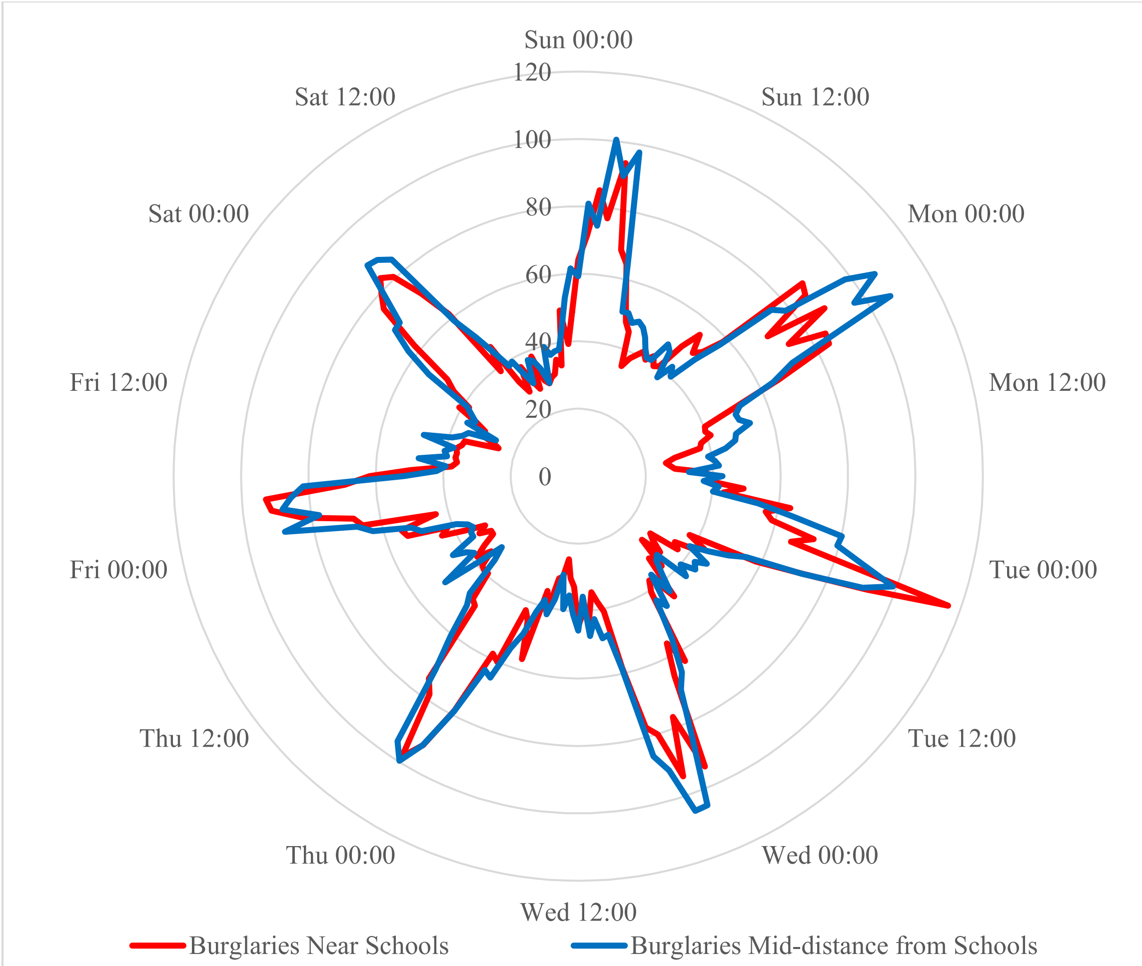

Figure 43: Comparison of Aoristic Temporal Patterns for Commercial Burglaries Near and Mid-distance from Schools

Aoristic Occurrence Times for Commercial Burglaries that are Mid-Distance from Schools

There were 9,183 commercial burglaries that occurred at a mid-distance from schools. The distance from a school ranged from a minimum of 2,701 feet to a maximum of 6,706 feet.

Table 42 shows the occurrence times for commercial burglaries that occurred at a mid-distance from schools. Comparing this data with the data in *Table 43* shows that commercial burglaries that occur mid-distance from schools occur at similar times as commercial burglaries that are far from schools. The day with the most commercial burglaries is usually Sunday, but in the case of burglaries occurring at a mid-distance from a school, the highest number is on Monday instead.

Table 42: Aoristic Occurrence Time for Commercial Burglaries Mid-Distance from Schools

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
2400-0059	59.3	78.7	80.1	70.3	63.8	67.3	69.5	489.0
0100-0159	80.9	98.3	79.6	84.4	78.8	88.5	69.9	580.4
0200-0259	74.5	106.4	88.1	104.8	92.1	77.7	78.1	621.7
0300-0359	100.4	96.6	98.9	105.2	99.7	88.3	88.5	677.6
0400-0459	90.0	106.9	90.5	91.3	95.2	85.4	87.5	646.8
0500-0559	97.7	71.8	72.3	86.0	71.2	81.7	84.8	565.5
0600-0659	67.3	64.1	55.3	58.8	60.7	51.8	58.9	416.9
0700-0759	50.5	52.3	50.4	47.9	50.5	42.1	51.2	344.9
0800-0859	50.6	50.2	44.6	48.6	47.3	39.4	44.2	324.8
0900-0959	48.2	50.5	39.0	42.7	35.1	47.6	38.6	301.7
1000-1059	49.3	53.3	46.1	47.6	30.9	39.4	39.3	305.8
1100-1159	48.1	48.4	42.9	35.8	39.3	40.4	34.3	289.1
1200-1259	45.7	47.8	44.4	45.8	50.5	37.9	30.5	302.6
1300-1359	42.7	44.5	40.1	41.1	38.3	47.4	37.6	291.6
1400-1459	40.5	38.9	43.7	35.4	40.1	39.1	36.7	274.4
1500-1559	40.7	40.7	33.0	39.7	43.9	36.4	33.8	268.3
1600-1659	47.3	41.9	34.1	29.5	35.9	35.0	28.9	252.6
1700-1759	45.7	32.9	38.0	37.2	36.0	26.6	39.7	256.0
1800-1859	37.5	42.8	43.7	42.0	34.6	36.5	36.9	274.0
1900-1959	42.8	37.2	36.3	38.0	35.7	34.5	37.6	262.2
2000-2059	40.3	41.8	46.6	42.0	38.9	36.6	38.0	284.1
2100-2159	48.9	40.2	43.5	49.5	49.2	38.9	44.2	314.4
2200-2259	57.3	53.9	55.6	54.7	51.8	53.6	53.1	379.9
2300-2359	75.6	65.0	65.8	65.1	63.1	62.5	61.6	458.7
Total	1,381.9	1,405.1	1,312.3	1,343.5	1,282.6	1,234.4	1,223.2	n=9,183

Figure 44 shows the graphical representation of the comparison of the aoristic temporal patterns for commercial burglaries that occur at a mid-distance from schools (in blue) and burglaries far from schools (in red). The graph shows that burglaries in the two areas follow similar time patterns. This graph shows that there are more differences in the pattern than were first thought from reviewing the tables. The weekend pattern shows

more differences, with a broader peak on Wednesday and Saturday mornings for the burglaries far from schools and the Sunday lows not going as low as the mid-distance burglaries drop to. On Tuesday and Thursday mornings, the patterns for the lows is reversed, with the burglaries that are far from schools going lower than the mid-distance burglaries.

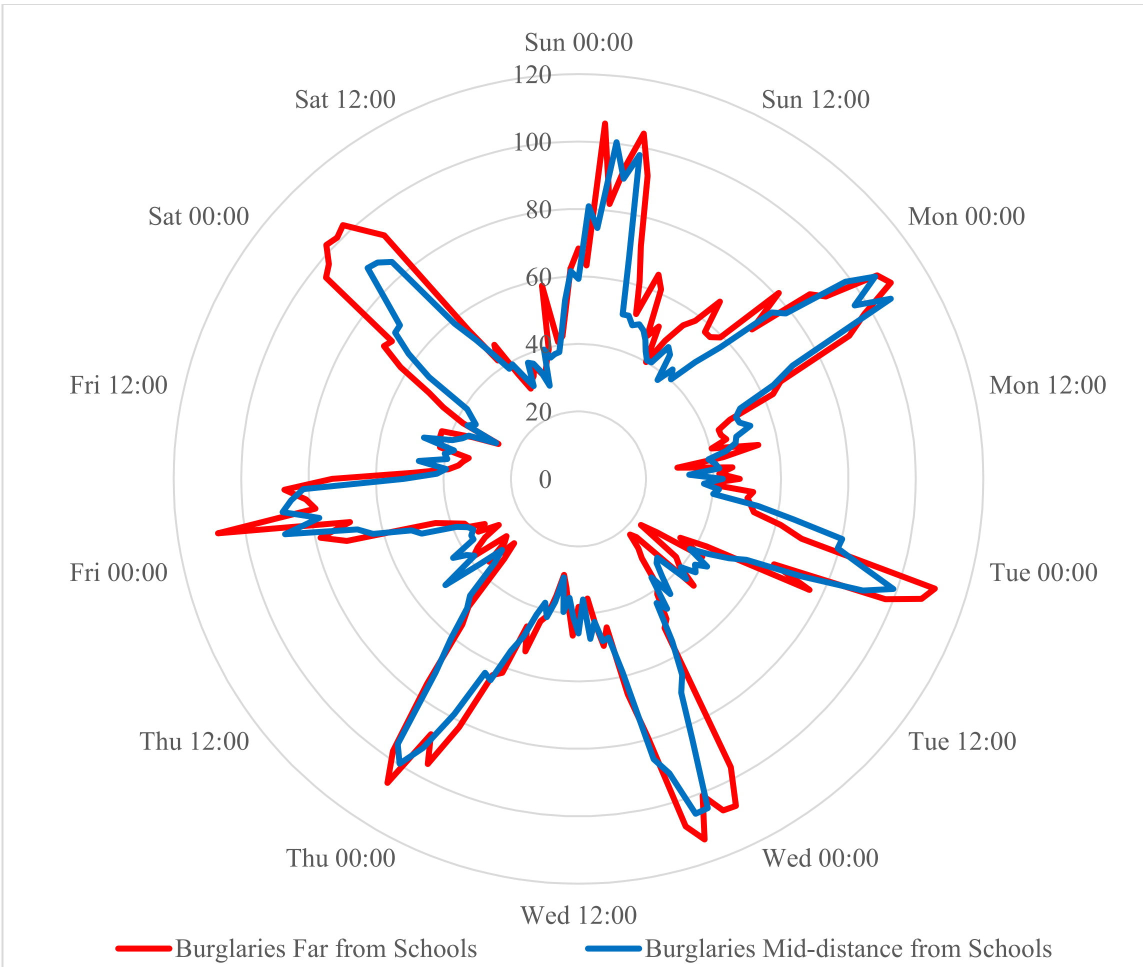

Figure 44: Comparison of Aoristic Temporal Patterns for Commercial Burglaries Mid-Distance and Far from Schools

Aoristic Occurrence Times for Commercial Burglaries that are Far from Schools

There were 3,231 commercial burglaries that occurred far from schools. The distance ranged from a minimum of 6,707 feet from the nearest school to a maximum of 149,174 feet from the nearest school.

Table 43 shows the occurrence times for commercial burglaries that occurred far from schools. Comparing this data with the data in *Table 41* shows that commercial burglaries that occur far from schools occur in a similar pattern to burglaries near schools. Most commercial burglaries happen during weekends with the most burglaries occurring on Sunday. This pattern was true for both the burglaries near and far from schools.

The burglaries that happen far from schools have a slight difference in the daily occurrence time pattern. The highest number per hour in burglaries that are far from schools is fairly consistent throughout the week with all of the peaks being between 34 and 38 burglaries in an hour. For burglaries near schools, there were larger differences between the days, from a low of 41.5 on Saturday to 58.1 on Tuesday.

Table 43: Aoristic Occurrence Time for Commercial Burglaries Far from Schools

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
2400-0059	22.8	29.2	20.5	35.9	27.2	26.1	31.9	193.6
0100-0159	21.1	30.4	22.8	35.7	31.9	23.0	32.5	197.4
0200-0259	35.2	35.7	36.8	33.6	29.1	36.0	34.0	240.5
0300-0359	27.3	36.4	35.9	37.7	35.5	26.2	33.7	232.8
0400-0459	31.2	32.7	32.6	35.9	32.6	27.0	34.2	226.2
0500-0559	34.7	30.3	21.1	26.5	25.2	29.1	32.4	199.2
0600-0659	30.7	22.2	25.3	21.8	18.4	24.3	30.8	173.5
0700-0759	23.8	21.0	14.3	14.9	16.7	16.4	18.2	125.3
0800-0859	20.5	16.1	11.6	16.7	10.8	12.9	14.2	102.7
0900-0959	17.3	14.7	14.4	14.3	9.0	11.9	15.6	97.2
1000-1059	21.7	14.7	9.4	11.8	12.0	11.5	12.0	93.2
1100-1159	20.4	15.1	7.7	12.6	9.6	11.0	10.1	86.6
1200-1259	15.7	13.5	12.3	12.7	9.1	14.0	10.7	88.0
1300-1359	17.0	18.1	13.1	15.5	12.9	14.1	11.1	101.8
1400-1459	13.3	14.5	15.5	12.8	12.1	14.3	12.0	94.5
1500-1559	16.1	9.8	8.1	10.8	10.9	14.3	11.0	81.1
1600-1659	18.4	15.3	7.5	9.6	9.1	11.2	11.1	82.0
1700-1759	19.4	13.9	9.1	11.7	11.2	8.6	12.0	86.0
1800-1859	22.4	15.9	10.0	13.9	10.3	12.7	13.1	98.3
1900-1959	19.1	12.7	13.2	14.6	11.8	15.1	19.4	106.0
2000-2059	19.1	17.3	13.8	17.8	12.1	17.0	13.7	110.8
2100-2159	19.8	16.8	16.3	15.4	13.3	20.8	14.2	116.6
2200-2259	27.0	17.2	17.0	20.6	14.8	23.3	16.8	136.6
2300-2359	22.6	17.6	32.2	21.2	23.7	22.9	20.8	161.0
Total	536.7	481.1	420.7	474.1	409.0	443.8	465.5	n=3,231

Figure 45 shows the graphical representation of the comparison of aoristic temporal patterns for commercial burglaries far from schools (in red) and near schools (in blue). The graph shows that the two types of burglaries occur in similar temporal patterns. The difference in the heights of the daily peaks is visible in this graph.

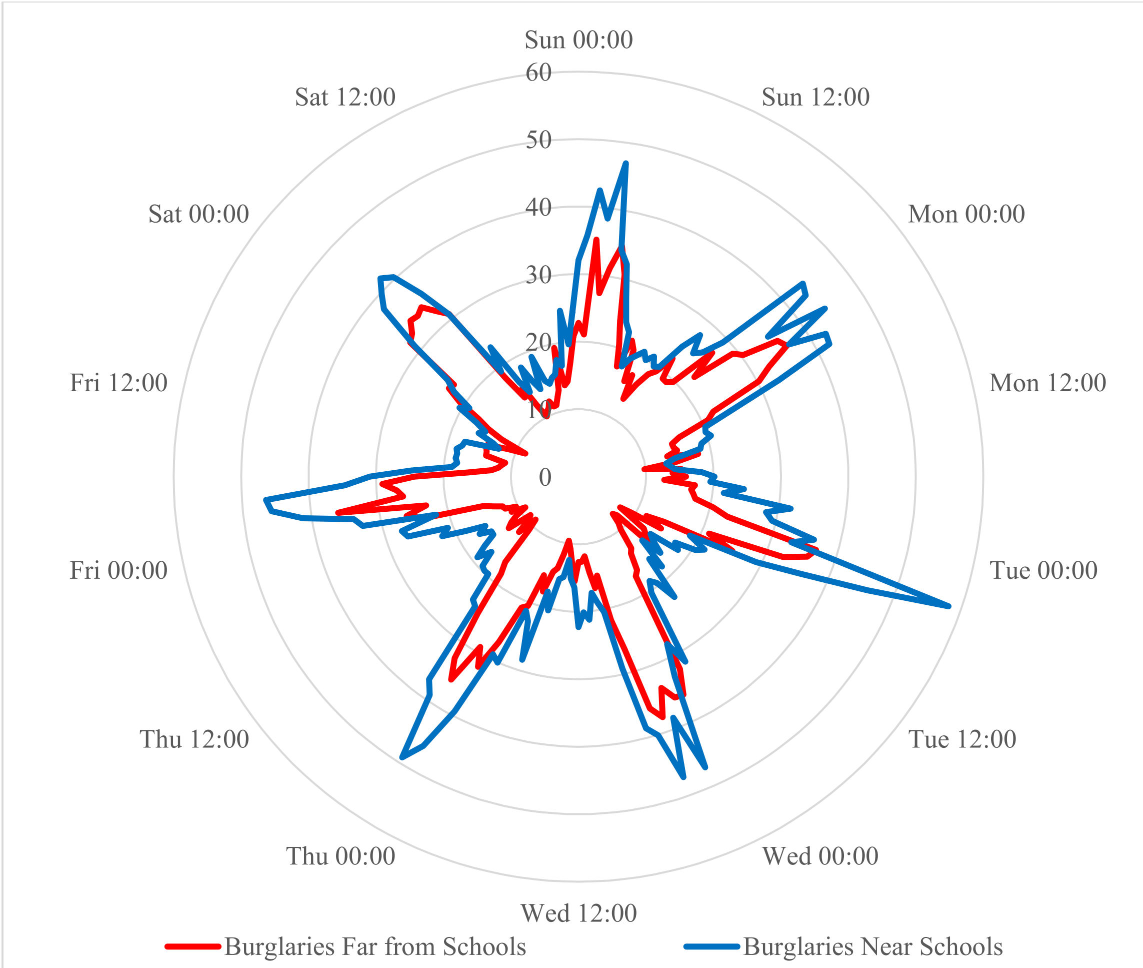

Figure 45: Comparison of Aoristic Temporal Patterns for Commercial Burglaries Near and Far from Schools

Occurrence Times for Commercial Alarms that are Near Schools

There were 31,996 commercial alarms that occurred near schools. The distance ranged from a minimum of 11 feet to a maximum of 2,735 feet. As mentioned above while discussing commercial burglaries, an alarm at a school is coded as a commercial alarm. The alarms very close to schools, such as the 11 feet mentioned as a minimum, are probably alarms at the school with the difference caused by the way the addresses are geocoded differently in the police and TEA data.

Table 44 shows the occurrence times for commercial alarms that occurred near schools. Comparing this data with the data in Table 45 shows that commercial alarms that occur near schools occur at similar times as mid-distance alarms occur. Commercial alarms, both near and mid-distance from schools, happen more during weekends with the highest number of alarms occurring on Saturday. The alarms that happen near schools appear to have a slight difference in the daily occurrence times from the mid-distance alarms, especially in the peak times.

Table 44: Occurrence Time for Commercial Alarms Near Schools

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
2400-0059	235	272	269	283	280	313	267	1,919
0100-0159	265	236	254	263	286	243	245	1,792
0200-0259	281	245	215	256	236	264	241	1,738
0300-0359	239	240	253	243	249	230	285	1,739
0400-0459	204	257	255	236	206	266	259	1,683
0500-0559	209	219	225	229	198	234	239	1,553
0600-0659	199	218	231	221	250	247	195	1,561
0700-0759	205	245	232	245	246	283	301	1,757
0800-0859	221	227	207	208	205	219	300	1,587
0900-0959	225	149	123	116	121	133	282	1,149
1000-1059	219	79	75	67	85	86	196	807
1100-1159	212	69	46	62	62	68	162	681
1200-1259	180	56	41	44	51	52	122	546
1300-1359	171	47	42	35	41	57	150	543
1400-1459	185	65	41	60	50	56	161	618
1500-1559	162	68	40	55	49	77	185	636
1600-1659	182	70	67	74	72	95	217	777
1700-1759	214	137	119	126	127	129	235	1,087
1800-1859	221	224	222	223	222	211	185	1,508
1900-1959	239	232	199	213	229	226	184	1,522
2000-2059	196	203	218	204	214	206	170	1,411
2100-2159	178	233	262	262	238	228	243	1,644
2200-2259	198	298	265	258	272	308	259	1,858
2300-2359	277	274	275	269	303	248	234	1,880
Total	5,117	4,363	4,176	4,252	4,292	4,479	5,317	n=31,996

Figure 46 shows a graphical comparison of the temporal patterns for commercial alarms that occur near and mid-distance from schools. To keep the two patterns on approximately the same scale for ease of comparison, the number of alarms per hour in

the alarms near schools is multiplied by two. The pattern for alarms near schools is shown in red and the pattern for all commercial alarms is shown in blue. Looking at the graph shows the differences in the exact times of the peaks, but that there is a very good overall similarity.

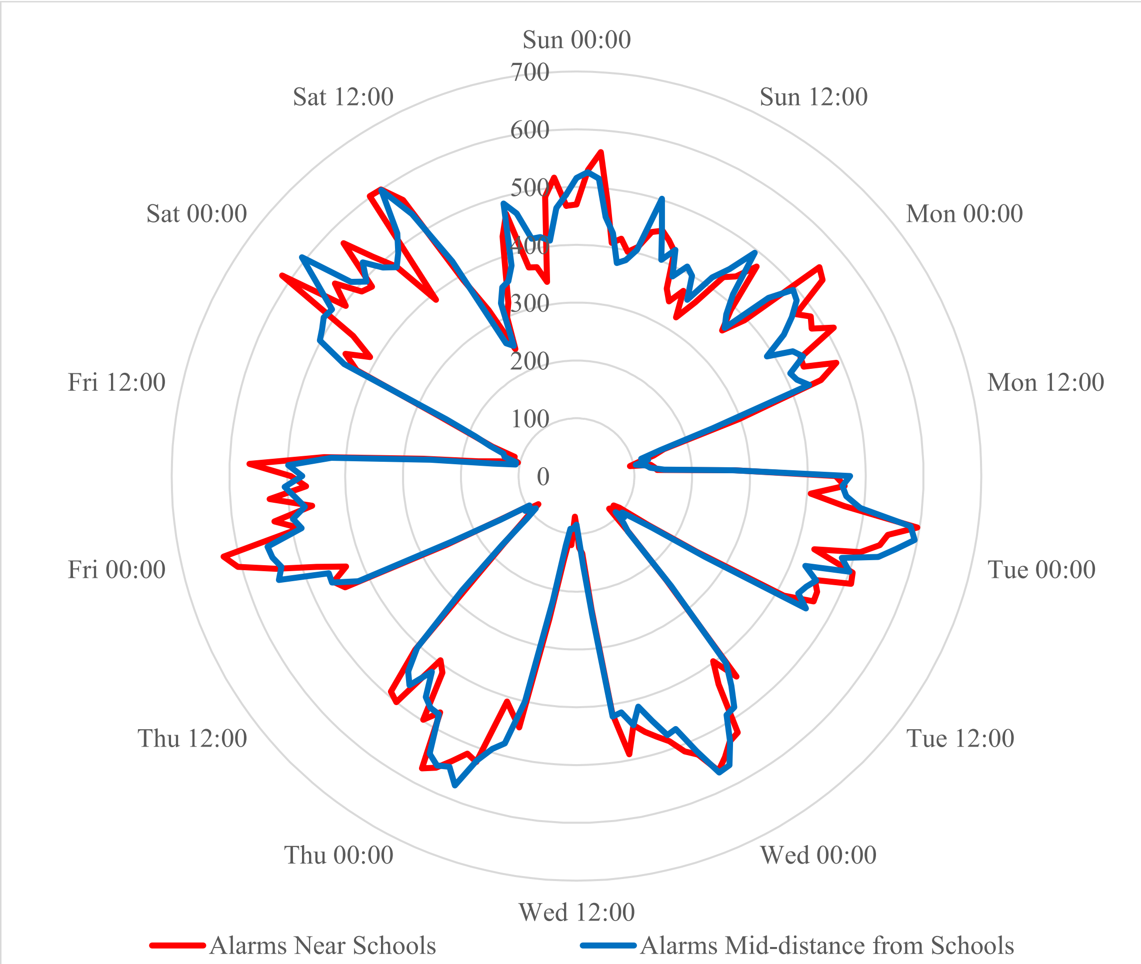

Figure 46: Comparison of Temporal Pattern for Commercial Alarms Near and Mid-distance from Schools

Occurrence Times for Commercial Alarms that are Mid-Distance from Schools

There were 63,978 commercial alarms that occurred at a mid-distance from schools. The distance ranged from a minimum of 2,376 feet to a maximum of 7,353 feet.

Table 45 shows the occurrence times for commercial alarms that occurred at a mid-distance from schools. Comparing this data with the data in *Table 46* shows that commercial alarms that occur at a mid-distance and far from schools occur at similar times. There are some differences in the shape of the peak, with mid-distance alarms generally having a single peak on weekdays, while alarms that are far from schools have a more varied peak.

Table 45: Occurrence Time for Commercial Alarms Mid-Distance from Schools

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
2400-0059	516	487	567	569	556	548	607	3,850
0100-0159	526	463	540	519	543	484	515	3,590
0200-0259	516	434	480	470	476	496	495	3,367
0300-0359	451	389	500	475	474	473	523	3,285
0400-0459	425	432	425	443	463	488	492	3,168
0500-0559	375	443	452	413	421	505	477	3,086
0600-0659	383	410	441	442	463	474	494	3,107
0700-0759	405	416	434	416	446	499	522	3,138
0800-0859	502	432	458	421	405	425	599	3,242
0900-0959	447	249	263	242	280	254	535	2,270
1000-1059	402	152	159	156	175	146	429	1,619
1100-1159	427	116	122	108	113	107	260	1,253
1200-1259	383	127	101	84	90	107	250	1,142
1300-1359	410	104	109	88	97	129	326	1,263
1400-1459	400	122	92	92	107	132	351	1,296
1500-1559	360	128	115	92	96	158	357	1,306
1600-1659	416	152	131	121	152	188	381	1,541
1700-1759	445	271	251	220	242	245	488	2,162
1800-1859	494	473	415	400	419	446	466	3,113
1900-1959	415	460	451	479	461	502	418	3,186
2000-2059	381	468	484	494	460	508	418	3,213
2100-2159	362	494	488	522	545	516	410	3,337
2200-2259	453	584	531	575	534	512	465	3,654
2300-2359	494	595	566	549	544	555	487	3,790
Total	10,388	8,401	8,575	8,390	8,562	8,897	10,765	n=63,978

Figure 47 shows a graphical comparison of the temporal patterns for commercial alarms that occur mid-distance and far from schools. To keep the two patterns on approximately the same scale for ease of comparison, the number of alarms per hour in the alarms far from schools is multiplied by two. The pattern for alarms mid-distance

from schools is shown in blue and the pattern for alarms far from schools is shown in blue. The graph shows the overall similarities and the differences in the exact times or numbers of the peaks. The mentioned difference of the single peak for mid-distance alarms is visible on Monday, Tuesday, and Wednesday nights in this graph.

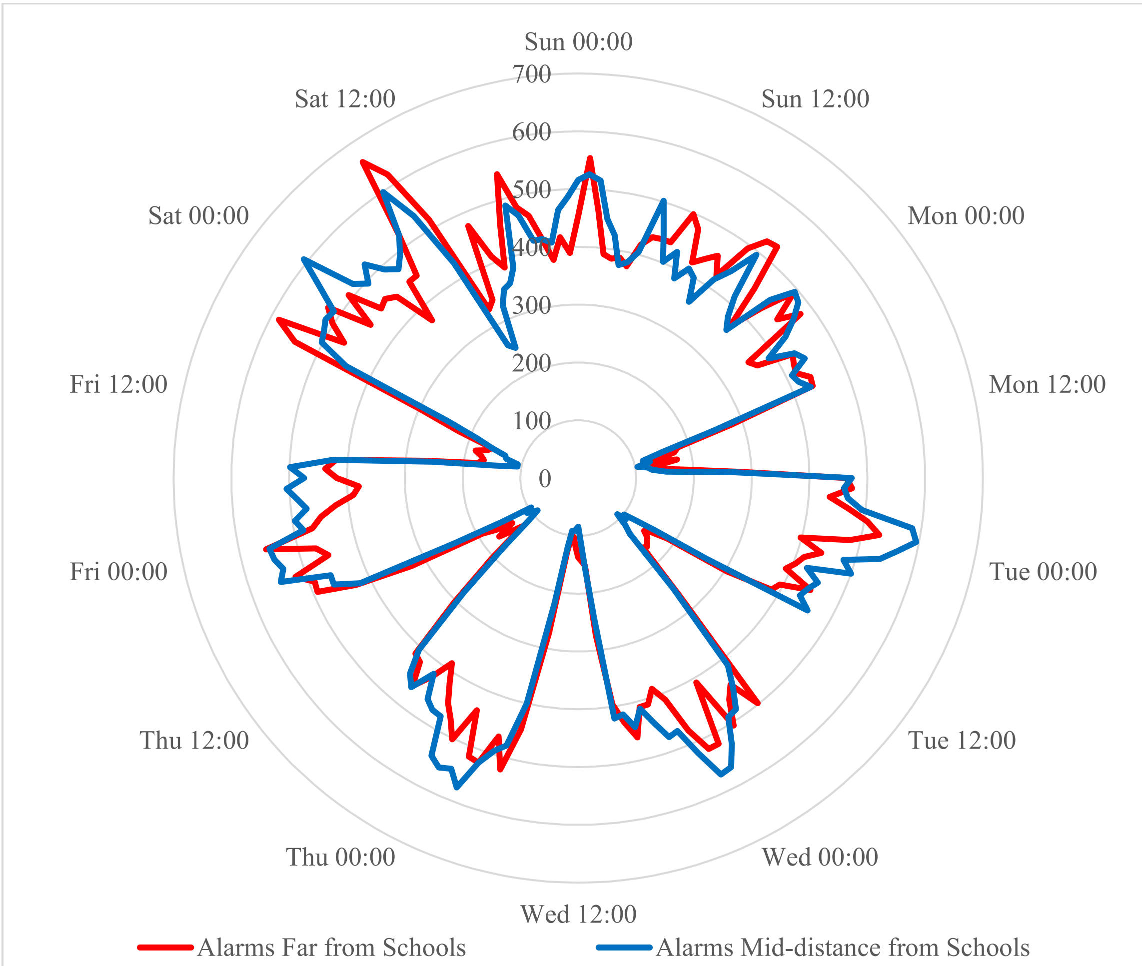

Figure 47: Comparison of Temporal Pattern for Commercial Alarms Mid-Distance and Far from Schools

Occurrence Times for Commercial Alarms that are Far from Schools

There were 31,992 commercial alarms that occurred far from schools. The distance ranged from a minimum of 7,354 feet to a maximum of 83,316 feet.

Table 46 shows the occurrence times for commercial alarms that occurred far from schools. Comparing this data with the data in *Table 44* shows that commercial alarms that occur far from schools occur at similar times as alarms near schools.

The alarms that happen far from schools appear to have a peak earlier in the evening than the alarms that are near schools.

Table 46: Occurrence Time for Commercial Alarms Far from Schools

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
2400-0059	227	220	241	260	251	277	254	1,730
0100-0159	277	239	199	238	236	234	225	1,648
0200-0259	232	178	220	206	225	225	228	1,514
0300-0359	195	183	207	193	209	211	222	1,420
0400-0459	192	214	202	205	194	195	186	1,388
0500-0559	194	211	196	205	214	190	224	1,434
0600-0659	188	209	223	230	230	209	224	1,513
0700-0759	209	219	197	215	210	219	261	1,530
0800-0859	218	218	193	198	207	210	331	1,575
0900-0959	219	141	152	137	152	133	310	1,244
1000-1059	219	90	93	76	102	88	258	926
1100-1159	249	86	79	72	64	83	165	798
1200-1259	239	65	73	69	73	86	171	776
1300-1359	211	87	79	60	85	92	238	852
1400-1459	219	64	81	51	69	82	206	772
1500-1559	227	71	84	51	84	79	193	789
1600-1659	212	95	82	65	96	111	229	890
1700-1759	247	142	135	136	163	150	272	1,245
1800-1859	262	232	249	223	213	272	240	1,691
1900-1959	264	237	222	261	246	293	231	1,754
2000-2059	224	218	232	234	245	234	209	1,596
2100-2159	186	235	253	261	259	251	190	1,635
2200-2259	216	253	204	259	226	262	209	1,629
2300-2359	246	265	260	219	235	223	195	1,643
Total	5,372	4,172	4,156	4,124	4,288	4,409	5,471	n=31,992

Figure 48 shows a graphical comparison of the temporal patterns for commercial alarms that occur near and far from schools. The pattern for alarms far from schools is shown in red and the pattern for alarms near schools is shown in blue. The graph shows the differences in the timing and shapes of the peaks.

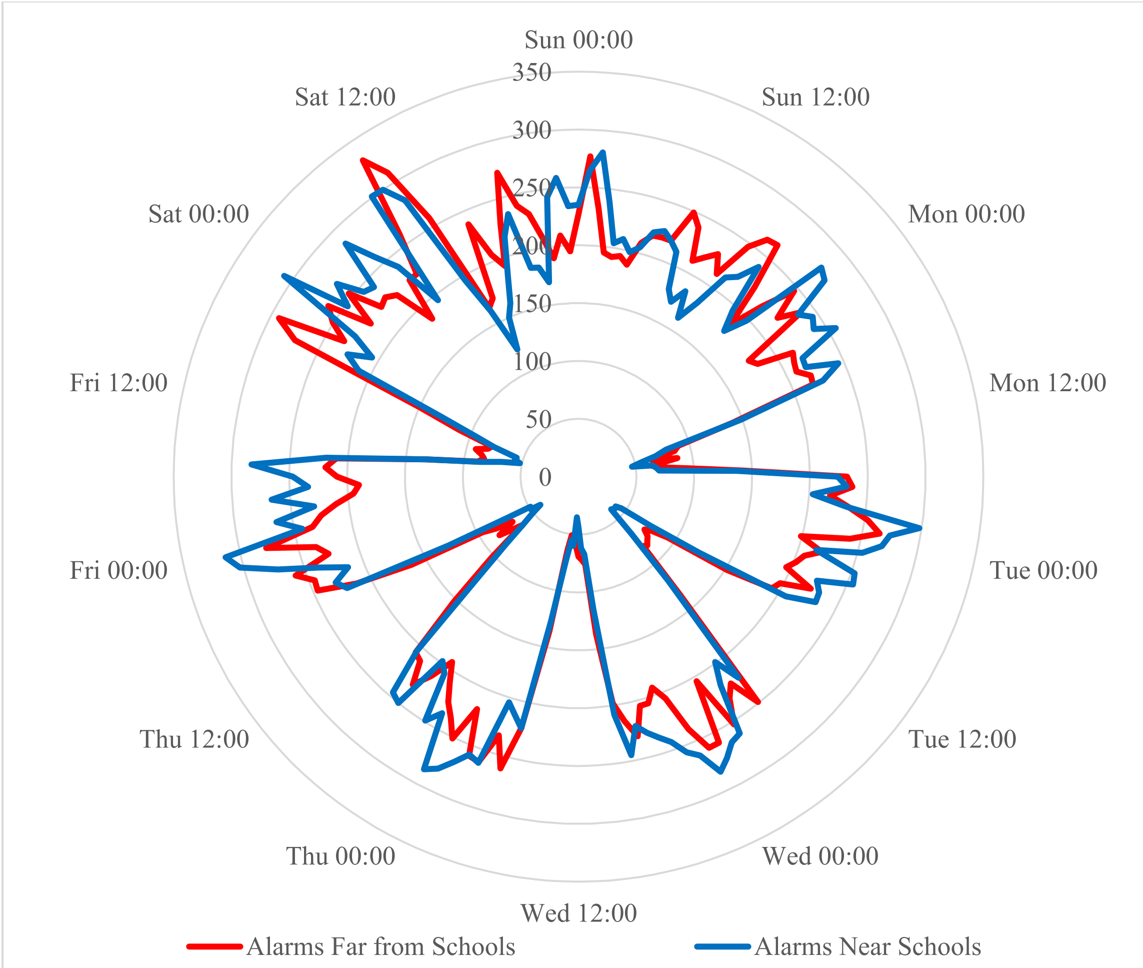

Figure 48: Comparison of Temporal Pattern for Commercial Alarms Near and Far from Schools

Discussion

Comparison of Occurrence Times for Residential Burglaries by Proximity of Schools. The distance from schools grouping for residential burglaries was based on quartiles. As a result, one-quarter of the residential burglaries occurred near schools, half occurred at a mid-distance from schools, while the remaining quarter occurred far from schools. Residential burglaries in all three areas generally follow the same time patterns as each other, but there are small differences between the three areas.

Residential burglaries close to schools tended to see higher peaks on Monday while burglaries further from schools tended to see higher peaks later in the week. Burglaries far from schools saw the peak occurrences at a slightly earlier time on most days than did burglaries closer to schools. *Figure 37* showed the comparison of temporal patterns for burglaries in near and mid-distance from schools, *Figure 38* showed the comparison of temporal patterns for burglaries mid-distance and far from schools, and *Figure 39* showed the comparison of temporal patterns for burglaries in near and far from schools.

The study of the tables and graphs leads to the conclusion that the proximity of residential burglary to a school affects when they occur. If the burglary is close to a school (within approximately 0.5 mile), the burglary is slightly more likely to occur earlier in the week. If the burglary is far from a school (more than approximately 1.25 miles), the burglary is more likely to occur earlier in the day than burglaries closer to the school.

Comparison of Occurrence Times for Residential Alarms by Proximity of Schools. The distance from schools grouping for residential alarms also was based on quartiles and had one-quarter of the residential alarms occur near schools, half occur at a mid-distance from schools, while the remaining quarter occur far from schools. Residential alarms in all three areas generally follow the same time patterns as each other. There are, however, small differences between the three areas.

Residential alarms far (more than approximately 1.6 miles) from schools tended to occur more on Friday and weekends than the alarms closer to schools. Alarms closer to the schools than that had generally similar patterns with some variation in the exact peak times. *Figure 40* showed the comparison of temporal patterns for residential alarms near and mid-distance from schools, *Figure 41* showed the comparison of temporal patterns for mid-distance and far from schools, and *Figure 42* showed the comparison of temporal patterns for alarms near and far from schools.

The study of the tables and graphs leads to the conclusion that the proximity of residential alarm to a school affects when they occur, but only if it is far from the school. Unlike burglaries, alarms close to schools appear to happen in similar patterns without enough variation to say there is an effect on the occurrence time.

Comparison of Occurrence Times for Commercial Burglaries by Proximity of Schools. The distance from schools grouping for commercial burglaries was based on quartiles. As a result, one-quarter of the commercial burglaries occurred near schools, half occurred at a mid-distance from schools, while the remaining quarter occurred far from schools. Commercial burglaries in all three areas generally follow the same time patterns as each other. There are, however, differences between the three areas.

Figure 43 showed the comparison of temporal patterns for commercial burglaries near and mid-distance from schools, *Figure 44* showed the comparison of temporal patterns for mid-distance and far from schools, and *Figure 45* showed the comparison of temporal patterns for burglaries near and far from schools.

Commercial burglaries near schools (closer than approximately 0.5 mile) had a higher peak on Monday night/Tuesday mornings than other days. They also tended to have a wider time period for a peak on Sunday night through Monday morning, even if it was a lower peak than Monday night. Burglaries that were mid-distance (between approximately 0.5 and 1.2 miles) from schools occurred more often on Mondays than other areas, where more occurred on Sundays. This difference appears to stem from a wider peak from 1:00 to 5:00 a.m. on Monday.

The study of the tables and graphs leads to the conclusion that the proximity of commercial burglary to a school affects when they occur, with different patterns for near or mid-distance burglaries.

Comparison of Occurrence Times for Commercial Alarms by Proximity of Schools. The distance from schools grouping for commercial alarms was also based on quartiles. As a result, one-quarter of the commercial alarms occurred near schools, half occurred at a mid-distance from schools, while the remaining quarter occurred far from schools. Commercial alarms in all three areas generally follow the same time patterns as each other, but there are observable differences between the three areas.

Figure 46 showed the comparison of temporal patterns for commercial alarms near and mid-distance from schools, *Figure 47* showed the comparison of temporal patterns for mid-distance and far from schools, and *Figure 48* showed the comparison of temporal patterns for alarms near and far from schools. The differences are primarily the number of calls at peak numbers, but with the time pattern at the peak also varying among them. The alarms that occurred at near or a mid-distance from the schools tended to be most alike, while the alarms that were far (more than approximately 1.4 miles) from a school tended to have a wider time period where the alarms were near peak numbers. The other alarms started to increase at the same times as those far from schools, but tended to rise to more of a single peak time.

The study of the tables and graphs leads to the conclusion that the proximity of commercial alarms to a school affects when they occur, especially for alarms that are distant from the school.

Chapter Conclusion

This chapter has examined the occurrence time for residential alarms and burglaries based on their proximity to the nearest school. It also separately examined the occurrence time for commercial alarms and burglaries when classified in the same way. The following sections compare the alarms and burglaries to each other, separated by target type.

Comparison of Occurrence Times for Residential Alarms and Burglaries by Proximity to Schools. A comparison of the data in *Table 35* and *Table 38* shows that residential alarms and residential burglaries that are close to the nearest school follow similar time patterns. There are some differences, including the alarms appear to peak slightly earlier in the day than burglaries peak and the alarms tend have wider peaks, that is start increasing earlier in the day and decreasing later in the day. There is also a difference in weekend patterns where alarms tend to have large peaks on Saturday and Sunday while burglaries do not increase as much.

Figure 49 shows a comparison of the aoristic pattern for residential burglaries and residential alarms that are close to schools. To keep the two patterns on approximately the same scale for ease of comparison, the number of burglaries per hour was multiplied by two. The pattern for the burglaries is shown in blue while the pattern for the alarms is shown in red. This graph shows that the patterns are generally similar with the differences noted above.

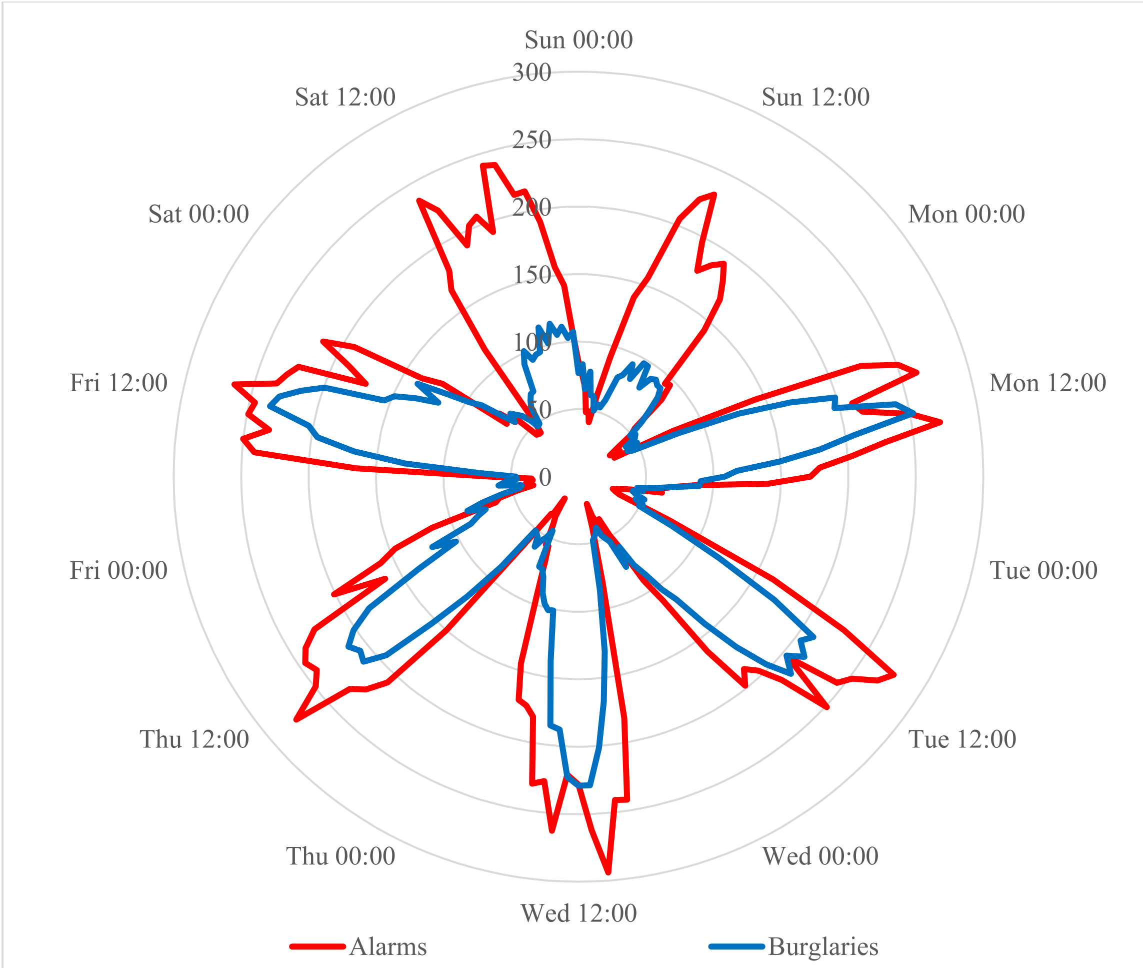

Figure 49: Comparison of the Aoristic Burglary Temporal Pattern to the Alarm Temporal Pattern for Residential Burglaries and Alarms Near Schools

A comparison of the data in *Table 36* and *Table 39* also shows similar patterns for residential burglaries and alarms when they are mid-distance from the nearest school. There are similar differences in this comparison as there are for alarms and burglaries near schools. The weekends show higher peaks for the alarms than for burglaries, the alarms tend to peak slightly earlier in the day on weekdays than burglaries do, and the alarms tend to have wider peaks than the burglaries.

Figure 50 shows a comparison of the aoristic pattern for residential burglaries and residential alarms that are mid-distance from schools. To keep the two patterns on approximately the same scale for ease of comparison, the number of burglaries per hour was multiplied by two. The pattern for the burglaries is shown in blue while the pattern for the alarms is shown in red. This graph shows that the patterns are generally similar with the differences noted above.

A comparison of the data in *Table 37* and *Table 40* also shows similar patterns for residential burglaries and alarms that are far from schools. As with incidents that are close to or mid-distance from schools, both the burglaries and alarms have differences in the weekday peak widths and large differences on weekends, with alarms showing a peak in the range of the weekday peak and burglaries showing a much lower peak.

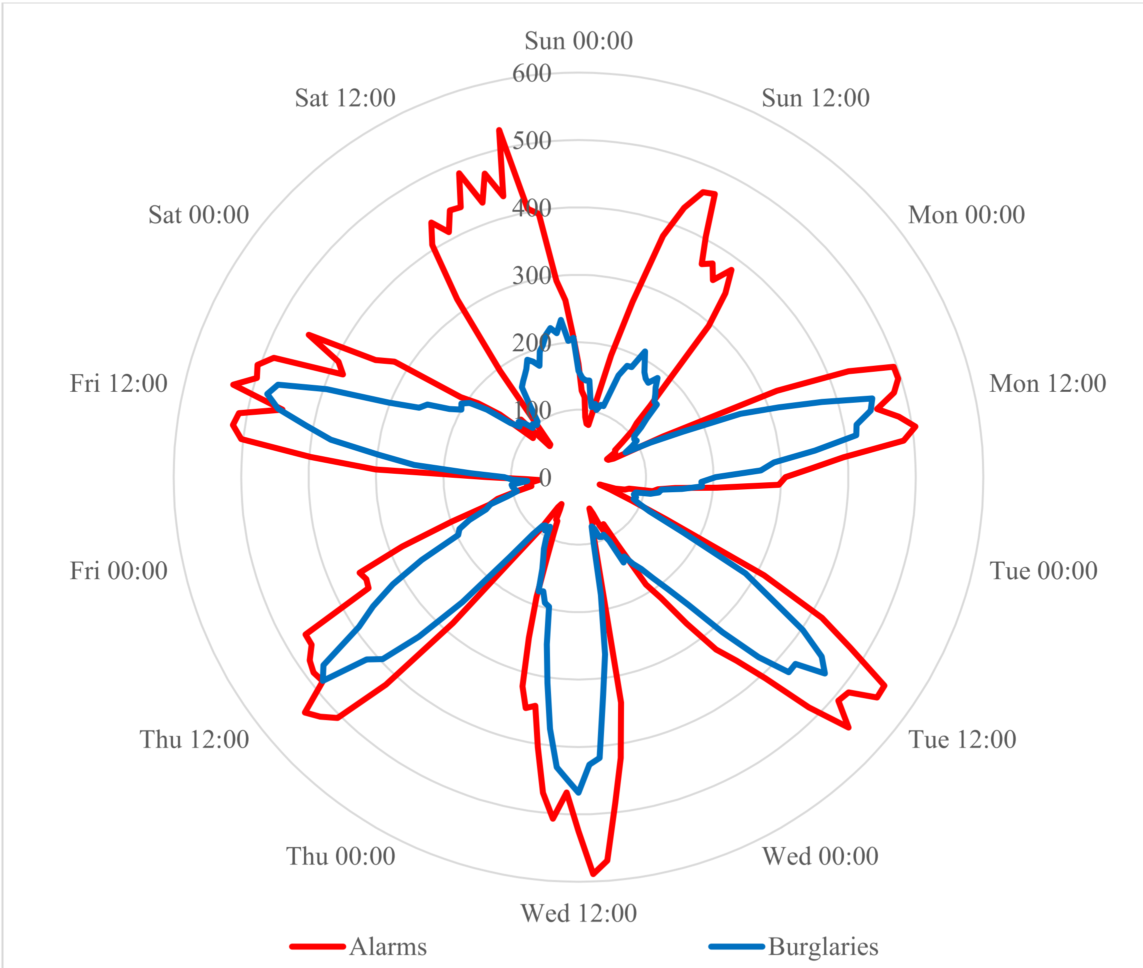

Figure 50: Comparison of the Aoristic Burglary Temporal Pattern to the Alarm Temporal Pattern for Residential Burglaries and Alarms Mid-distance from Schools

Figure 51 shows a comparison of the aoristic pattern for residential burglaries and residential alarms that are far from schools. To keep the two patterns on approximately the same scale for ease of comparison, the number of burglaries per hour was multiplied by two. The pattern for the burglaries is shown in blue while the pattern for the alarms is shown in red. This graph shows that the patterns are generally similar with the differences noted above.

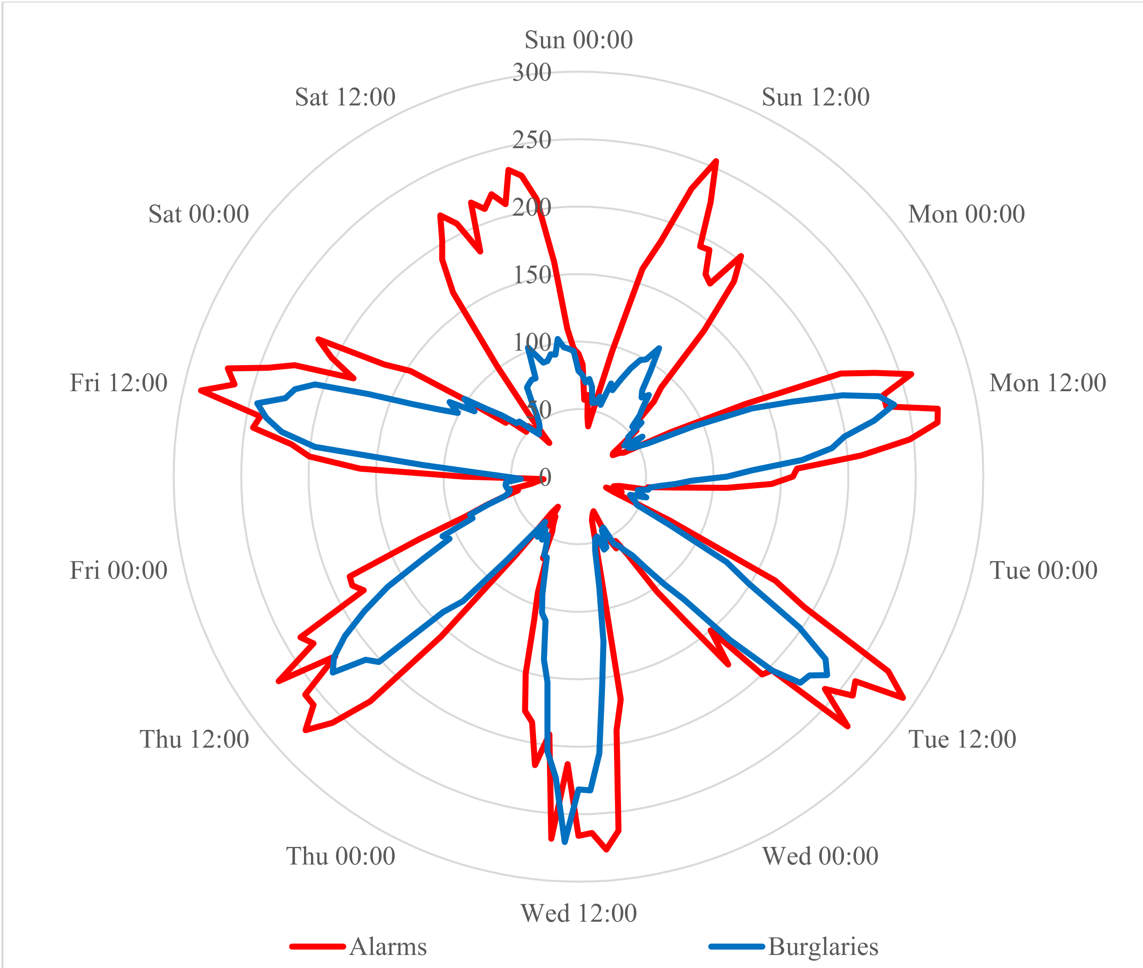

Figure 51: Comparison of the Aoristic Burglary Temporal Pattern to the Alarm Temporal Pattern for Residential Burglaries and Alarms Far from Schools

Comparison of Occurrence Times for Commercial Alarms and Burglaries by Proximity of Schools. A comparison of the data in *Table 41* and *Table 44* shows that commercial alarms and commercial burglaries that occur near schools follow generally similar time patterns. The largest difference appears to be that alarms tend to have a much wider peak in general, that is the time period when the most alarms occur is longer than when the most burglaries occur. Alarms also tend to have an elevated number occur on weekends when burglaries tend to drop during the non-peak times on weekends.

Figure 52 shows a comparison of the aoristic pattern for commercial burglaries and commercial alarms that are near schools. To keep the two patterns on approximately the same scale for ease of comparison, the number of burglaries per hour was multiplied by six. The pattern for the burglaries is shown in blue while the pattern for the alarms is shown in red. This graph shows that the patterns are generally similar with the differences noted above.

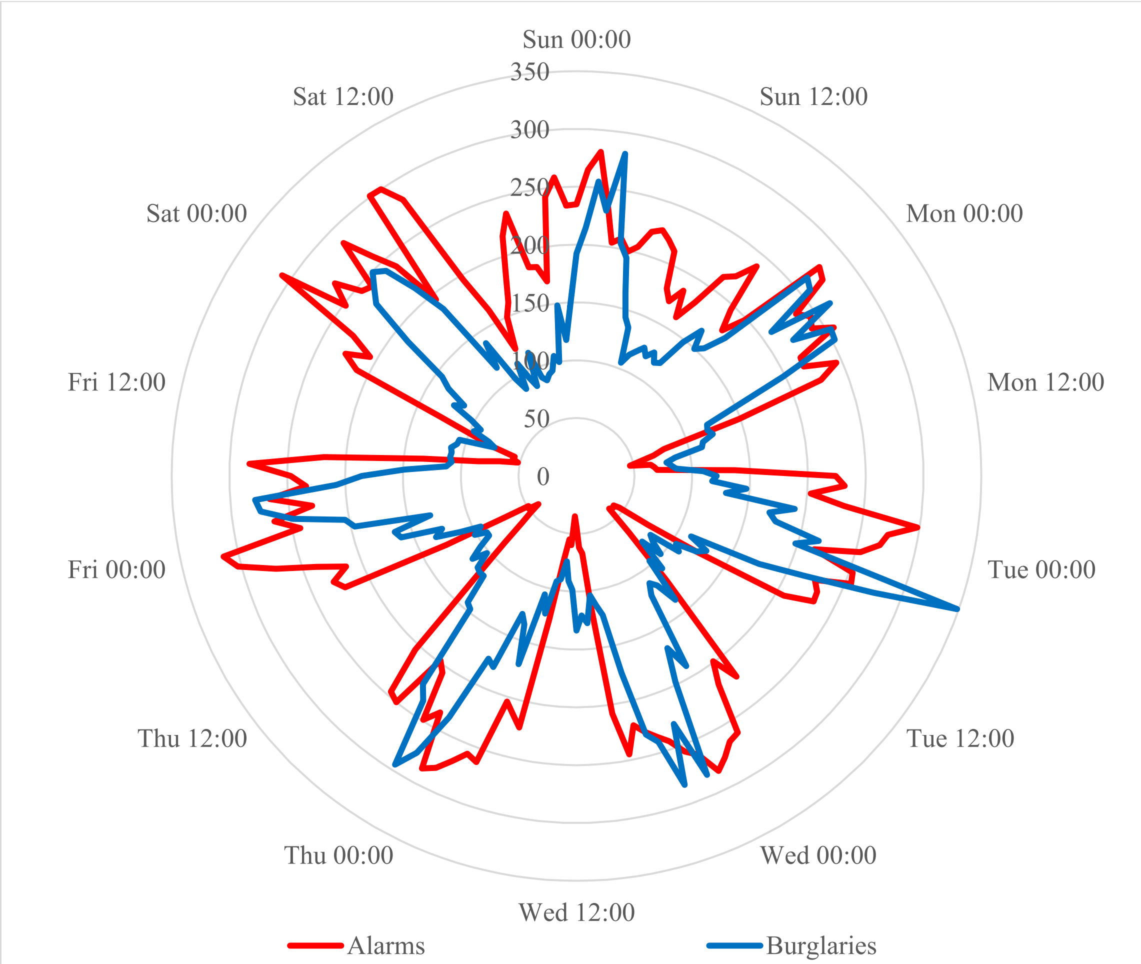

Figure 52: Comparison of the Aoristic Burglary Temporal Pattern to the Alarm Temporal Pattern for Commercial Burglaries and Alarms Near Schools

A comparison of the data in *Table 42* and *Table 45* also shows similar patterns for commercial burglaries and alarms that occur mid-distance from the nearest school. The differences between the alarms and burglaries is very similar to the differences that were observed in burglaries and alarms near schools.

Figure 53 shows a comparison of the aoristic pattern for commercial burglaries and commercial alarms that are mid-distance from schools. To keep the two patterns on approximately the same scale for ease of comparison, the number of burglaries per hour was multiplied by six. The pattern for the burglaries is shown in blue while the pattern for the alarms is shown in red. This graph shows that the patterns are generally similar with the differences noted above.

A comparison of the data in *Table 43* and *Table 46* also shows similar patterns for commercial burglaries and alarms that occur far from schools. The differences between the alarms and burglaries that occur far from schools is also very similar to the differences that were observed in burglaries and alarms near schools.

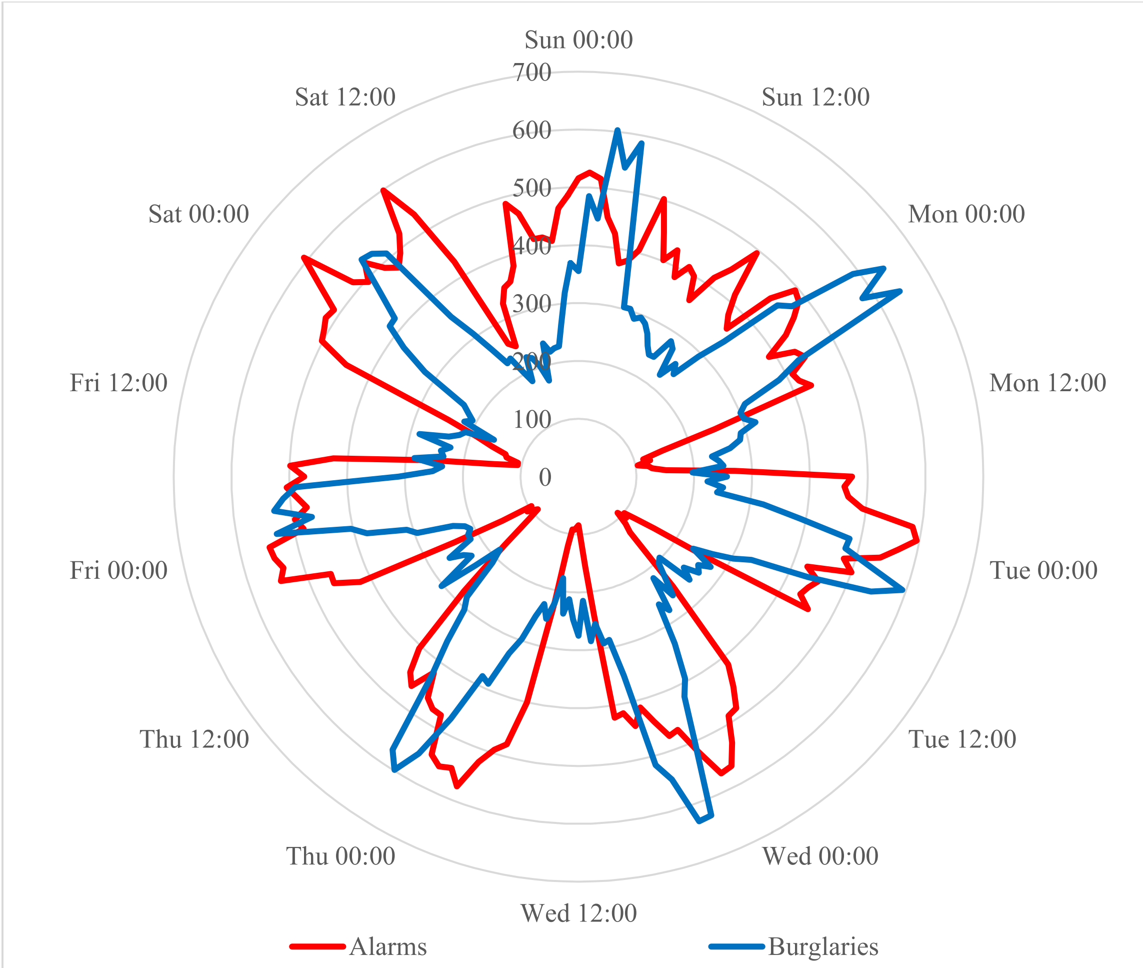

Figure 53: Comparison of the Aoristic Burglary Temporal Pattern to the Alarm Temporal Pattern for Commercial Burglaries and Alarms Mid-distance from Schools

Figure 54 shows a comparison of the aoristic pattern for commercial burglaries and commercial alarms that are far from schools. To keep the two patterns on approximately the same scale for ease of comparison, the number of burglaries per hour was multiplied by eight. The pattern for the burglaries is shown in blue while the pattern for the alarms is shown in red. This graph shows that the patterns are generally similar with the differences noted above.

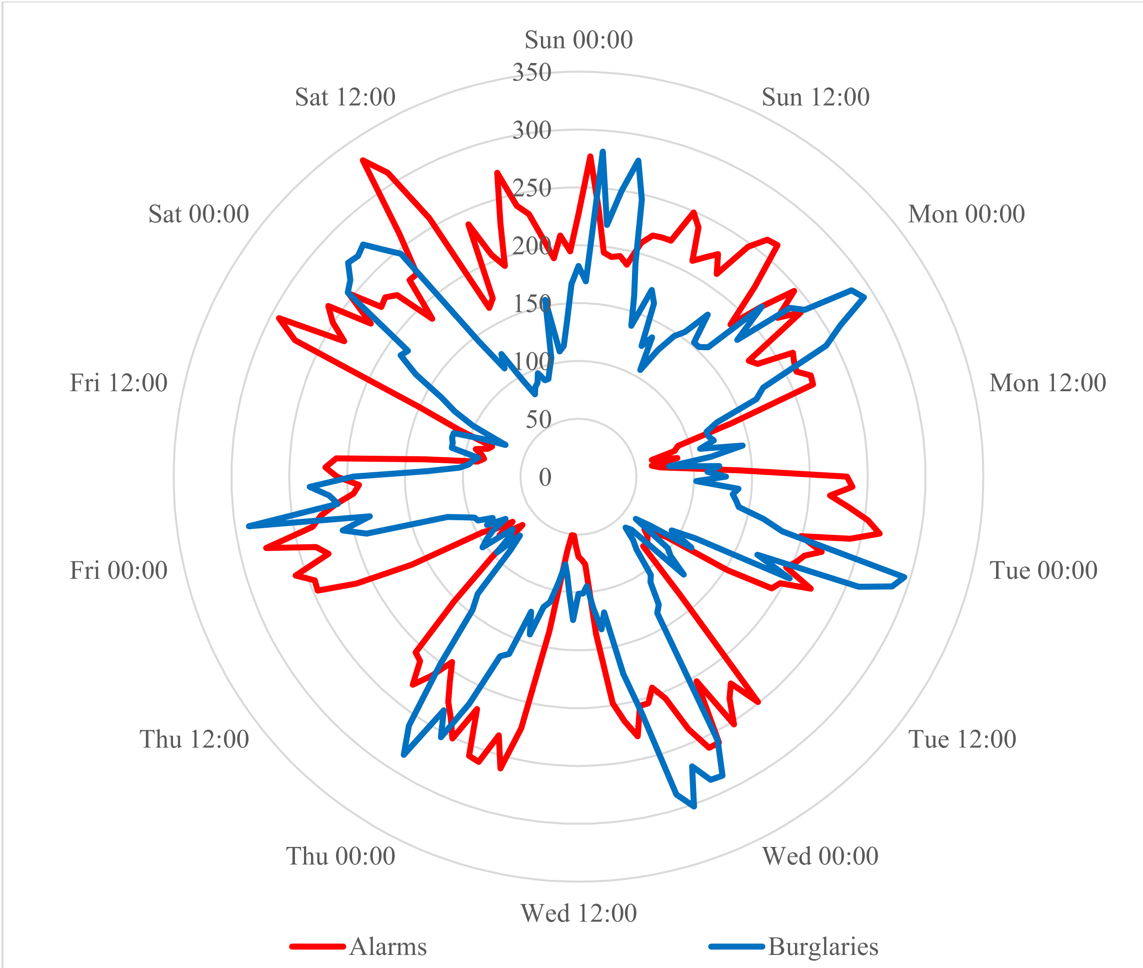

Figure 54: Comparison of the Aoristic Burglary Temporal Pattern to the Alarm Temporal Pattern for Commercial Burglaries and Alarms Far from Schools

Conclusion. When viewing burglaries and classifying them by their proximity to the nearest school, it has been shown that there are differences in when these incidents occur. This is true whether the target type is commercial or residential. When examining alarms for the same effect, the time difference is also seen for residential and commercial alarms.

In the case of residential alarms and burglaries, alarm times and police-coded burglary times are closely parallel. In the case of commercial alarms, the patterns are similar but not as much so.

IX: PROXIMITY OF BARS

In this chapter, the temporal patterns of burglaries and alarms will be compared based on their proximity to the nearest bar. The review of the literature has shown that one of the factors affecting whether burglaries occur or not was the proximity of a bar and this examination will determine if that same finding affects when the burglaries and alarms occur. The result expected from this analysis is the finding that burglaries and alarms occur at different times based on the distance from the incident to the nearest bar. It is also expected to find that police-coded burglaries and alarms occur have similar temporal patterns.

The straight-line distance between the incident and the nearest bar is used in this analysis. The definition of a bar used here is if the TABC has determined that the location makes more than 50% of its revenue from the sale of alcoholic beverages for consumption on the premises where it is sold.

The distance is calculated within the ArcGIS Pro database system after plotting the addresses on a map. The distance is calculated for each incident separately and then the groups are broken down by target type and distance. The incidents will be grouped into three groups based on the lowest 25% of the incidents in each target type being near a bar, the highest 25% of the incidents in each target type being far from a bar, and the middle 50% being mid-distance from a bar. In each target type, the type of incident (alarm or burglary) will be analyzed separately. The time patterns for the burglaries and alarms in each group will be calculated and compared to determine if the distance from a bar makes a difference in the occurrence time.

Table 47 shows the shortest and longest distance, as well as the number of incidents in each group.

Table 47: Distances from Bars and Number of Burglaries and Alarms per Distance Group

	Distance Group	Minimum Burglary Distance	Maximum Burglary Distance	Minimum Alarm Distance	Maximum Alarm Distance	Number of Burglaries	Number of Alarms
Residential	Near	9	1,078	5	1,633	8,843	24,155
Residential	Mid-Distance	1,079	2,969	1,634	3,957	17,737	48,307
Residential	Far	2,970	155,247	3,958	11,311	8,860	24,154
Commercial	Near	0	704	3	517	4,163	32,001
Commercial	Mid-Distance	705	2,521	518	2,295	8,326	63,990
Commercial	Far	2,522	123,667	2,296	83,791	4,061	n=31,975

Aoristic Occurrence Times for Residential Burglaries that are Near Bars

There were 8,843 residential burglaries near bars. The distance ranged from a minimum of nine feet to a maximum of 1,078 feet. A burglary of a bar would normally be recorded as a commercial burglary. Under Texas law, if a building has been designed to be lived in, it is considered a habitation even if it is also used for other purposes. The distance of nine feet for a minimum distance of a residential burglary to bar may represent a bar where the owner lives in a portion of the building used as a bar and the address is slightly different between the TABC and SAPD data systems and resulted in a geocoding difference between the two. Some commercial buildings also are made with the business on the ground floor and apartments on floors above that. The addresses may have the same slight difference for geocoding as the bar that the owner lives in.

Table 48 shows the occurrence times for residential burglaries near bars. Comparing this data with the data in *Table 49* shows that burglaries close to bars tend to occur in a similar pattern to residential burglaries that are mid-distance from bars. Most residential burglaries near or mid-distance from bars happen during the work week (Monday through Friday), with the most burglaries in one day occurring on Friday. They also show similar daily patterns, with burglaries increasing beginning around 7:00 a.m., peaking around 12:00 noon., and dropping to a low around 6:00 a.m. There are some differences in the peak numbers, especially on weekends where it appears that burglaries near bars occur more often than mid-distance from bars.

Table 48: Aoristic Occurrence Time for Residential Burglaries Near Bars

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
2400-0059	40.5	30.9	32.4	27.1	25.8	26.9	37.5	221.1
0100-0159	44.5	26.1	21.5	24.3	28.6	24.8	35.3	205.1
0200-0259	38.9	25.9	24.3	28.2	25.1	26.1	36.2	204.7
0300-0359	35.6	29.6	24.9	24.1	23.4	24.0	31.2	192.9
0400-0459	35.5	28.1	29.1	20.7	25.4	22.0	28.4	189.1
0500-0559	29.0	23.0	31.0	22.4	26.8	20.4	29.0	181.6
0600-0659	32.0	26.2	32.0	31.8	27.5	30.0	25.6	205.2
0700-0759	25.9	37.9	42.9	46.8	38.2	38.4	29.9	259.9
0800-0859	30.2	64.2	59.9	62.2	57.5	60.8	34.1	368.8
0900-0959	33.4	72.4	74.6	76.0	70.3	72.9	41.8	441.4
1000-1059	43.2	97.1	84.0	97.3	86.3	87.0	40.3	535.4
1100-1159	49.8	89.1	96.1	98.9	95.8	97.5	42.9	570.2
1200-1259	53.5	93.2	99.8	104.4	94.9	94.4	54.3	594.5
1300-1359	56.4	96.2	89.4	106.8	105.0	100.3	48.1	602.2
1400-1459	51.9	97.3	86.3	94.7	85.9	99.8	54.5	570.5
1500-1559	53.6	85.6	88.3	100.5	83.8	95.2	55.6	562.6
1600-1659	54.9	77.6	82.3	73.9	71.1	80.6	51.9	492.3
1700-1759	48.7	61.5	66.0	61.1	66.5	66.1	53.1	423.0
1800-1859	48.6	53.7	61.3	54.4	50.8	65.2	55.9	389.8
1900-1959	42.5	49.0	52.3	54.7	42.9	59.4	54.5	355.5
2000-2059	44.4	44.6	50.3	49.0	42.1	68.0	60.5	358.9
2100-2159	43.0	41.5	46.2	47.1	41.2	59.8	57.8	336.5
2200-2259	41.1	29.8	33.0	43.8	34.7	56.6	53.0	291.9
2300-2359	38.7	33.4	43.0	41.4	26.5	47.4	59.7	290.2
Total	1,015.5	1,313.9	1,350.9	1,391.7	1,276.2	1,423.7	1,071.1	n=8,843

Figure 55 is a graphical representation of the aoristic temporal patterns for residential burglaries near and mid-distance from bars compared to all residential burglaries. To keep the patterns on approximately the same scale for ease of comparison, the number of burglaries per hour that occurred near bars was multiplied by two. The burglaries near bars are shown with the red line and the mid-distance burglaries are shown with the blue line. This graph shows that the burglaries near bars generally occur at the same time as mid-distance residential burglaries. The differences in peak numbers, especially on weekends, are also visible in the graph.

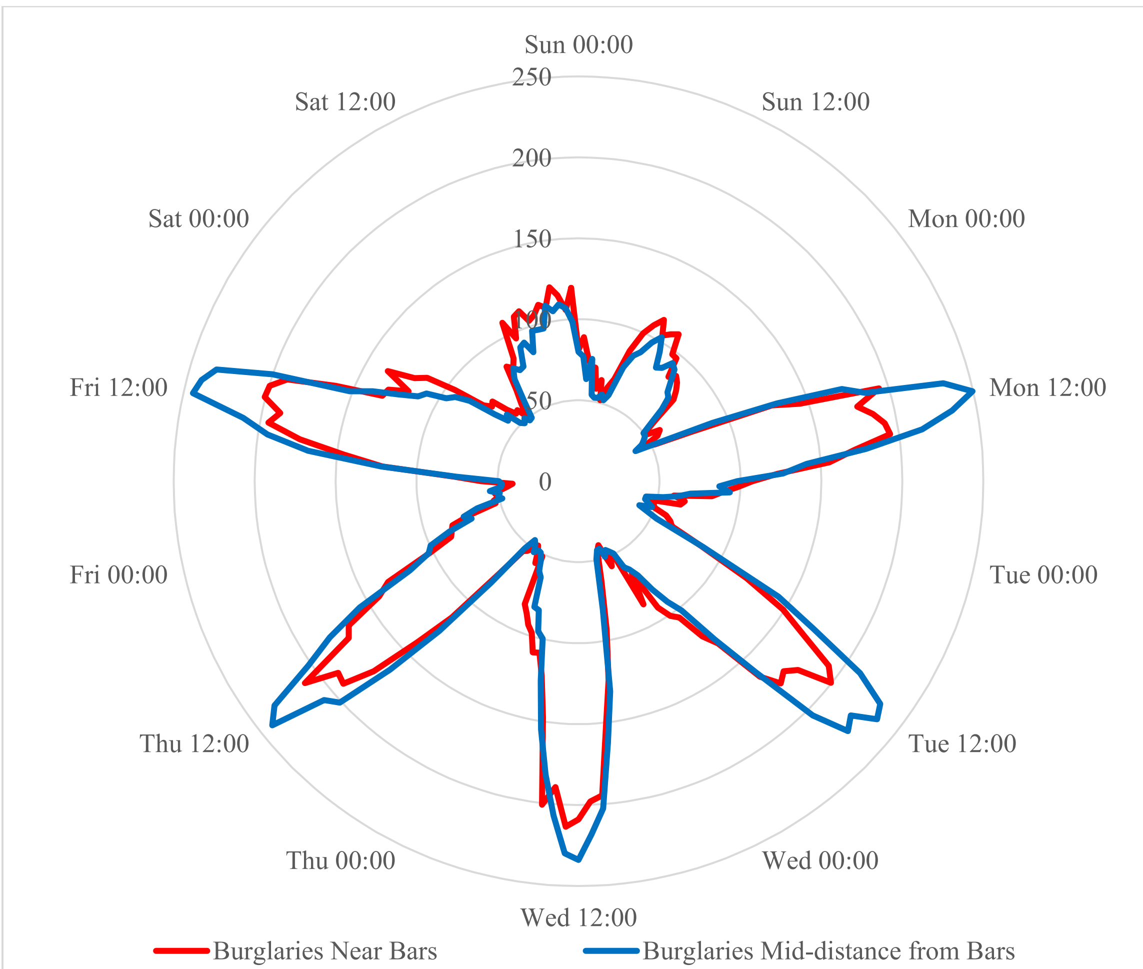

Figure 55: Comparison of Aoristic Temporal Patterns for Residential Burglaries Near and Mid-distance from Bars

Aoristic Occurrence Times for Residential Burglaries that are Mid-Distance from Bars

There were 17,737 residential burglaries that occurred at a mid-distance from bars. The distance ranged from a minimum of 1,079 feet to a maximum of 2,969 feet.

Table 49 shows the occurrence times for residential burglaries located at a mid-distance from a bar. Comparing this data with the data in *Table 50* shows that burglaries mid-distance from bars tend to occur at similar times as those far from bars. There are some differences in the peak numbers, especially on Tuesday and Wednesday, where it appears that burglaries mid-distance from bars have a lower peak than burglaries far from bars.

Table 49: Aoristic Occurrence Time for Residential Burglaries Mid-Distance from Bars

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
2400-0059	79.8	57.0	42.8	49.5	53.4	48.2	66.3	397.1
0100-0159	77.1	49.8	42.6	47.5	49.9	50.6	57.3	374.7
0200-0259	63.2	49.7	45.1	45.7	49.4	49.1	60.4	362.6
0300-0359	75.9	47.7	48.3	49.4	51.8	55.1	50.8	379.0
0400-0459	53.9	45.2	40.4	43.7	47.4	47.9	48.9	327.4
0500-0559	52.5	39.7	46.0	44.0	45.2	47.2	51.3	325.9
0600-0659	52.7	54.7	53.5	49.4	53.2	49.2	48.1	360.8
0700-0759	55.4	90.1	87.2	80.6	82.7	75.6	48.6	520.1
0800-0859	52.2	131.7	142.7	131.2	126.2	122.3	59.3	765.6
0900-0959	56.4	172.3	171.2	162.7	164.6	168.1	74.5	969.7
1000-1059	75.7	185.4	210.5	202.8	201.1	194.2	80.5	1,150.2
1100-1159	84.5	233.3	231.6	218.2	207.4	210.7	77.5	1,263.1
1200-1259	88.4	249.6	235.8	233.9	241.8	244.2	78.4	1,372.2
1300-1359	96.8	235.0	221.9	229.9	233.4	240.9	90.2	1,348.1
1400-1459	102.6	214.6	227.0	207.0	201.9	233.9	91.9	1,278.9
1500-1559	94.5	178.7	204.5	182.2	181.4	200.1	84.4	1,125.9
1600-1659	84.8	141.4	161.2	155.1	156.2	151.8	97.1	947.6
1700-1759	86.8	126.5	129.0	125.6	117.8	138.7	96.9	821.3
1800-1859	93.3	98.0	102.1	99.7	102.5	123.3	96.7	715.6
1900-1959	90.9	86.9	92.5	95.9	99.5	112.0	110.2	688.0
2000-2059	83.5	93.7	81.1	83.3	85.7	108.4	106.1	641.8
2100-2159	77.8	69.6	68.6	82.4	70.0	96.4	109.9	574.6
2200-2259	75.7	62.1	63.0	63.7	74.2	92.2	107.0	537.9
2300-2359	67.7	53.3	60.2	60.7	64.8	83.6	98.5	488.8
Total	1,822.2	2,765.8	2,808.7	2,744.1	2,761.4	2,943.9	1,890.8	n=17,737

Figure 56 is a graphical representation of the aoristic temporal patterns for residential burglaries mid-distance and far from bars. To keep the two patterns on approximately the same scale for ease of comparison, the number of burglaries per hour that occur far from bars is multiplied by two. The burglaries mid-distance from bars are shown with the blue line and burglaries far from bars are shown with the red line. This graph shows that the burglaries mid-distance from bars generally occur at the same time as residential burglaries far from bars. The differences in peak numbers, especially on Tuesday and Wednesday, are visible in the graph.

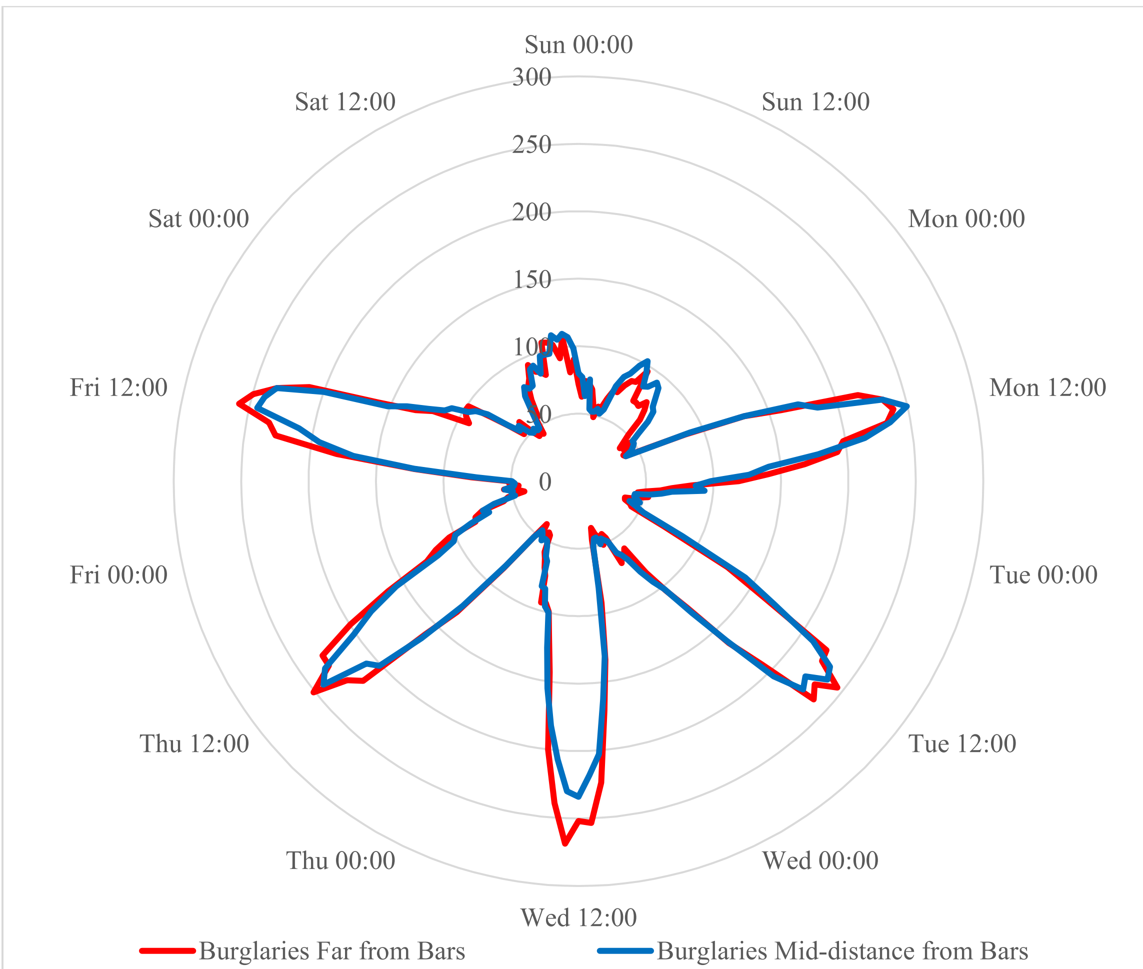

Figure 56: Comparison of Aoristic Temporal Patterns for Residential Burglaries Mid-Distance and Far from Bars

Aoristic Occurrence Times for Residential Burglaries that are Far from Bars

There were 8,860 residential burglaries that occurred far from bars. The distance ranged from a minimum of 2,970 feet to a maximum of 155,247 feet.

Table 50 shows the occurrence times for residential burglaries that are far from a bar. Comparing this data with the data in *Table 48* shows that burglaries far from bars tend to occur at similar times as residential burglaries near bars. The table shows that burglaries far from bars are more likely to occur during the work week (Monday through Friday) than those near bars.

Table 50: Aoristic Occurrence Time for Residential Burglaries Far from Bars

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
2400-0059	36.1	19.5	26.5	23.3	29.1	26.8	32.8	194.0
0100-0159	31.4	24.6	23.3	21.4	22.7	20.4	26.6	170.2
0200-0259	37.2	20.3	22.2	25.3	21.9	22.5	28.2	177.6
0300-0359	36.3	22.5	18.3	21.8	25.1	27.8	31.1	182.8
0400-0459	34.4	19.2	18.5	20.8	24.4	22.3	24.7	164.2
0500-0559	29.5	19.8	20.8	18.0	19.7	25.7	22.1	155.5
0600-0659	24.4	28.6	21.7	22.3	26.5	26.0	22.7	172.1
0700-0759	28.6	43.2	35.6	45.9	42.3	39.6	21.8	257.0
0800-0859	28.3	65.9	63.8	66.9	66.2	61.0	28.3	380.4
0900-0959	32.5	79.7	81.7	85.6	80.2	90.3	28.3	478.3
1000-1059	36.1	108.3	111.2	112.0	108.8	113.6	34.8	624.8
1100-1159	35.9	116.6	112.2	126.7	113.1	116.8	39.7	661.1
1200-1259	39.4	119.7	122.8	125.9	125.5	129.0	42.2	704.5
1300-1359	42.0	116.3	115.4	134.4	115.0	124.7	47.0	694.9
1400-1459	42.4	99.1	118.9	119.7	114.8	116.9	43.5	655.3
1500-1559	48.1	96.6	95.9	100.2	99.9	105.7	42.8	589.1
1600-1659	36.1	84.1	81.9	71.6	81.5	79.7	41.2	476.0
1700-1759	36.2	70.5	61.7	59.0	63.6	65.9	53.2	410.0
1800-1859	35.7	59.4	51.9	49.7	58.7	59.8	52.7	367.8
1900-1959	38.7	42.3	42.2	46.7	52.3	45.8	51.4	319.5
2000-2059	35.9	34.6	30.1	47.0	41.1	48.0	46.0	282.6
2100-2159	32.2	30.6	31.9	37.2	40.4	49.4	53.7	275.4
2200-2259	25.2	25.3	31.5	34.3	37.4	49.3	40.5	243.4
2300-2359	21.8	22.3	34.3	31.2	28.7	39.8	45.2	223.4
Total	824.1	1,368.9	1,374.1	1,446.9	1,438.8	1,506.7	900.6	n=8,860

Figure 57 is a graphical representation of the occurrence times for residential burglaries far from bars compared to all residential burglaries. The burglaries far from bars are shown with the red line and the residential burglaries near bars are shown with the blue line. This graph shows that the burglaries far from bars occur in a generally similar temporal pattern to those near bars, but that burglaries far from bar occur more often on weekdays while burglaries near bars occur more often on weekends.

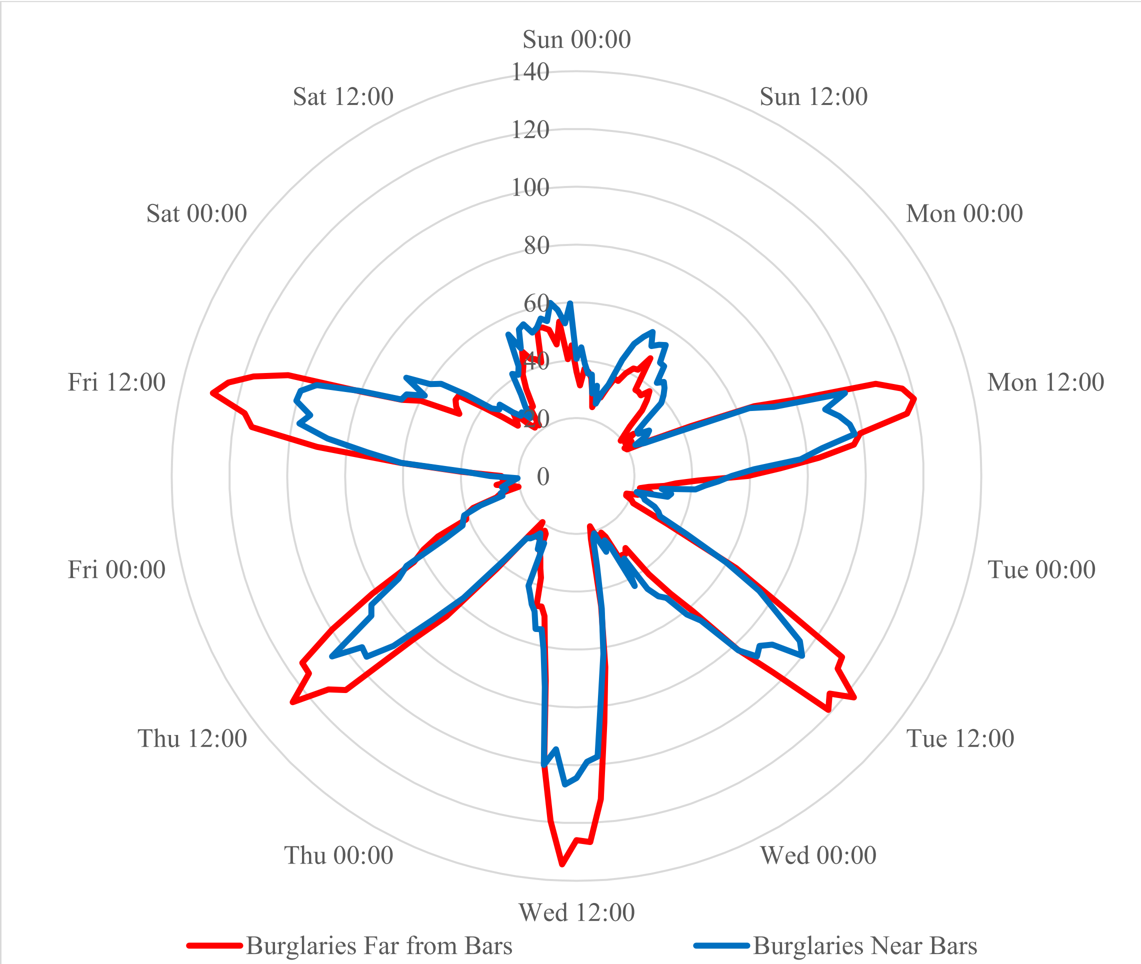

Figure 57: Comparison of Aoristic Temporal Patterns for Residential Burglaries Near and Far from Bars

Occurrence Times for Residential Alarms that are Near Bars

There were 24,155 residential alarms near bars. The distance ranged from a minimum of five feet to a maximum of 1,633 feet. As discussed under the section on residential burglaries near bars, the low number of five feet as a minimum distance may refer to either a bar where the owner lives on the premises or a complex where there are stores on the ground floor and apartments on higher floors, where both would have the same address for locating the building.

Table 51 shows the occurrence times for residential alarms near bars. Comparing this data with the data in *Table 52* shows that alarms close to bars tend to occur at similar times as residential alarms mid-distance from bars. Most residential alarms near bars happen during the work week (Monday through Friday), though alarms mid-distance from bars have the most alarms on Friday with almost identical numbers on Saturday and Thursday while alarms near bars have almost identical numbers on Friday and Saturday with fewer alarms on Thursday. The two areas also show similar daily patterns, with an increase in alarms beginning around 7:00 a.m., peaking around 10:00 a.m., and dropping to a low around 4:00 a.m.

Table 51: Occurrence Time for Residential Alarms Near Bars

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
2400-0059	101	54	43	52	52	49	84	435
0100-0159	84	42	31	49	44	41	70	361
0200-0259	76	28	31	36	27	37	65	300
0300-0359	57	32	22	25	24	34	54	248
0400-0459	41	31	32	24	30	36	40	234
0500-0559	38	28	41	37	44	45	47	280
0600-0659	67	74	72	69	65	76	51	474
0700-0759	98	134	136	157	124	156	99	904
0800-0859	138	209	207	230	212	222	147	1,365
0900-0959	153	274	273	249	235	243	196	1,623
1000-1059	206	252	281	271	270	235	224	1,739
1100-1159	225	202	252	299	266	241	207	1,692
1200-1259	217	208	271	255	229	241	213	1,634
1300-1359	199	241	215	197	232	225	221	1,530
1400-1459	182	268	256	244	222	235	237	1,644
1500-1559	185	227	215	241	229	233	209	1,539
1600-1659	200	200	204	225	225	221	256	1,531
1700-1759	184	167	158	187	186	188	231	1,301
1800-1859	173	162	165	178	171	195	247	1,291
1900-1959	155	151	140	176	157	219	201	1,199
2000-2059	87	105	118	123	149	177	190	949
2100-2159	92	71	86	104	115	144	161	773
2200-2259	74	62	57	69	86	119	122	589
2300-2359	64	73	51	50	75	83	124	520
Total	3,096	3,295	3,357	3,547	3,469	3,695	3,696	n=24,155

Figure 58 is a graphical representation of the temporal patterns for residential alarms near and mid-distance from bars. To keep the patterns on approximately the same scale for ease of comparison, the number of alarms per hour near bars was multiplied by two. The alarms near bars are shown with the red line and all residential alarms are shown with the blue line. This graph shows that the two patterns are generally similar. The differences in peak numbers, especially on Friday and Saturday are also clearly visible in the graph.

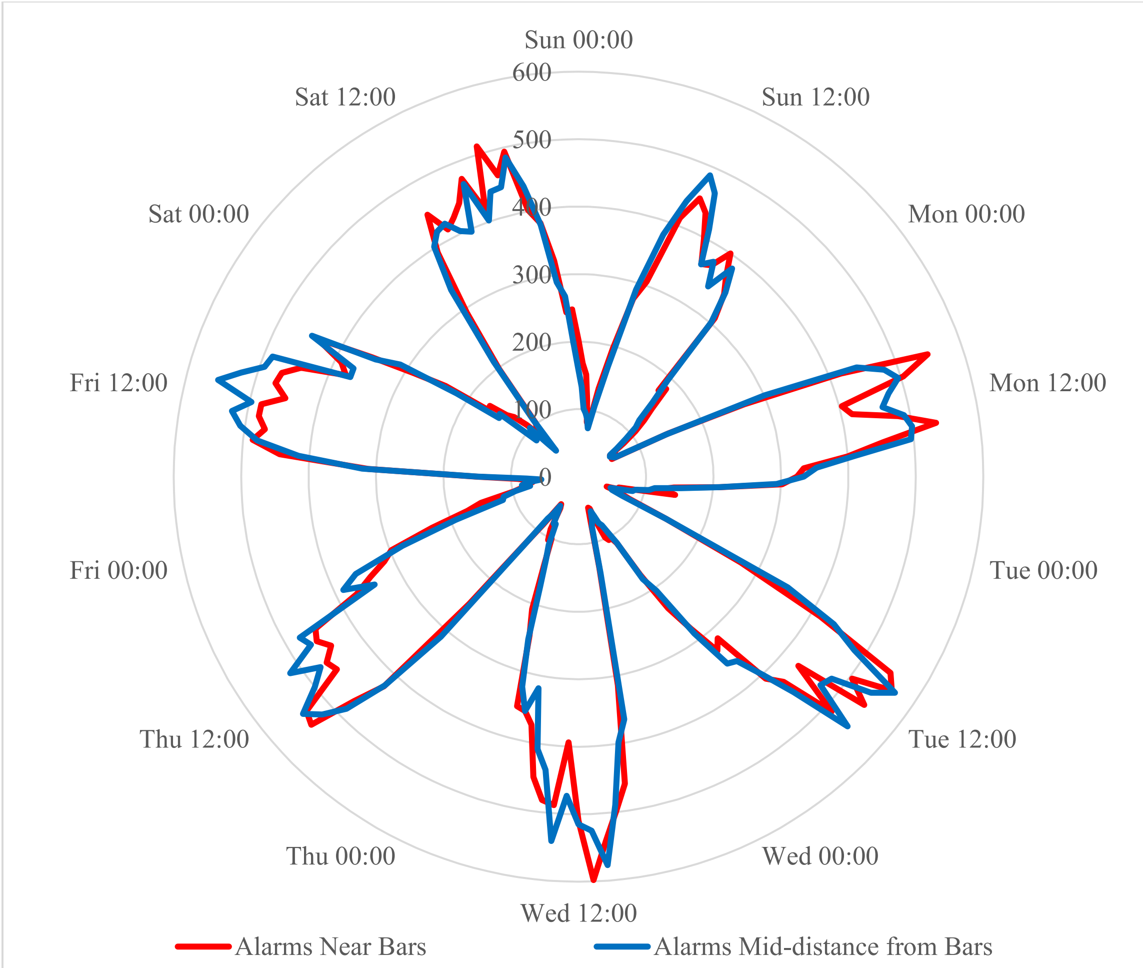

Figure 58: Comparison of Temporal Patterns for Residential Alarms Near and Mid-distance from Bars

Occurrence Times for Residential Alarms that are Mid-Distance from Bars

There were 48,305 residential alarms that occurred at a mid-distance from bars. The distance ranged from a minimum of 1,634 feet to a maximum of 3,957 feet.

Table 52 shows the occurrence times for residential alarms located at a mid-distance from a bar. Comparing this data with the data in *Table 53* shows that alarms mid-distance from bars tend to occur at similar times as residential alarms far from bars. There are some differences in the peak numbers, particularly on Monday, where the alarms far from bars have a double peak with each peak being higher than the peak number for mid-distance alarms even though the total numbers for Mondays are comparable.

Table 52: Occurrence Time for Residential Alarms Mid-Distance from Bars

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
2400-0059	158	90	86	80	78	96	149	737
0100-0159	133	70	83	75	79	73	82	595
0200-0259	101	57	62	62	61	85	93	521
0300-0359	95	55	50	54	51	76	102	483
0400-0459	87	58	53	67	67	55	67	454
0500-0559	73	61	71	77	77	77	51	487
0600-0659	107	143	144	147	132	149	108	930
0700-0759	169	301	351	366	313	321	212	2,033
0800-0859	290	443	437	398	422	416	335	2,741
0900-0959	380	480	483	489	486	479	402	3,199
1000-1059	439	496	568	577	518	507	419	3,524
1100-1159	487	476	539	525	539	523	424	3,513
1200-1259	466	462	480	515	500	497	404	3,324
1300-1359	414	491	473	473	475	553	396	3,275
1400-1459	363	500	544	541	517	523	466	3,454
1500-1559	376	496	451	437	468	493	402	3,123
1600-1659	341	411	400	408	477	487	442	2,966
1700-1759	383	353	360	319	342	369	444	2,570
1800-1859	349	334	354	356	387	370	485	2,635
1900-1959	302	294	289	322	360	447	438	2,452
2000-2059	194	209	205	252	280	347	377	1,864
2100-2159	155	153	179	173	193	312	290	1,455
2200-2259	123	114	113	133	117	219	268	1,087
2300-2359	112	106	95	110	115	146	199	883
Total	6,097	6,653	6,870	6,956	7,054	7,620	7,055	n=48,305

Figure 59 is a graphical representation of the temporal patterns for residential alarms mid-distance and far from bars. To keep the two patterns on approximately the same scale for ease of comparison, the number of alarms per hour far from bars was multiplied by two. The alarms mid-distance from bars are shown with the blue line and distance residential alarms are shown with the red line. This graph shows that the alarms mid-distance from bars generally occur in a similar pattern as residential alarms far from bars.

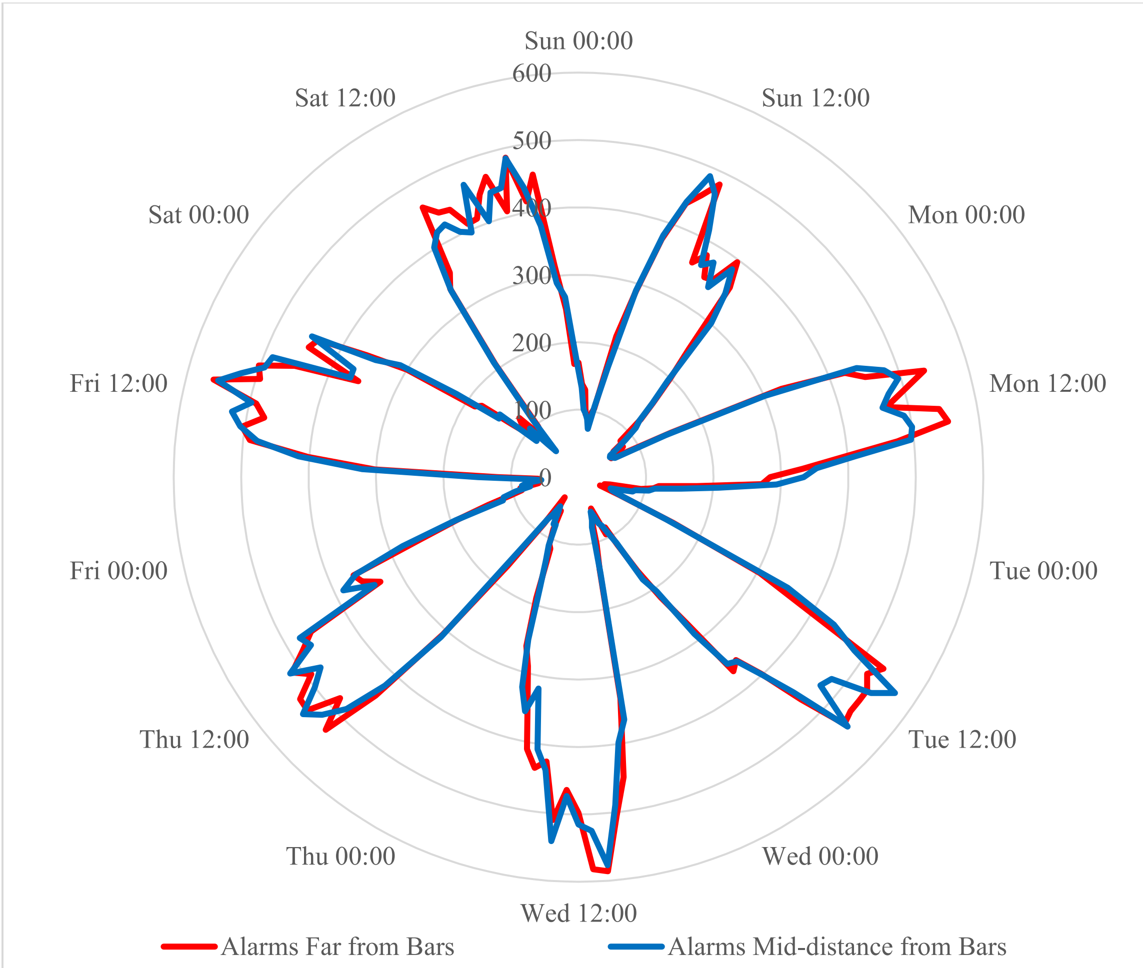

Figure 59: Comparison of Temporal Patterns for Residential Alarms Mid-Distance and Far from Bars

Occurrence Times for Residential Alarms that are Far from Bars

There were 24,153 residential alarms that occurred far from bars. The distance ranged from a minimum of 3,958 feet to a maximum of 11,311 feet.

Table 53 shows the occurrence times for residential alarms located far from a bar. Comparing this data with the data in *Table 51* shows that alarms far from bars tend to occur at similar times as alarms near bars. The difference in the peaks on Friday and

Saturday are similar to the differences between alarms near and mid-distance to bars, though there is less difference for Thursday.

Table 53: Occurrence Time for Residential Alarms Far from Bars

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
2400-0059	85	44	24	47	43	43	62	348
0100-0159	69	32	20	31	28	44	50	274
0200-0259	65	40	25	25	35	30	57	277
0300-0359	47	29	22	32	34	31	62	257
0400-0459	46	28	17	34	18	28	45	216
0500-0559	47	38	33	52	43	30	42	285
0600-0659	52	76	78	70	84	60	48	468
0700-0759	108	164	152	167	154	151	104	1,000
0800-0859	144	212	193	225	221	201	169	1,365
0900-0959	187	225	267	253	265	245	179	1,621
1000-1059	218	268	259	293	241	252	231	1,762
1100-1159	228	250	266	291	265	237	222	1,759
1200-1259	241	234	266	249	264	245	220	1,719
1300-1359	180	272	266	232	246	280	205	1,681
1400-1459	190	277	269	255	257	247	206	1,701
1500-1559	175	238	233	212	241	251	222	1,572
1600-1659	177	196	199	218	229	226	233	1,478
1700-1759	198	166	179	205	166	178	204	1,296
1800-1859	180	142	184	169	178	222	243	1,318
1900-1959	125	136	134	145	182	218	208	1,148
2000-2059	100	88	108	131	125	181	227	960
2100-2159	78	60	82	95	94	150	158	717
2200-2259	63	56	58	57	70	93	125	522
2300-2359	41	47	42	54	52	89	84	409
Total	3,044	3,318	3,376	3,542	3,535	3,732	3,606	n=24,153

Figure 60 is a graphical representation of the temporal patterns for residential alarms near and far from bars. The alarms far from bars are shown with the red line and alarms near bars are shown with the blue line. This graph shows that the alarms far from bars generally occur in a similar pattern to alarms near bars. The differences in peak numbers are visible in the graph.

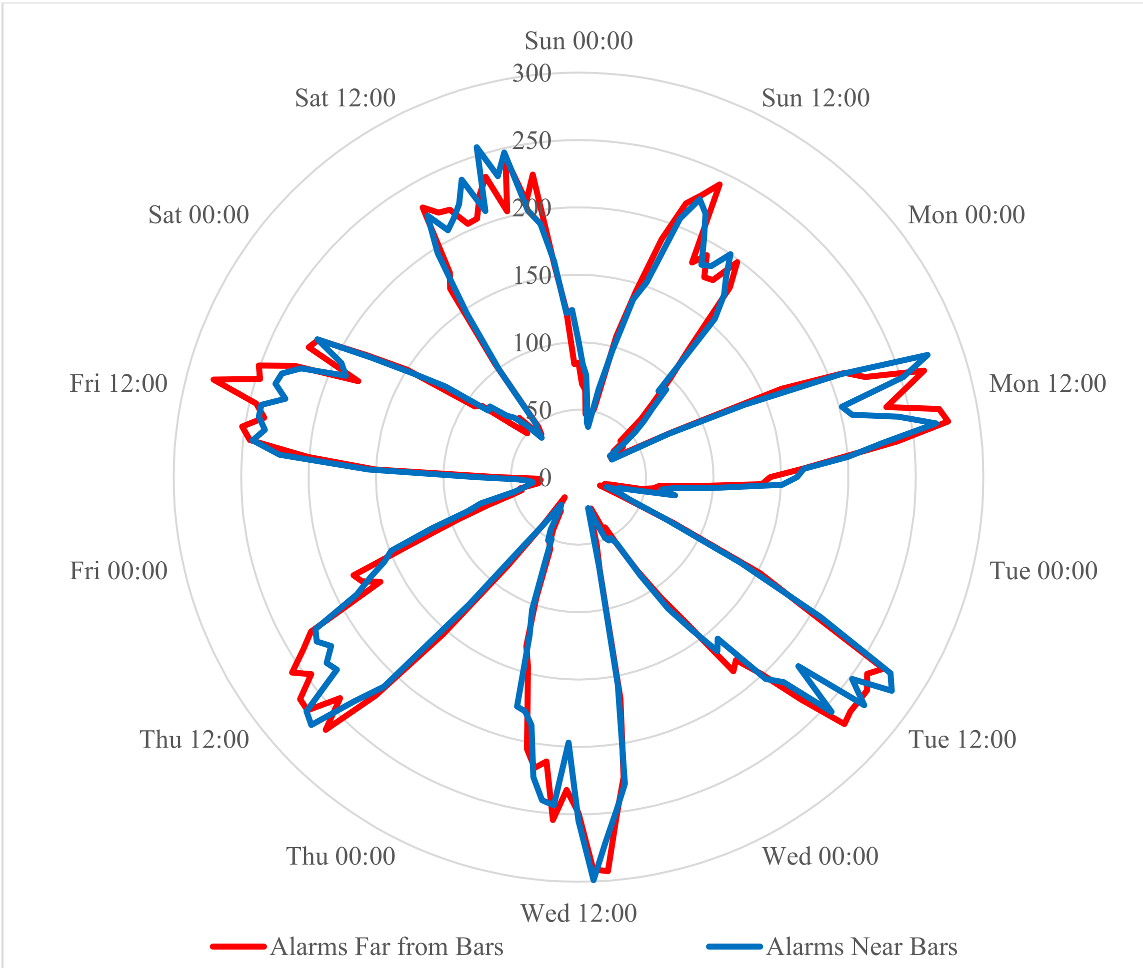

Figure 60: Comparison of Temporal Patterns for Residential Alarms Near and Far from Bars

Aoristic Occurrence Times for Commercial Burglaries that are Near Bars

There were 4,163 commercial burglaries near bars. The distance ranged from a minimum of zero feet to a maximum of 704 feet. A burglary of a bar is a commercial burglary. The minimum recorded distance of zero feet for the distance of a commercial burglary to bar represents a bar that was burglarized.

Table 54 shows the aoristic occurrence times for commercial burglaries near bars. Comparing this data with the data in *Table 55* shows that burglaries close to bars tend to occur at similar times as commercial burglaries mid-distance from bars. Most commercial burglaries near bars happen during on weekends (Friday evening through Monday morning) and the day with the most burglaries is Sunday. Burglaries near and mid-distance from bars show similar daily patterns, with burglaries starting to increase beginning around 5:00 p.m., increasing the rate of increase beginning around 10:00 p.m., peaking around 3:00 a.m., and dropping to a low around noon. There is a difference in burglaries near bars showing a peak number per hour on Tuesday, while mid-distance burglaries show a lower peak on Tuesday and a high peak on Thursday morning.

Table 54: Aoristic Occurrence Time for Commercial Burglaries Near Bars

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
2400-0059	29.6	40.7	35.2	36.1	33.0	36.2	32.7	243.4
0100-0159	35.4	53.3	39.7	38.1	43.9	35.4	36.2	282.1
0200-0259	41.6	59.6	49.2	45.4	50.4	40.7	35.5	322.4
0300-0359	54.8	52.5	65.5	58.8	53.7	45.5	42.8	373.7
0400-0459	56.0	53.0	55.2	47.3	47.4	48.9	52.7	360.5
0500-0559	44.5	41.4	43.2	43.5	38.4	41.6	47.2	299.8
0600-0659	37.1	32.0	32.7	31.6	24.9	24.9	35.3	218.4
0700-0759	27.0	25.1	18.1	20.2	26.3	18.3	25.0	159.8
0800-0859	26.6	16.3	20.4	21.4	17.2	14.0	20.4	136.2
0900-0959	21.0	19.6	16.9	16.2	10.8	11.8	15.2	111.6
1000-1059	18.6	14.8	13.1	19.1	11.1	13.5	18.7	108.9
1100-1159	20.6	12.0	12.5	12.3	12.9	12.2	12.8	95.3
1200-1259	19.5	16.4	13.3	11.9	11.1	10.0	12.8	95.0
1300-1359	19.1	14.6	14.0	12.6	11.5	14.5	15.1	101.4
1400-1459	18.3	11.9	17.6	12.1	10.3	14.2	14.3	98.7
1500-1559	20.8	11.7	8.8	10.0	14.5	12.1	13.0	90.8
1600-1659	22.8	13.9	9.0	11.3	10.9	15.5	10.5	93.9
1700-1759	19.1	13.3	10.5	9.8	14.3	11.4	15.3	93.6
1800-1859	14.6	18.6	15.3	16.4	14.5	16.7	18.3	114.4
1900-1959	18.2	16.4	16.8	14.0	13.9	15.9	16.0	111.3
2000-2059	16.4	17.6	15.6	22.4	14.7	17.3	15.8	119.9
2100-2159	25.9	18.5	17.9	19.4	23.9	16.4	25.0	147.0
2200-2259	27.9	26.2	24.8	22.4	17.7	21.8	25.8	166.7
2300-2359	40.9	36.0	28.5	33.5	28.1	26.6	24.5	218.2
Total	676.3	635.4	593.6	585.7	555.8	535.5	580.7	n=4,163

Figure 61 is a graphical representation of the aoristic temporal patterns for commercial burglaries near and mid-distance from bars. To keep the two patterns on

approximately the same scale for ease of comparison, the number of burglaries per hour near bars was multiplied by two. The burglaries near bars are shown with the red line and mid-distance commercial burglaries are shown in blue. This graph shows that the burglaries near and mid-distance from bars generally occur at very similar times. The differences in the size of the peak are also visible in the graph.

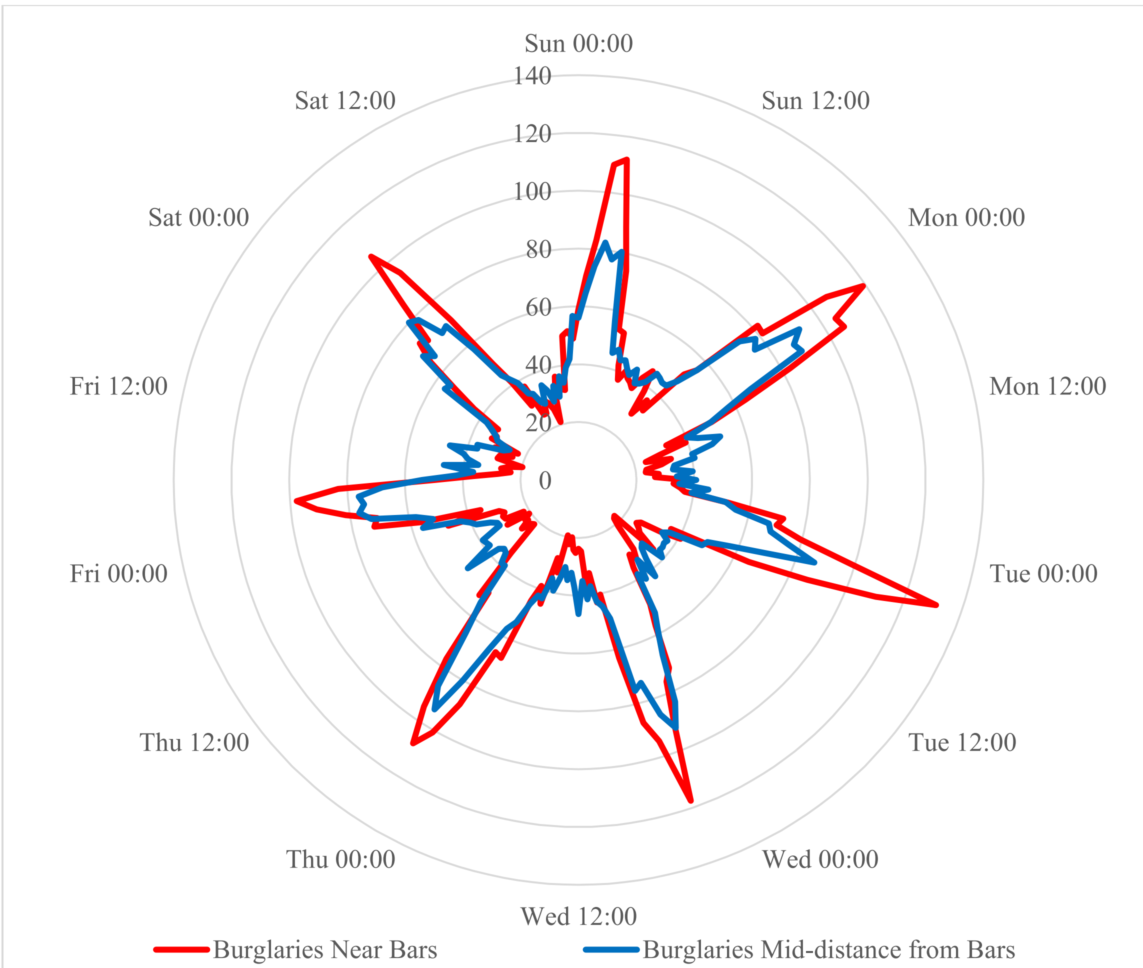

Figure 61: Comparison of Aoristic Temporal Patterns for Commercial Burglaries Near and Mid-distance from Bars

Aoristic Occurrence Times for Commercial Burglaries that are Mid-Distance from Bars

There were 8,326 commercial burglaries that occurred at a mid-distance from bars. The distance ranged from a minimum of 705 feet to a maximum of 2,521 feet.

Table 55 shows the aoristic occurrence times for commercial burglaries mid-distance from a bar. Comparing this data with the data in *Table 56* shows that burglaries mid-distance from bars tend to occur at similar times as commercial burglaries far from bars. There are some differences in the peak numbers, especially on Monday and Thursday, where it appears that burglaries mid-distance from bars have a larger difference from distant commercial burglaries than they have on other days.

Table 55: Aoristic Occurrence Time for Commercial Burglaries Mid-Distance from Bars

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
2400-0059	56.1	78.3	67.6	67.1	57.1	57.7	68.7	452.6
0100-0159	64.6	75.8	68.8	83.7	66.1	72.8	65.6	497.4
0200-0259	74.2	92.5	76.2	92.1	79.9	76.6	80.0	571.6
0300-0359	82.6	88.0	86.4	85.9	93.7	74.6	78.3	589.5
0400-0459	77.2	89.2	69.1	73.4	86.2	76.2	69.3	540.6
0500-0559	80.3	67.3	57.2	75.5	65.6	67.9	70.3	484.0
0600-0659	56.6	57.3	49.5	49.1	54.3	54.1	58.0	378.8
0700-0759	45.4	50.0	48.4	44.5	38.9	42.3	44.9	314.4
0800-0859	47.2	40.2	36.2	42.5	39.3	36.5	42.1	284.0
0900-0959	43.8	43.8	34.2	36.9	35.6	46.8	39.6	280.7
1000-1059	44.5	51.3	37.3	41.3	35.0	35.0	34.5	278.8
1100-1159	42.0	47.9	36.8	35.0	36.4	38.8	33.7	270.5
1200-1259	40.3	40.3	37.2	46.4	48.9	40.7	29.8	283.8
1300-1359	43.2	40.9	37.1	37.1	38.1	46.0	28.8	271.2
1400-1459	38.7	33.5	39.4	32.2	38.5	36.6	35.2	254.2
1500-1559	39.4	32.9	31.1	34.9	39.1	37.0	32.8	247.1
1600-1659	41.0	39.6	32.0	30.4	31.5	27.9	28.4	230.8
1700-1759	45.7	34.0	35.7	34.9	31.6	26.0	33.7	241.6
1800-1859	45.2	40.7	42.6	39.3	33.8	31.1	29.5	262.2
1900-1959	44.4	34.8	34.3	35.2	38.5	32.1	36.5	255.9
2000-2059	44.6	45.0	41.4	42.8	40.3	34.4	34.0	282.6
2100-2159	48.3	39.3	38.4	42.3	43.2	37.5	39.1	288.1
2200-2259	55.9	51.5	53.0	46.2	56.3	55.9	42.0	360.7
2300-2359	73.4	55.3	58.7	53.7	52.0	55.1	56.7	404.9
Total	1,274.5	1,269.4	1,148.4	1,202.4	1,179.9	1,139.8	1,111.6	n=8,326

Figure 62 is a graphical representation of the aoristic temporal patterns for commercial burglaries mid-distance and far from bars. To keep the two patterns on the approximately same scale for ease of comparison, the number of burglaries per hour for burglaries far from bars was multiplied by two. The burglaries mid-distance from bars are shown with the blue line and commercial burglaries far from bars are shown with the red line. This graph clearly shows that the burglaries mid-distance and far from bars generally occur in similar patterns. The differences in peak numbers, especially on Monday and Thursday, are also visible in the graph.

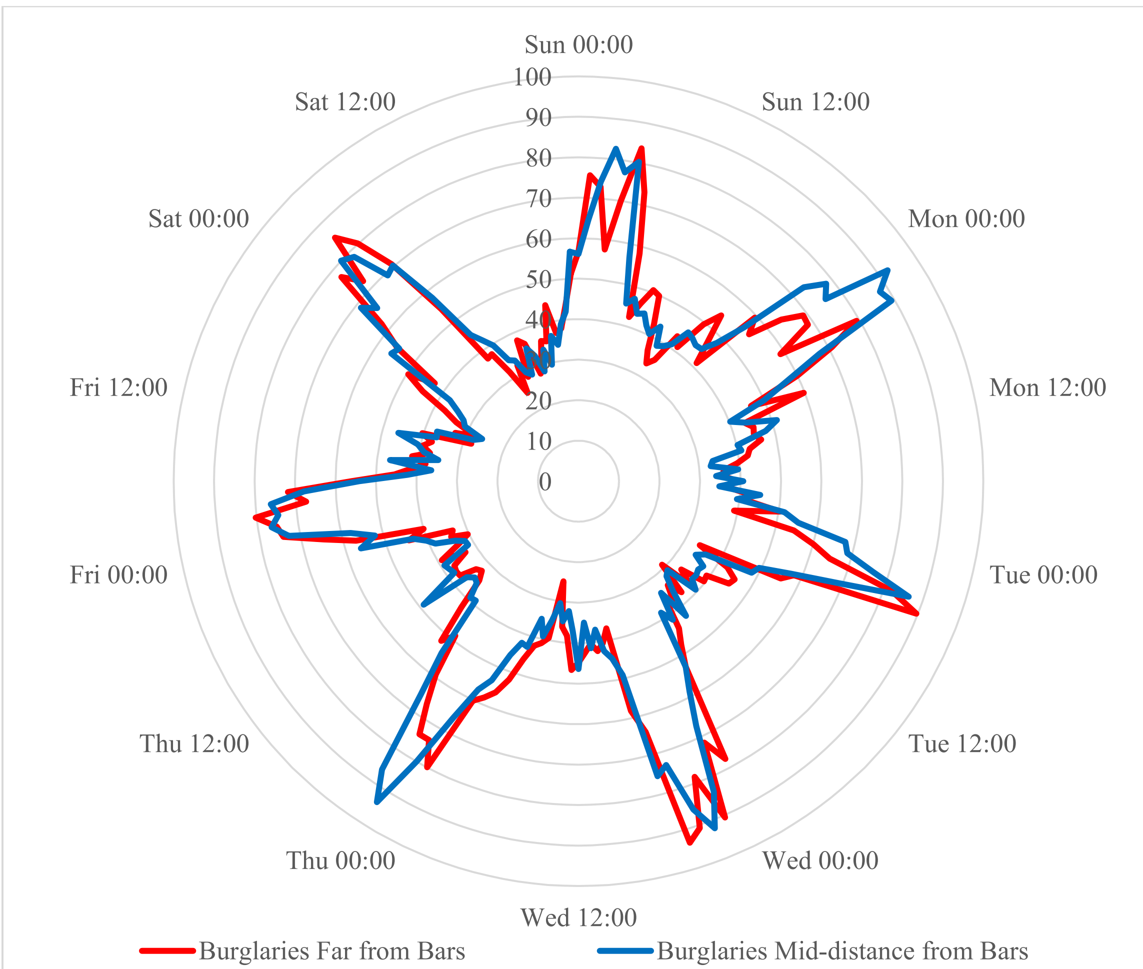

Figure 62: Comparison of Aoristic Temporal Patterns for Commercial Burglaries Mid-Distance and Far from Bars

Aoristic Occurrence Times for Commercial Burglaries that are Far from Bars

There were 4,163 commercial burglaries that occurred far from bars. The distance ranged from a minimum of 2,522 feet to a maximum of 123,667 feet.

Table 56 shows the occurrence times for commercial burglaries that are far from a bar. Comparing this data with the data in *Table 54* shows that burglaries far from bars tend to occur at similar times as commercial burglaries near bars. The burglaries far from bars tend to be spread put more throughout the day and week while the burglaries near bars tend to be concentrated more into short time periods each morning.

Table 56: Aoristic Occurrence Time for Commercial Burglaries Far from Bars

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
2400-0059	28.4	32.0	27.3	35.8	30.1	32.3	31.1	217.0
0100-0159	37.8	34.5	30.0	45.3	40.0	37.1	38.6	263.4
0200-0259	36.5	34.3	32.5	39.2	36.9	37.7	36.3	253.4
0300-0359	28.8	29.5	41.0	45.4	36.9	40.1	42.6	264.2
0400-0459	35.0	39.6	44.8	46.7	33.3	33.7	40.1	273.3
0500-0559	41.8	35.4	29.0	32.1	29.7	35.9	35.4	239.3
0600-0659	36.6	30.0	27.7	29.1	24.4	28.0	27.2	203.1
0700-0759	29.2	23.2	17.0	18.5	26.0	22.7	18.8	155.4
0800-0859	21.2	29.9	21.2	20.2	21.3	20.7	19.0	153.5
0900-0959	23.3	21.8	22.8	21.1	17.3	19.0	15.9	141.3
1000-1059	25.4	22.6	22.5	20.2	16.3	20.8	12.6	140.3
1100-1159	25.0	22.4	19.6	21.2	16.7	18.7	16.2	139.8
1200-1259	21.5	23.2	19.8	22.4	18.7	19.8	14.3	139.7
1300-1359	18.3	21.5	16.7	23.4	18.8	18.8	19.0	136.4
1400-1459	16.8	21.2	18.7	19.1	18.6	20.2	18.2	132.7
1500-1559	17.7	19.7	14.6	18.1	16.5	14.0	14.1	114.7
1600-1659	21.7	18.0	18.7	12.5	19.5	16.4	15.5	122.2
1700-1759	20.6	17.8	16.9	19.7	16.9	14.0	17.9	123.8
1800-1859	24.8	19.7	18.7	20.5	15.2	16.8	17.7	133.3
1900-1959	27.0	18.2	18.0	21.0	17.2	18.7	22.1	142.3
2000-2059	23.4	21.0	22.0	23.0	16.7	22.2	18.5	146.9
2100-2159	20.6	20.8	23.9	26.0	22.2	24.8	19.0	157.2
2200-2259	29.7	25.2	26.5	28.0	20.0	21.5	21.7	172.6
2300-2359	27.8	19.6	38.8	29.1	28.5	27.9	25.6	197.2
Total	638.6	601.1	588.8	637.9	557.4	581.7	557.5	n=4,163

Figure 63 is a graphical representation of the aoristic temporal patterns for commercial burglaries near and far from bars. The burglaries far from bars are shown

with the red line and commercial burglaries near bars are shown in blue. This comparison clearly shows that the burglaries far from bars occur in a similar general pattern as burglaries near bars. The differences in mentioned above, with the burglaries far from bars being more spread throughout the week, are visible in this graph as higher lows and lower peaks. With both groups having a similar total number of burglaries, the higher peaks on all days for burglaries near bars must be balanced by more burglaries during the low periods for burglaries far from bars.

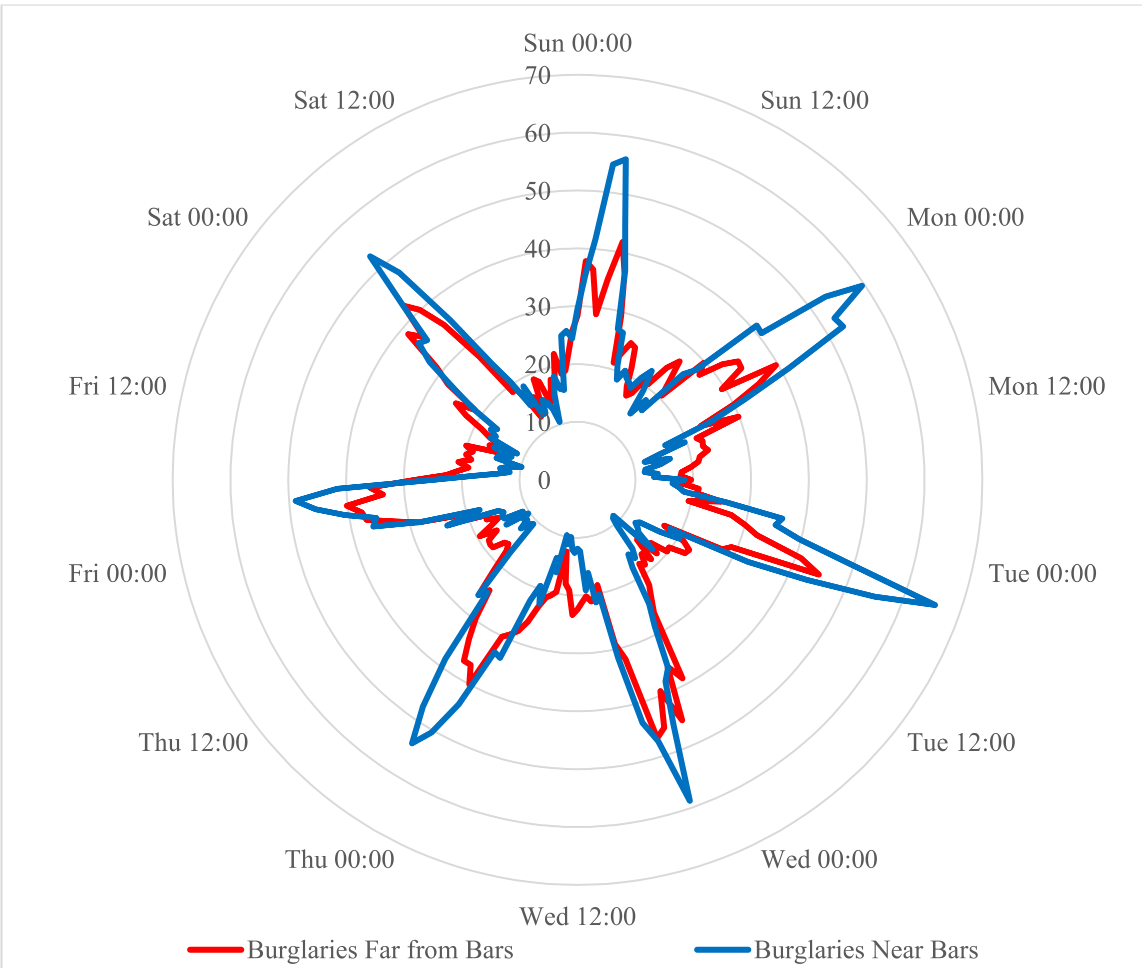

Figure 63: Comparison of Aoristic Temporal Patterns for Commercial Burglaries Near and Far from Bars

Occurrence Times for Commercial Alarms that are Near Bars

There were 32,001 commercial alarms near bars. The distance ranged from a minimum of three feet to a maximum of 517 feet. As discussed under the section on commercial burglaries near bars, the low number of three feet as a minimum distance probably refers to an alarm at the bar with the distance caused by differences in the way TABC and SAPD listed the address.

Table 57 shows the occurrence times for commercial alarms near bars. Comparing this data with the data in *Table 58* shows that alarms close to bars tend to occur at similar times as commercial alarms mid-distance from bars. Most commercial alarms near bars happen on weekends (Friday evening through Monday morning), though the day with the most alarms is Sunday while alarms mid-distance from bars have higher numbers of alarms on Saturday. Both areas also show similar daily patterns, with an increase in alarms beginning around 5:00 p.m., peaking around 3:00 a.m., and dropping to a low around noon.

Table 57: Occurrence Time for Commercial Alarms Near Bars

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
2400-0059	245	229	235	255	252	272	240	1,728
0100-0159	283	243	230	267	275	226	245	1,769
0200-0259	267	244	220	248	243	260	249	1,731
0300-0359	283	207	301	264	240	268	263	1,826
0400-0459	214	244	223	245	214	245	272	1,657
0500-0559	231	210	219	219	216	258	254	1,607
0600-0659	193	206	212	218	255	254	233	1,571
0700-0759	198	197	241	218	234	261	266	1,615
0800-0859	222	241	216	220	228	235	297	1,659
0900-0959	231	169	179	161	156	169	264	1,329
1000-1059	197	116	112	97	151	123	207	1,003
1100-1159	217	103	105	76	76	95	151	823
1200-1259	180	89	76	67	75	86	128	701
1300-1359	187	92	93	61	91	101	144	769
1400-1459	196	89	86	64	72	78	169	754
1500-1559	163	89	82	61	65	98	148	706
1600-1659	166	98	76	69	99	94	179	781
1700-1759	215	131	117	109	142	120	196	1,030
1800-1859	213	188	186	178	192	190	195	1,342
1900-1959	196	199	188	208	199	220	172	1,382
2000-2059	187	214	231	222	208	195	169	1,426
2100-2159	179	213	209	231	210	219	209	1,470
2200-2259	201	250	246	234	262	242	224	1,659
2300-2359	261	256	246	245	218	223	214	1,663
Total	5,125	4,317	4,329	4,237	4,373	4,532	5,088	n=32,001

Figure 64 is a graphical representation of the temporal patterns for commercial alarms near and mid-distance from bars. To keep the two patterns on approximately the same scale for ease of comparison, the number of alarms per hour that were near bars was multiplied by two. The alarms near bars are shown with the red line and the mid-distance commercial alarms are shown in blue. This graph shows that the alarms near bars generally occur in a similar temporal pattern as alarms that are mid-distance from bars. The differences in peak numbers is visible in the graph, including the tendency for the number of alarms near bars to peak slightly later in the morning than alarms that are mid-distance from bars. Another point visible in the graph is that the single highest number of alarms near bars happens on Tuesday at 3:00 a.m., even though Tuesday does not have the highest number of burglaries overall.

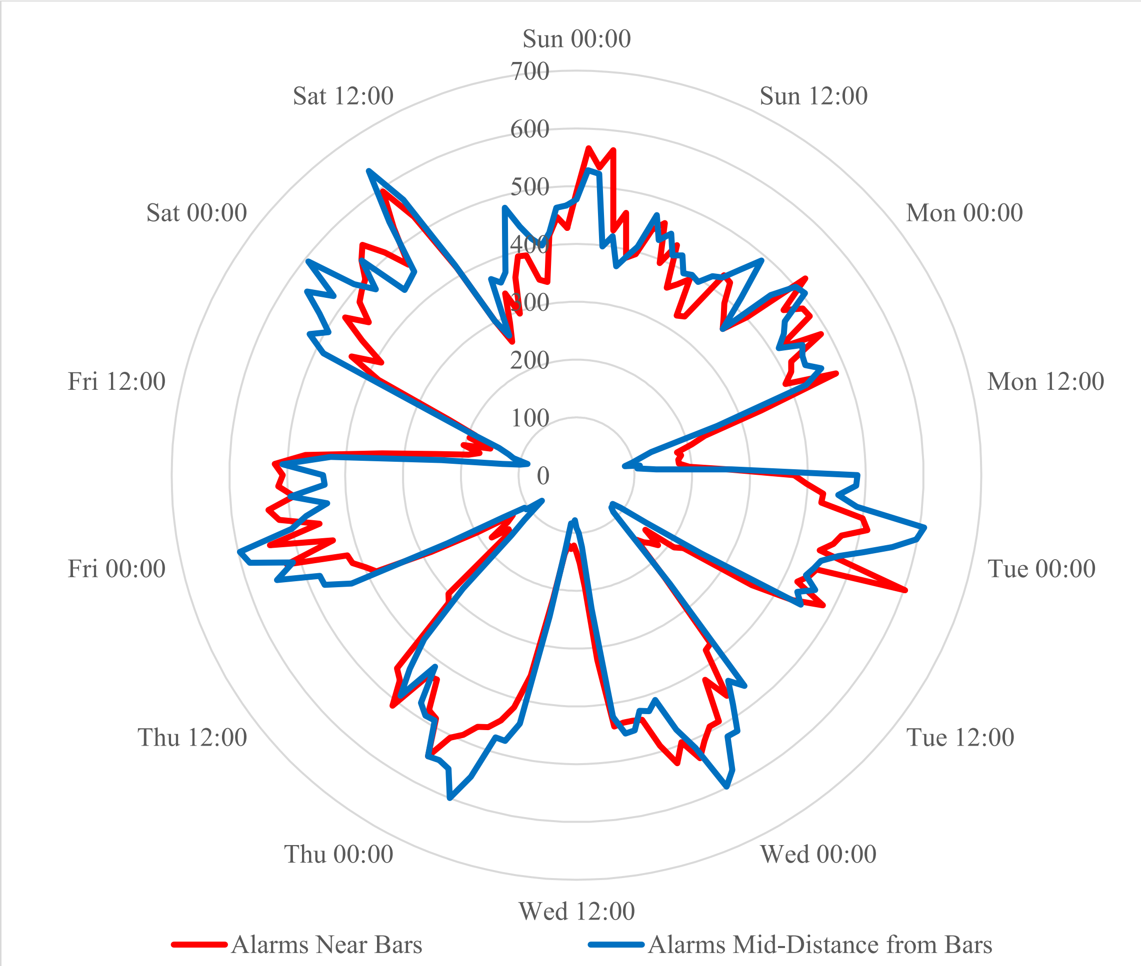

Figure 64: Comparison of Temporal Patterns for Commercial Alarms Near and Mid-distance from Bars

Occurrence Times for Commercial Alarms that are Mid-Distance from Bars

There were 63,972 commercial alarms that occurred at a mid-distance from bars. The distance ranged from a minimum of 518 feet to a maximum of 2,295 feet.

Table 58 shows the occurrence times for commercial alarms mid-distance from a bar. Comparing this data with the data in *Table 59* shows that alarms mid-distance from bars tend to occur at similar times as commercial alarms far from bars. There are some differences in the peak numbers, with Saturday and Sunday evenings having a spike in alarms far from bars that does not show in mid-distance alarms.

Table 58: Occurrence Time for Commercial Alarms Mid-Distance from Bars

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
2400-0059	477	505	560	598	547	597	593	3,877
0100-0159	528	448	514	515	550	501	507	3,563
0200-0259	523	434	474	473	490	473	473	3,340
0300-0359	398	413	448	412	491	434	525	3,121
0400-0459	418	451	441	427	477	496	437	3,147
0500-0559	368	442	433	422	412	436	443	2,956
0600-0659	388	439	458	453	488	438	450	3,114
0700-0759	409	462	432	455	442	509	545	3,254
0800-0859	471	427	448	423	387	426	637	3,219
0900-0959	431	258	255	232	278	235	563	2,252
1000-1059	449	135	146	125	153	129	420	1,557
1100-1159	415	114	95	100	118	99	302	1,243
1200-1259	422	100	80	91	91	87	268	1,139
1300-1359	395	85	82	78	74	113	370	1,197
1400-1459	400	111	82	85	105	123	358	1,264
1500-1559	395	106	90	84	106	142	372	1,295
1600-1659	417	138	131	131	146	192	419	1,574
1700-1759	425	269	248	249	252	274	479	2,196
1800-1859	455	486	466	441	432	486	441	3,207
1900-1959	490	484	442	476	475	522	416	3,305
2000-2059	419	454	480	475	477	495	402	3,202
2100-2159	358	488	523	553	549	525	422	3,418
2200-2259	458	608	522	600	513	564	464	3,729
2300-2359	500	598	577	554	585	522	467	3,803
Total	10,409	8,455	8,427	8,452	8,638	8,818	10,773	n=63,972

Figure 65 is a graphical representation of the temporal patterns for commercial alarms mid-distance and far from bars. The alarms mid-distance from bars are shown with the blue line and alarms far from bars are shown in blue. This graph shows that the alarms mid-distance and far from bars generally occur at the same times. The Saturday and Sunday evening differences in peak numbers stand out in this graph.

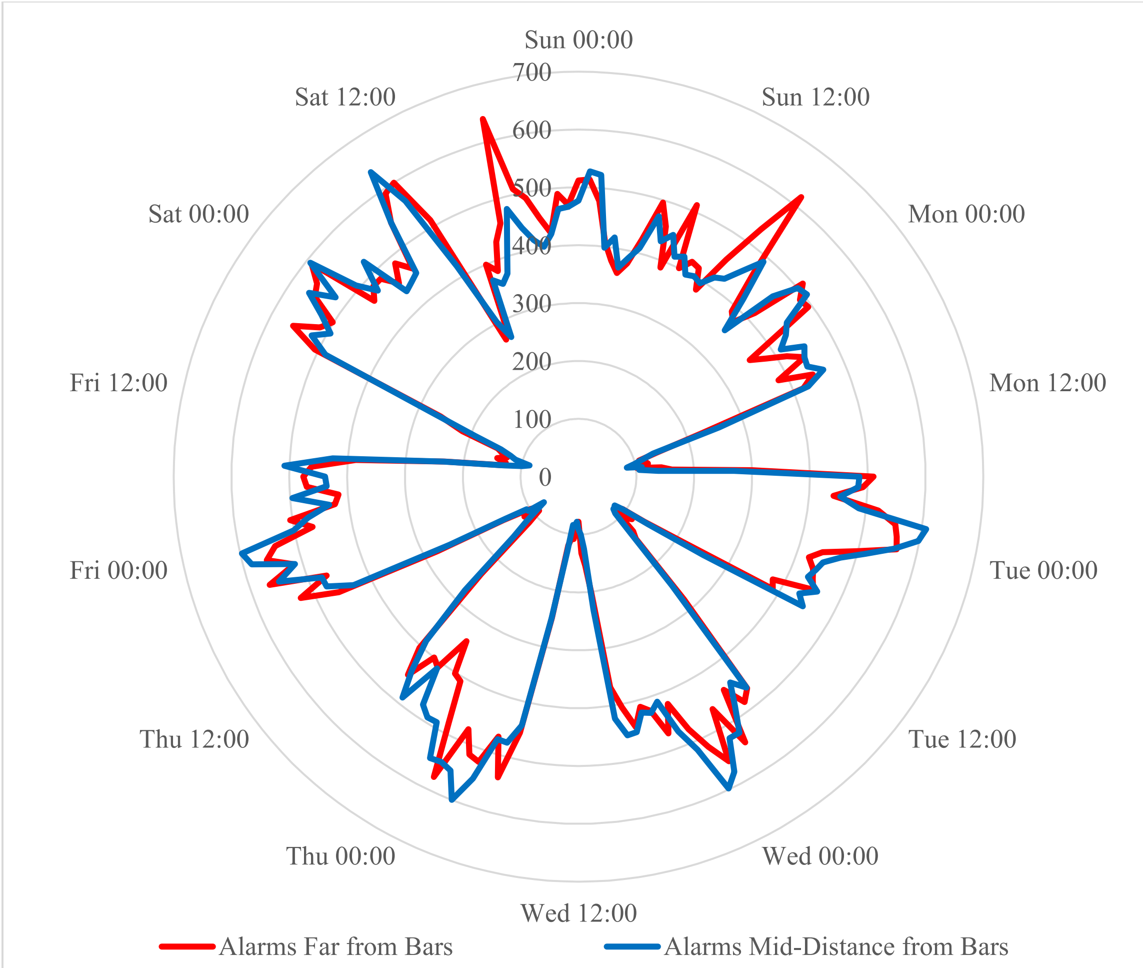

Figure 65: Comparison of Temporal Patterns for Commercial Alarms Mid-Distance and Far from Bars

Occurrence Times for Commercial Alarms that are Far from Bars

There were 31,993 commercial alarms that occurred far from bars. The distance ranged from a minimum of 2,296 feet to a maximum of 83,791 feet.

Table 59 shows the occurrence times for commercial alarms located far from a bar. Comparing this data with the data in *Table 57* shows that alarms near and far from bars tend to occur at similar times. There are some differences in the peak numbers and when they occur. There are spikes in alarm calls far from bars on Saturday and Sunday evenings which do not occur in the pattern for alarms near bars. The alarms far from bars also tend to peak earlier than in the evening than those near bars.

Table 59: Occurrence Time for Commercial Alarms Far from Bars

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
2400-0059	256	245	282	259	288	269	295	1,894
0100-0159	257	247	249	238	240	234	233	1,698
0200-0259	239	179	221	211	204	252	242	1,548
0300-0359	204	192	211	235	201	212	242	1,497
0400-0459	189	208	218	212	172	208	228	1,435
0500-0559	179	221	221	206	205	235	243	1,510
0600-0659	189	192	225	222	200	238	230	1,496
0700-0759	212	221	190	203	226	231	273	1,556
0800-0859	248	209	194	184	202	193	296	1,526
0900-0959	229	112	104	102	119	116	300	1,082
1000-1059	194	70	69	77	58	68	256	792
1100-1159	256	54	47	66	45	64	134	666
1200-1259	200	59	59	39	48	72	147	624
1300-1359	210	61	55	44	58	64	200	692
1400-1459	208	51	46	54	49	69	191	668
1500-1559	191	72	67	53	58	74	215	730
1600-1659	227	81	73	60	75	108	229	853
1700-1759	266	150	140	124	138	130	320	1,268
1800-1859	309	255	234	227	230	253	255	1,763
1900-1959	232	246	242	269	262	279	245	1,775
2000-2059	195	221	223	235	234	258	226	1,592
2100-2159	189	261	271	261	283	251	212	1,728
2200-2259	208	277	232	258	257	276	245	1,753
2300-2359	256	280	278	238	279	281	235	1,847
Total	5,343	4,164	4,151	4,077	4,131	4,435	5,692	n=31,993

Figure 66 is a graphical representation of the temporal patterns for commercial alarms near and far from bars. The alarms far from bars are shown with the red line and commercial alarms near bars are shown with the blue line. This graph shows that the alarms near and far from bars generally occur in similar temporal patterns. The differences in peak numbers, especially the differences mentioned on Saturday and Sunday, are visible in the graph.

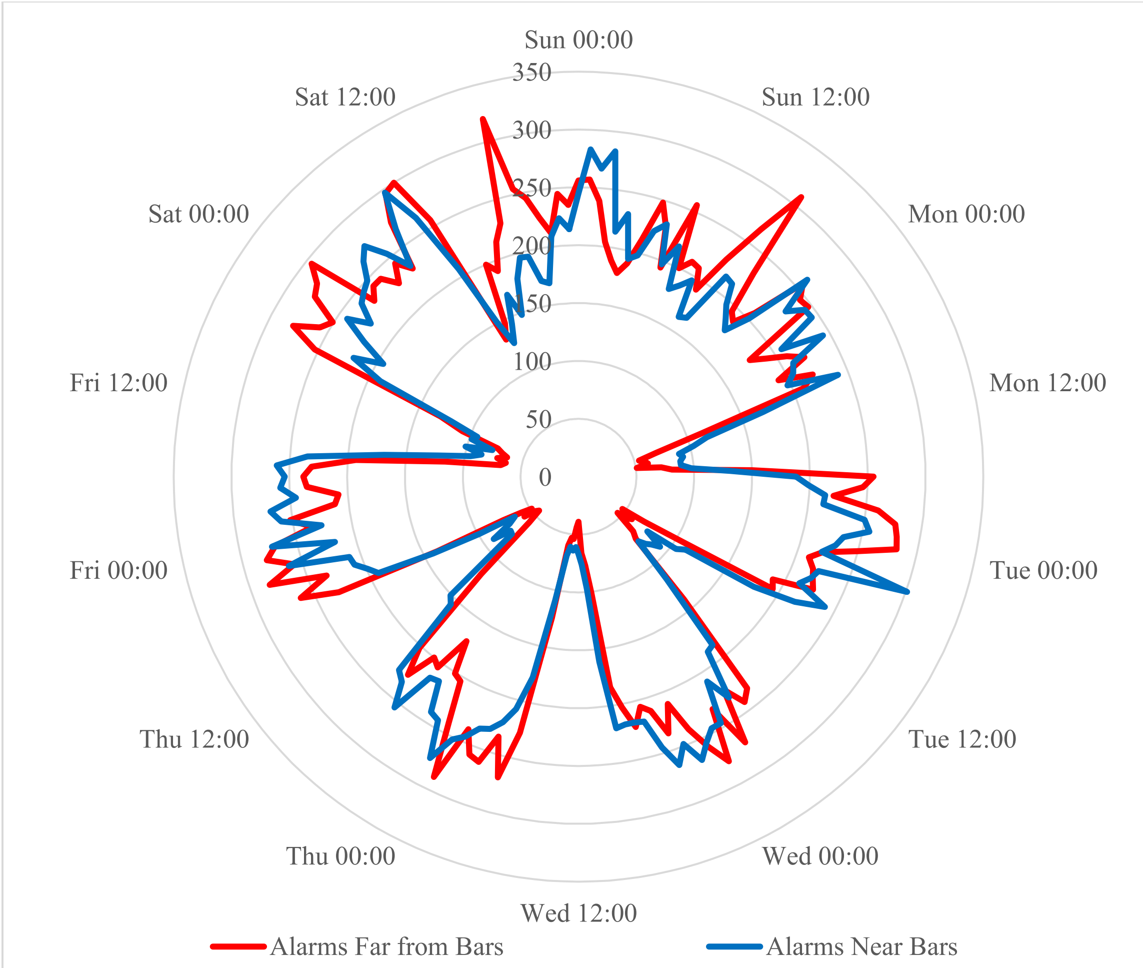

Figure 66: Comparison of Temporal Patterns for Commercial Alarms Near and Far from Bars

Discussion

Comparison of Occurrence Times for Residential Burglaries by Proximity of Bars. The distance from bars grouping for residential burglaries was based on quartiles. As a result, approximately one-quarter of the residential burglaries occurred near bars, half occurred at a mid-distance from bars, while the remaining quarter occurred far from bars. Residential burglaries in all three areas generally follow the same time patterns as each other, but there are small differences between the three areas.

Residential burglaries close to bars tended to see higher peaks on Saturday and Sunday while burglaries further from bars tended to see higher peaks during the work week. Burglaries far from bars saw the peak occurrences at a slightly earlier time on most days than did burglaries closer to bars. *Figure 55* showed the comparison of temporal patterns for burglaries near and mid-distance from bars, *Figure 56* showed the comparison of temporal patterns for burglaries mid-distance and far from bars, and *Figure 57* showed the comparison of temporal patterns for burglaries near and far from bars.

The study of the tables and graphs leads to the conclusion that the proximity of residential burglary to a bar affects when they occur. If the burglary is close to a bar (within approximately 0.25 mile), the burglary is slightly more likely to occur on a weekend.

Comparison of Occurrence Times for Residential Alarms by Proximity of Bars. The distance from bars grouping for residential alarms also was based on quartiles and approximately one-quarter of the residential alarms occurred near bars, half occurred at a mid-distance from bars, while the remaining quarter occurred far from bars. Residential alarms in all three areas generally follow the same time patterns as each other. There are, however, small differences between the three areas.

Residential alarms near (closer than approximately 0.3 mile) from bars tended to occur more on Friday than alarms further from bars, but the difference is slight and almost disappears if Thursday, Friday, and Saturday are considered together. Alarms in all three distance groupings had generally similar patterns with some variation in the exact peak times. *Figure 58* showed the comparison of temporal patterns for residential alarms near and mid-distance from bars, *Figure 59* showed the comparison of temporal patterns for mid-distance and far from bars, and *Figure 60* showed the comparison of temporal patterns for alarms near and far from bars.

The study of the tables and graphs leads to the conclusion that the proximity of residential alarm to a bar affects when they occur, but only if it is close to the bar and it has a very slight effect even then.

Comparison of Occurrence Times for Commercial Burglaries by Proximity of Bars. The distance from bars grouping for commercial burglaries was based on quartiles. As a result, approximately one-quarter of the commercial burglaries occurred near bars, half occurred at a mid-distance from bars, while the remaining quarter occurred far from bars. Commercial burglaries in all three areas generally follow the same time patterns as each other. There are, however, differences between the three areas.

Figure 61 showed the comparison of aoristic temporal patterns for commercial burglaries near and mid-distance from bars, *Figure 62* showed the comparison of aoristic temporal patterns for mid-distance and far from bars, and *Figure 63* showed the comparison of aoristic temporal patterns for burglaries near and far from bars.

Commercial burglaries near bars (closer than approximately 700 feet) had a higher peak on Tuesday mornings than other days. They also tended to have a narrower time period for a peak each day and had fewer burglaries that did not occur in peak times. Burglaries that occurred further from bars tended to be more spread out in when they occurred than those near bars.

The study of the tables and graphs leads to the conclusion that the proximity of commercial burglary to a bar affects when they occur, with different patterns for burglaries near a bar.

Comparison of Occurrence Times for Commercial Alarms by Proximity of Bars. The distance from bars grouping for commercial alarms was also based on quartiles. As a result, approximately one-quarter of the commercial alarms occurred near bars, half occurred at a mid-distance from bars, while the remaining quarter occurred far from bars. Commercial alarms in all three areas generally follow the same time patterns as each other, but there are observable differences between the three areas.

Figure 64 showed the comparison of temporal patterns for commercial alarms near and mid-distance from bars, *Figure 65* showed the comparison of temporal patterns for mid-distance and far from bars, and *Figure 66* showed the comparison of temporal patterns for alarms near and far from bars. The differences are primarily the number of calls at peak numbers, but with the time pattern at the peak also varying among them. The alarms that occurred at near bars (within approximately 0.5 mile) tended to peak slightly later in the peak time period than alarms further from bars.

The study of the tables and graphs leads to the conclusion that the proximity of commercial alarms to a bar affects when they occur, especially for alarms that are close to the bar.

Chapter Conclusion

The temporal patterns for residential alarms and burglaries based on their proximity to the nearest bar were examined in this chapter. A separate examination was performed of the temporal patterns for commercial alarms and burglaries when classified in the same way. The following sections compare the alarms and burglaries to each other, separated by target type.

Comparison of Occurrence Times for Residential Alarms and Burglaries by Proximity of Bars. A comparison of the data in *Table 48* and *Table 51* shows that residential alarms and residential burglaries that are close to the nearest bar follow the same general time pattern. There are some differences, including the alarms appear to peak slightly earlier in the day than burglaries peak. There is a difference in weekend patterns where alarms tend to have large peaks on Saturday and Sunday while burglaries do not increase as much.

Figure 67 shows a graphical representation of the aoristic temporal pattern for burglaries and the temporal pattern for alarms near bars. To keep the two patterns on approximately the same scale for ease of comparison, the hourly number of burglaries was multiplied by two. The alarm pattern is shown in red and the burglary pattern is shown in blue. The graph shows that the alarms and burglaries follow similar patterns, but the alarms tend to peak slightly earlier in the day than burglaries. The weekend peak difference can be seen, with the Saturday and Sunday peaks for alarms being approximately the same height as the weekday peaks, while the peaks for the weekend for burglaries are much lower.

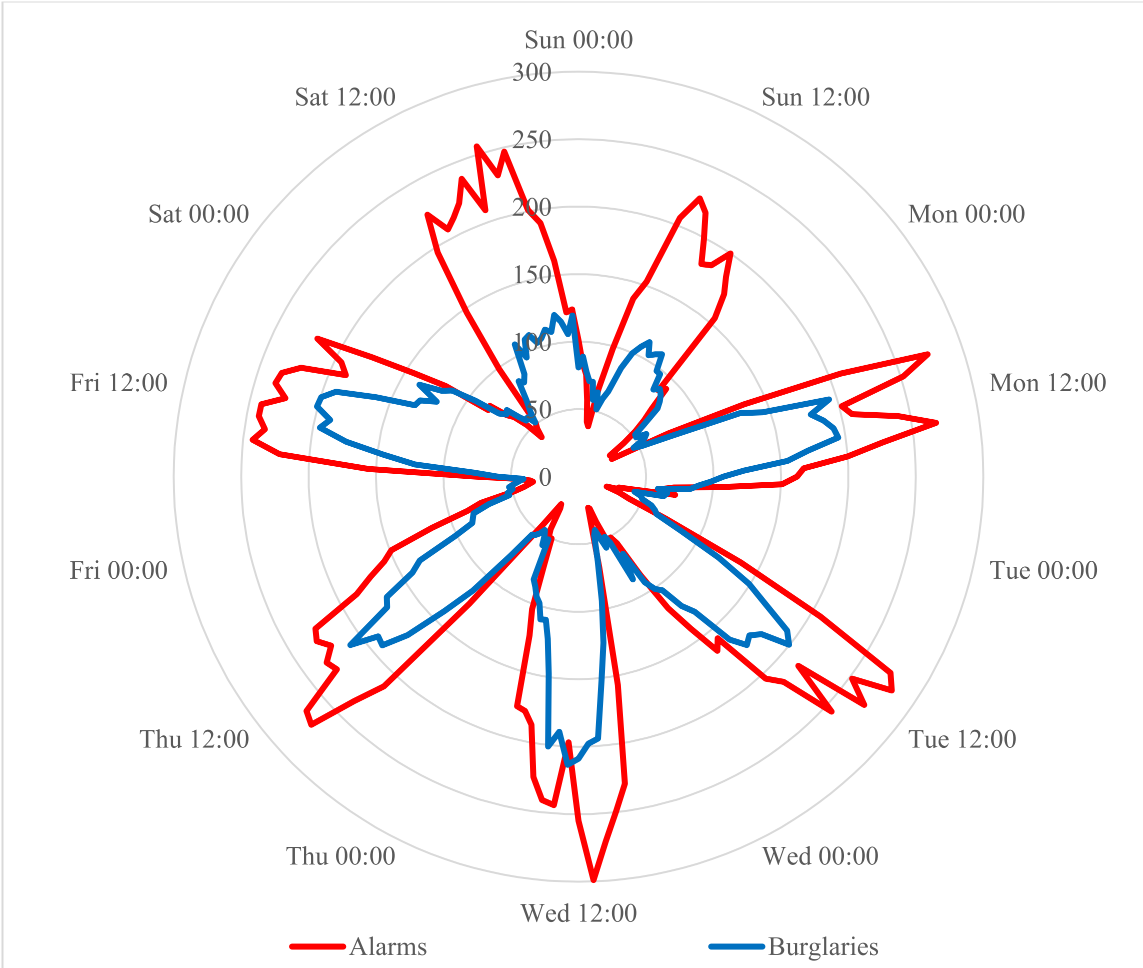

Figure 67: Comparison of the Aoristic Burglary Temporal Pattern to the Alarm Temporal Pattern for Residential Burglaries and Alarms Near Bars

A comparison of the data in *Table 49* and *Table 52* also shows similar patterns for residential burglaries and alarms when they are mid-distance from the nearest bar. The two patterns appear to have the same differences as the patterns for burglaries and alarms near bars.

Figure 68 shows a graphical representation of the aoristic temporal pattern for burglaries and the temporal pattern for alarms mid-distance from bars. To keep the two patterns on approximately the same scale for ease of comparison, the hourly number of burglaries was multiplied by two. The alarm pattern is shown in red and the burglary pattern is shown in blue. The graph shows that the alarms and burglaries follow similar patterns, with similar differences as the patterns for alarms and burglaries near schools.

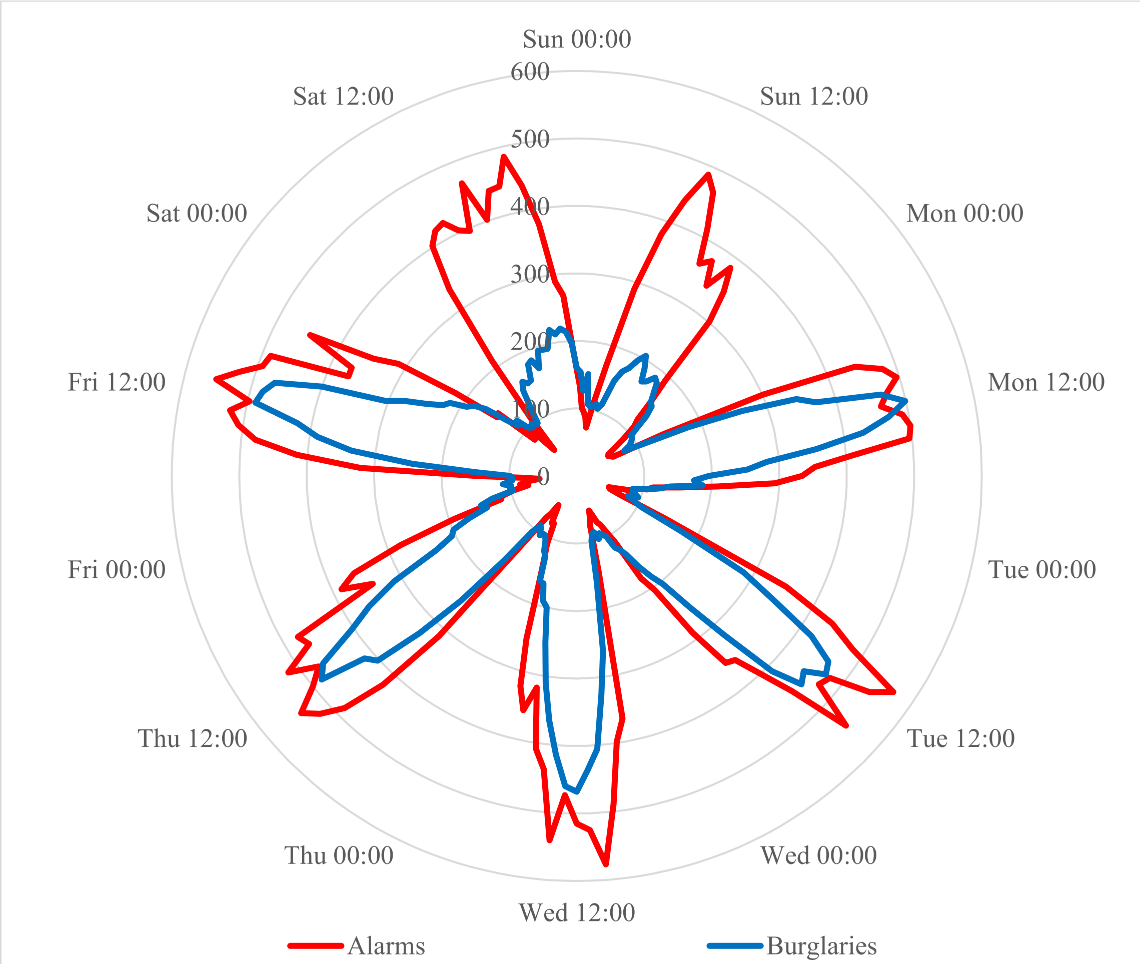

Figure 68: Comparison of the Aoristic Burglary Temporal Pattern to the Alarm Temporal Pattern for Residential Burglaries and Alarms Mid-distance from Bars

A comparison of the data in *Table 50* and *Table 53* also shows similar patterns for residential burglaries and alarms that are far from bars. As with incidents that are close to or mid-distance from bars, both the burglaries and alarms have minor differences in the weekday peaks but show large differences on weekends, with alarms showing a peak in the range of the weekday peak and burglaries showing a much lower peak.

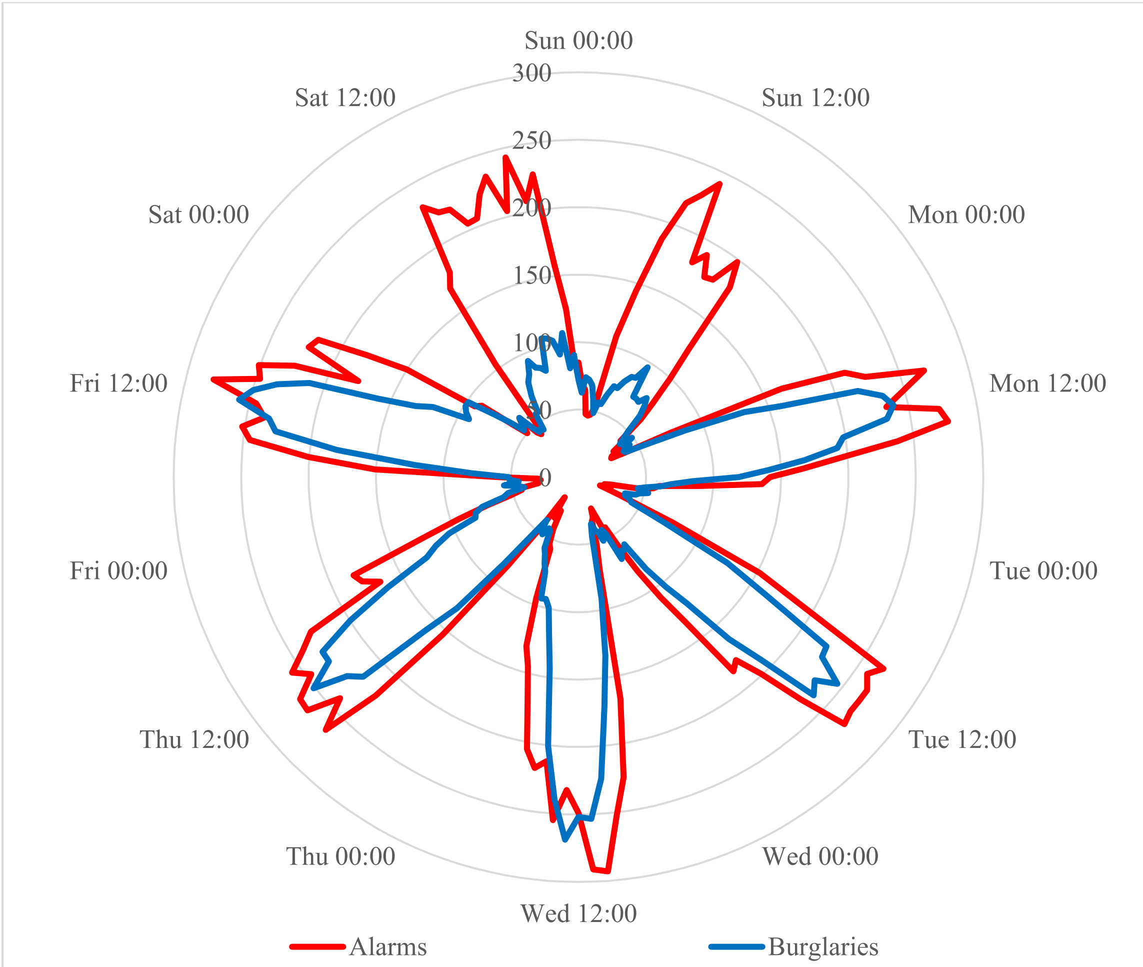

Figure 69: Comparison of the Aoristic Burglary Temporal Pattern to the Alarm Temporal Pattern for Residential Burglaries and Alarms Far from Bars

Comparison of Occurrence Times for Commercial Alarms and Burglaries by Proximity of Bars. A comparison of the data in *Table 54* and *Table 57* shows that commercial alarms and commercial burglaries that occur near bars follow generally similar time patterns. One difference appears to be that alarms tend to have a much wider peak in general, that is, the time period when the most alarms occur is wider than when the most burglaries occur. Alarms also tend to have a larger number occur on weekends when burglaries tend to have a distinct low and peak on weekends.

Figure 70 shows a graphical representation of the comparison of the aoristic temporal pattern for commercial burglaries and the temporal pattern for commercial alarms near bars. To keep the two patterns on approximately the same scale for ease of comparison, the number of burglaries per hour was multiplied by five. This graph shows the difference in the width of the peaks for alarms and burglaries. It also shows how burglaries have a much more distinct low time period and peak time period on weekends.

A comparison of the data in *Table 55* and *Table 58* also shows similar patterns for commercial burglaries and alarms that occur mid-distance from the nearest bar. The differences between the alarms and burglaries is very similar to the differences that were observed in burglaries and alarms near bars.

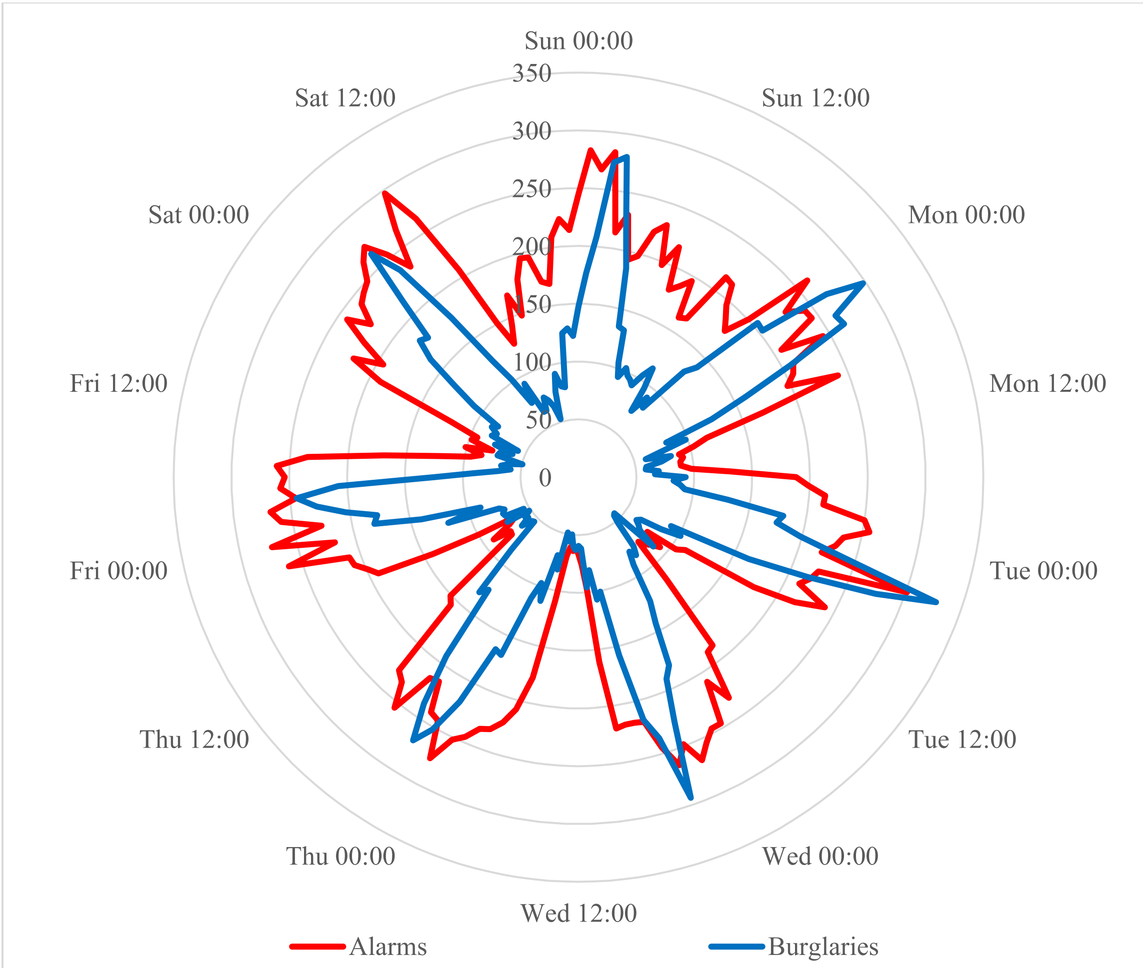

Figure 70: Comparison of the Aoristic Burglary Temporal Pattern to the Alarm Temporal Pattern for Commercial Burglaries and Alarms Near Bars

Figure 71 show a graphical representation of the comparison of the aoristic temporal pattern for commercial burglaries and the temporal pattern for commercial alarms that occur mid-distance from bars. As with the pattern comparison for alarms and burglaries near bars, this graph shows the same differences noted.

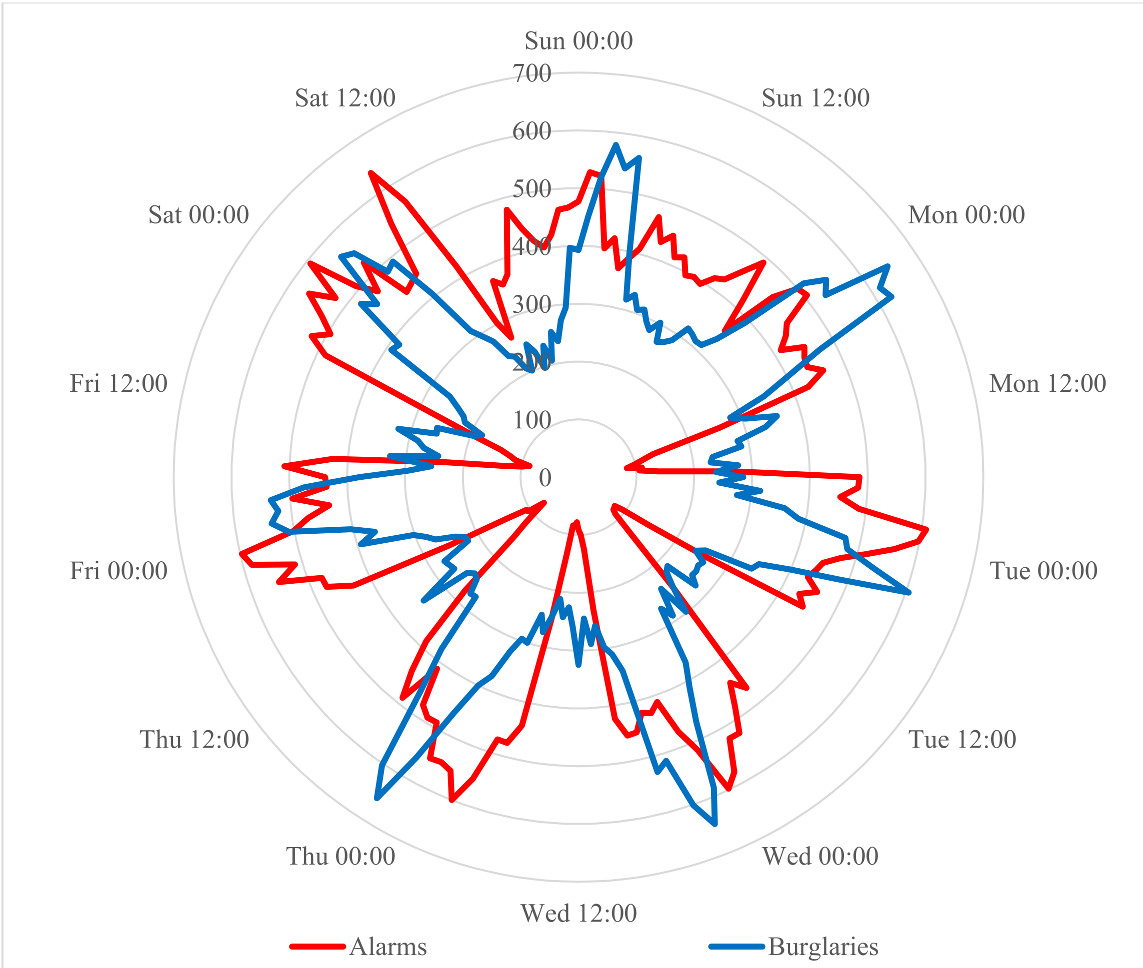

Figure 71: Comparison of the Aoristic Burglary Temporal Pattern to the Alarm Temporal Pattern for Commercial Burglaries and Alarms Mid-distance from Bars

A comparison of the data in *Table 56* and *Table 59* also shows similar patterns for commercial burglaries and alarms that occur far from bars. The differences between the alarms and burglaries that occur far from bars is also very similar to the differences that were observed in burglaries and alarms near bars.

Figure 72 shows a graphical representation of the comparison of the aoristic temporal pattern for commercial burglaries and the temporal pattern for commercial alarms that occur far from bars. As with the pattern comparisons for alarms and burglaries near and mid-distance from bars, this graph shows the same differences noted.

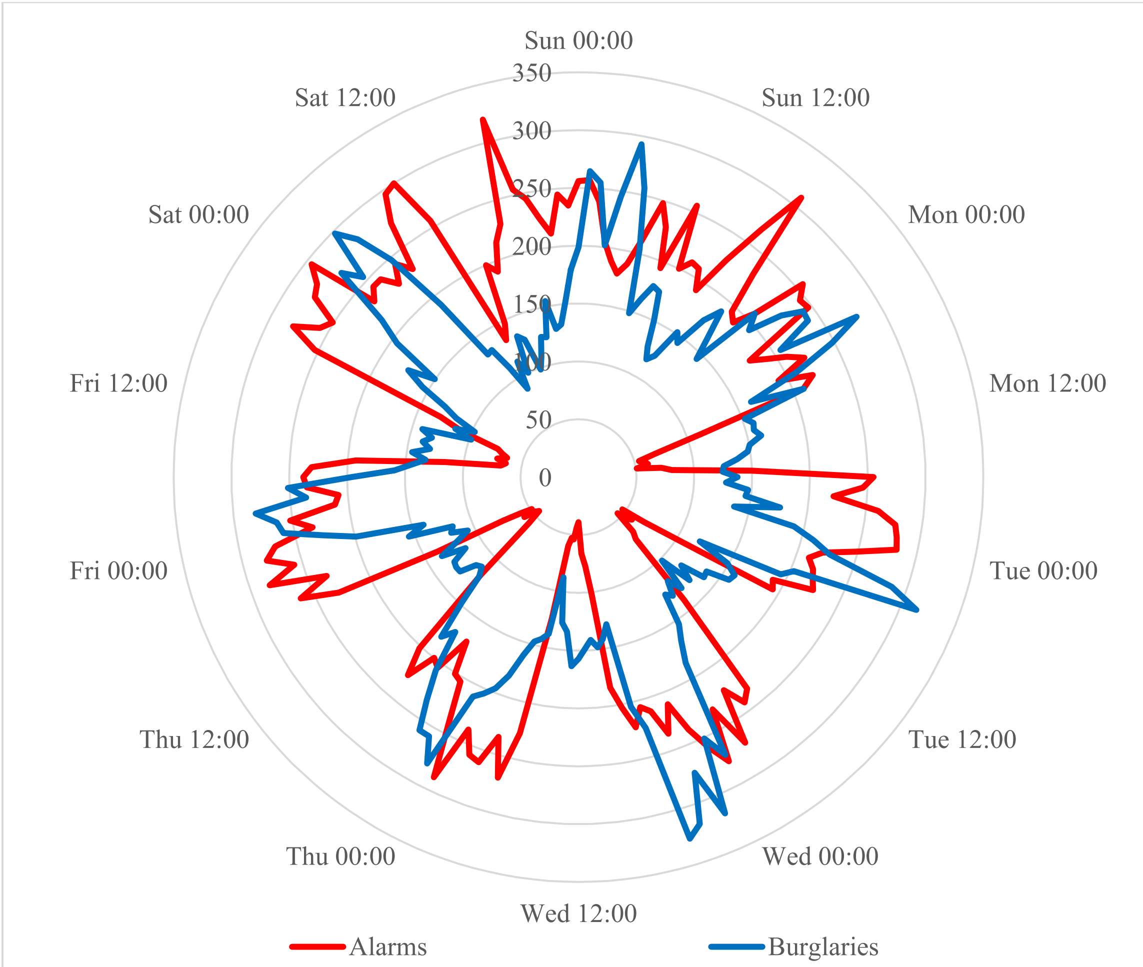

Figure 72: Comparison of the Aoristic Burglary Temporal Pattern to the Alarm Temporal Pattern for Commercial Burglaries and Alarms Far from Bars

Conclusion. When viewing burglaries and classifying them by the proximity of the nearest bar, it has been shown that there are differences in when these incidents occur. This is true whether the target type is commercial or residential. When examining alarms for the same effect, the time difference is also seen for residential and commercial alarms.

In the case of residential alarms and police-coded burglaries, temporal patterns are quite similar. Within the commercial case, temporal patterns are less similar.

X: PROXIMITY OF ESCAPE ROUTES

In this chapter, the temporal patterns of burglaries and alarms will be compared based on the proximity of the incident to the nearest escape route. The review of the literature has shown that one of the factors affecting whether burglaries occur or not was the proximity of an escape route. One of the possible reasons for this finding was that people coming from out of the area might be concerned with their escape. This chapter will determine if that same finding affects when the burglaries occur. Based on the assumption that different groups of offenders are committing offenses close to or far from escape routes, then this analysis is expected to find that burglaries and alarms occur at different times based on the proximity of the incident to the nearest escape route from the area. It is also expected to find that police-coded burglaries and alarms have similar temporal patterns.

The straight-line distance between the incident and the nearest point on a major thoroughfare to use as an escape route is used in this dissertation. The distance is calculated within the ArcGIS Pro database system after plotting the addresses on a map. The distance is calculated for each incident separately and then the incidents are broken down by target type and distance. The incidents will be grouped into three groups based on the closest 25% of the incidents in each target type being near an escape route, the furthest 25% of the incidents in each target type being far from an escape route, and the middle 50% being mid-distance from an escape route. The time patterns for the burglaries and alarms in each group will be calculated and compared to determine if the distance from an escape route makes a difference in the occurrence time.

Table 60 shows the shortest and longest distance for each group of residential and commercial burglary, as well as the number of incidents in each group.

Table 60: Distances to Escape Routes and Number of Burglaries and Alarms per Distance Group

	Distance Group	Minimum Burglary Distance	Maximum Burglary Distance	Minimum Alarm Distance	Maximum Alarm Distance	Number of Burglaries	Number of Alarms
Residential	Near	0	1,050	0	1,504	8,862	24,155
Residential	Mid-Distance	1,051	3,872	1,505	4,492	17,718	48,306
Residential	Far	3,873	146,373	4,493	12,792	8,860	24,152
Commercial	Near	0	349	0	116	4,163	32,004
Commercial	Mid-Distance	350	3,353	117	2,434	8,326	63,959
Commercial	Far	3,354	116,365	2,435	66,785	4,163	n=32,003

Aoristic Occurrence Times for Residential Burglaries that are Near Escape Routes

There were 8,862 residential burglaries near escape routes. The distance ranged from a minimum of zero feet to a maximum of 1,050 feet. The distance of zero feet for a minimum distance of a residential burglary to escape route represents a situation where the owner lives next to a highway or major thoroughfare.

Table 61 shows the aoristic occurrence times for residential burglaries near escape routes. Comparing this data with the data in *Table 62* shows that burglaries close to escape routes tend to occur at similar times as residential burglaries that are mid-distance from an escape route. Residential burglaries near and mid-distance from escape routes happen primarily during the work week (Monday through Friday). They show similar daily patterns, with burglaries increasing beginning around 7:00 a.m., peaking around 12:00 noon., and dropping to a low around 6:00 a.m. There are some differences in the peak numbers, especially on weekends where it appears that burglaries near escape routes have more occurrences than mid-distance residential burglaries.

Table 61: Aoristic Occurrence Time for Residential Burglaries Near Escape Routes

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
2400-0059	38.9	31.0	24.9	34.1	26.5	24.9	33.1	213.5
0100-0159	40.6	22.9	26.1	24.4	25.3	21.4	31.5	192.2
0200-0259	33.8	23.7	19.8	23.6	27.5	23.1	35.3	186.7
0300-0359	34.8	26.0	24.5	23.0	21.4	27.2	29.3	186.1
0400-0459	29.6	25.7	22.2	26.6	23.4	22.5	24.0	174.1
0500-0559	27.7	23.1	24.7	20.0	23.0	26.4	25.0	169.9
0600-0659	30.1	28.2	23.3	29.9	25.3	28.5	23.8	189.0
0700-0759	29.8	47.9	36.0	42.0	36.3	35.6	27.6	255.1
0800-0859	28.8	62.5	59.8	66.1	57.9	55.4	31.5	362.0
0900-0959	37.6	77.7	76.8	77.4	80.8	74.1	41.7	466.1
1000-1059	37.6	89.1	92.4	93.0	96.2	90.3	40.5	539.2
1100-1159	45.3	102.4	105.9	97.4	95.3	96.7	41.3	584.3
1200-1259	51.5	103.5	100.3	105.0	101.7	103.6	48.8	614.4
1300-1359	50.6	106.7	94.3	100.8	105.8	98.1	47.0	603.4
1400-1459	51.5	95.8	98.9	98.1	93.1	95.7	53.5	586.5
1500-1559	49.0	82.7	93.8	90.1	87.1	89.0	46.5	538.2
1600-1659	49.1	78.3	81.7	71.5	77.5	77.1	49.5	484.6
1700-1759	41.2	62.1	72.3	62.8	59.0	75.1	55.4	428.0
1800-1859	46.5	59.1	61.4	55.9	52.1	69.5	59.9	404.5
1900-1959	46.5	46.2	59.5	57.8	54.8	69.9	60.0	394.6
2000-2059	42.4	43.1	49.4	53.6	52.4	62.7	66.0	369.6
2100-2159	43.5	39.3	41.8	48.6	44.7	60.0	63.1	341.0
2200-2259	50.1	32.9	27.8	34.4	43.6	55.8	54.9	299.6
2300-2359	40.8	31.9	39.1	34.6	33.1	42.6	57.3	279.4
Total	977.2	1,341.5	1,356.8	1,371.1	1,343.7	1,425.1	1,046.5	n=8,862

Figure 73 is a graphical representation of the comparison of aoristic temporal patterns for residential burglaries near and mid-distance from escape routes. To keep the two patterns on the same approximate scale, the number of burglaries per hour that are close to escape routes were multiplied by two. The burglaries near escape routes are shown with the red line and the mid-distance residential burglaries are shown with the blue line. This graph shows that the burglaries near escape routes generally occur in a similar pattern to the mid-distance burglaries. The differences in peak numbers, especially on weekends, are also visible in the graph.

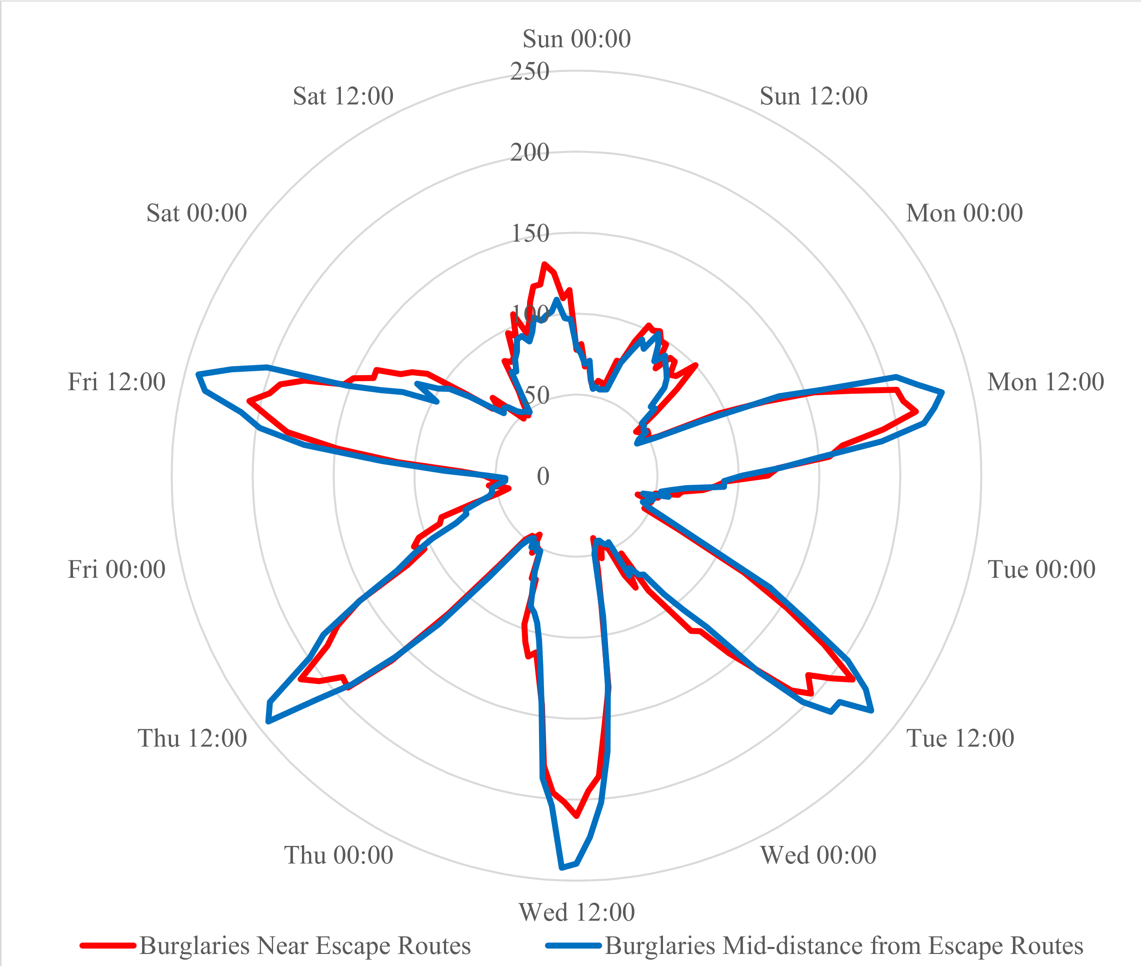

Figure 73: Comparison of Aoristic Temporal Patterns Residential Burglaries Near and Mid-distance from Escape Routes

Aoristic Occurrence Times for Residential Burglaries that are Mid-Distance from Escape Routes

There were 17,718 residential burglaries that occurred at a mid-distance from escape routes. The distance ranged from a minimum of 1,051 feet to a maximum of 3,872 feet.

Table 62 shows the aoristic occurrence times for residential burglaries located at a mid-distance from an escape route. Comparing this data with the data in *Table 63* shows that burglaries mid-distance from escape routes tend to occur at similar times as burglaries far from escape routes. There are some differences in the peak numbers, but the differences are small.

Table 62: Aoristic Occurrence Time for Residential Burglaries Mid-Distance from Escape Routes

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
2400-0059	79.5	51.7	58.4	45.6	51.4	54.6	68.2	409.4
0100-0159	75.5	51.8	42.5	46.3	52.7	53.0	59.2	381.0
0200-0259	69.3	50.1	49.6	45.2	48.6	53.1	61.2	377.1
0300-0359	71.5	50.7	47.8	42.4	52.3	49.0	59.9	373.7
0400-0459	60.0	44.3	44.0	42.1	46.6	44.2	54.2	335.4
0500-0559	54.6	42.3	48.3	45.1	48.3	43.8	51.6	334.0
0600-0659	55.9	53.9	61.1	49.5	55.1	54.9	50.8	381.2
0700-0759	55.1	84.3	85.6	88.3	83.0	81.4	48.7	526.4
0800-0859	55.6	134.4	137.8	130.5	124.7	121.0	59.2	763.2
0900-0959	56.4	160.7	166.2	171.4	158.5	169.3	75.6	958.0
1000-1059	74.8	206.7	202.8	202.3	189.3	197.8	74.2	1,147.9
1100-1159	83.4	217.4	221.9	223.3	211.9	210.7	81.3	1,250.0
1200-1259	93.3	231.4	232.8	239.5	243.4	235.3	84.9	1,360.6
1300-1359	88.6	224.9	214.3	242.2	235.2	241.7	91.7	1,338.6
1400-1459	101.1	217.1	214.4	204.4	199.3	222.9	92.5	1,251.8
1500-1559	94.7	189.7	197.5	187.9	184.6	202.4	87.8	1,144.5
1600-1659	85.4	150.4	164.9	144.4	154.5	152.2	92.8	944.5
1700-1759	92.1	125.7	123.2	120.4	125.1	131.8	101.2	819.5
1800-1859	88.3	102.3	106.1	104.2	111.6	119.2	98.1	729.7
1900-1959	85.0	91.1	91.1	94.1	97.0	97.7	100.5	656.5
2000-2059	81.8	91.3	73.8	88.5	79.9	113.6	102.6	631.6
2100-2159	76.8	68.4	72.4	85.7	71.9	101.1	109.3	585.7
2200-2259	62.6	59.2	65.9	74.2	71.7	95.0	97.5	526.1
2300-2359	63.8	53.0	70.0	64.5	61.9	81.8	96.6	491.7
Total	1,805.2	2,752.7	2,792.3	2,781.8	2,758.7	2,927.5	1,899.7	n=17,718

Figure 74 is a graphical representation of the comparison of the aoristic temporal patterns for residential burglaries mid-distance and far from escape routes. To keep the patterns on the approximately same scale, the number of burglaries per hour that are far from an escape route are multiplied by two. The burglaries mid-distance from escape routes are shown with the red line and all residential burglaries are shown with the blue line. This graph shows that the burglaries mid-distance from escape routes generally

occur at the same time as burglaries far from escape routes. The differences in peak numbers are visible in the graph, which shows how small the differences are.

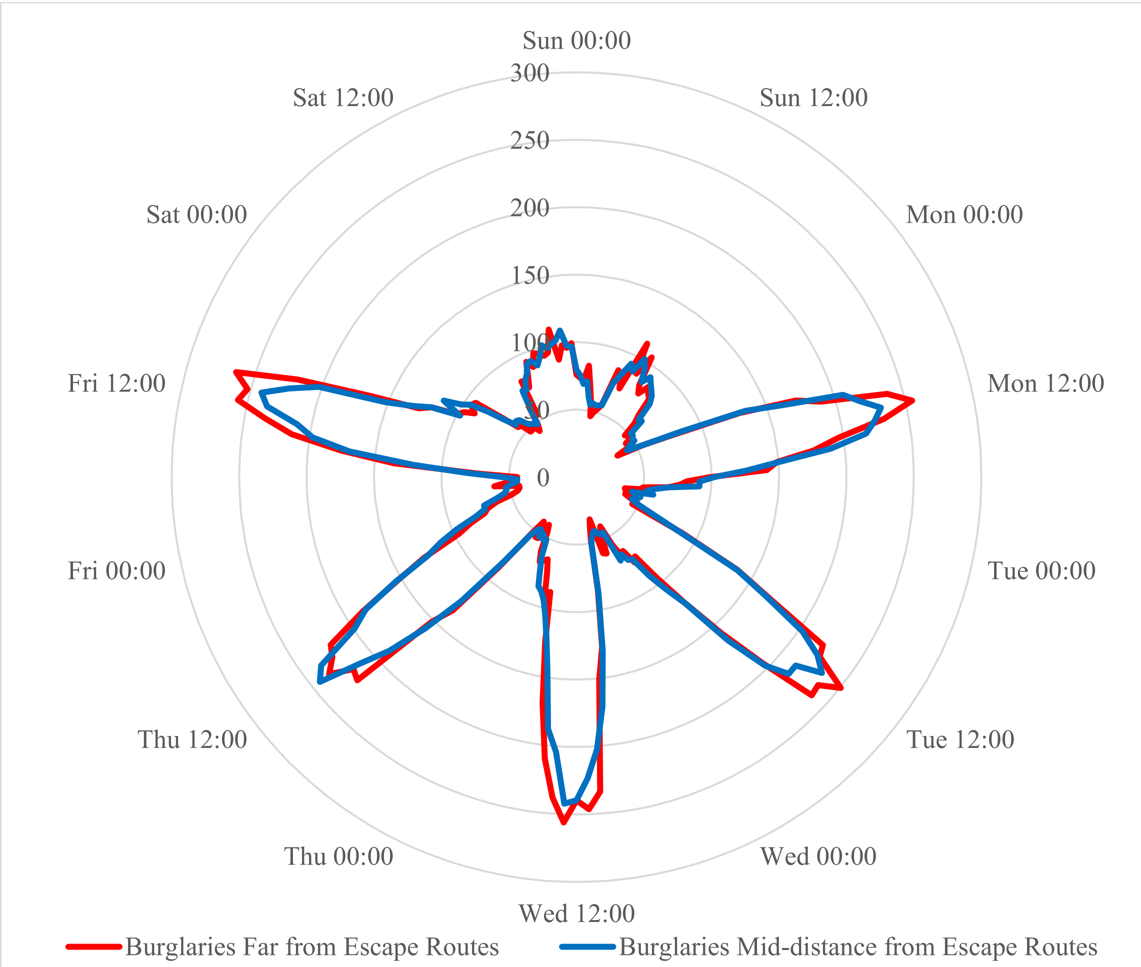

Figure 74: Comparison of Aoristic Temporal Patterns for Residential Burglaries Mid-Distance and Far from Escape Routes

Aoristic Occurrence Times for Residential Burglaries that are Far from Escape Routes

There were 8,860 residential burglaries that occurred far from escape routes. The distance ranged from a minimum of 3,873 feet to a maximum of 146,373 feet.

Table 63 shows the occurrence times for residential burglaries that are far from an escape route. Comparing this data with the data in *Table 61* shows that burglaries far from escape routes tend to occur at similar times as when those near escape routes. There are some differences in the peak numbers, especially in the weekend. There is a difference where the burglaries near escape rounds occur more often on weekends, as opposed to burglaries far from escape routes, where more occur during the peak times on Monday through Friday.

Table 63: Aoristic Occurrence Time for Residential Burglaries Far from Escape Routes

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
2400-0059	38.0	24.7	18.4	20.2	30.3	22.3	35.3	189.2
0100-0159	36.8	25.8	18.8	22.4	23.1	21.4	28.4	176.8
0200-0259	36.2	22.1	22.2	30.4	20.3	21.5	28.4	181.1
0300-0359	41.5	23.1	19.1	29.9	26.7	30.7	23.9	194.9
0400-0459	34.1	22.6	21.7	16.4	27.0	25.5	23.9	171.2
0500-0559	28.7	17.1	24.7	19.4	20.5	23.0	25.7	159.0
0600-0659	23.1	27.4	22.8	24.1	26.7	21.9	21.9	167.9
0700-0759	24.9	39.1	44.1	42.9	44.0	36.6	24.0	255.5
0800-0859	26.3	64.9	68.8	63.6	67.3	67.8	31.0	389.7
0900-0959	28.4	85.9	84.5	75.5	75.9	87.8	27.2	465.2
1000-1059	42.6	95.0	110.5	116.9	110.7	106.7	40.9	623.3
1100-1159	41.5	119.2	112.0	123.1	109.1	117.6	37.6	660.1
1200-1259	36.5	127.6	125.3	119.7	117.2	128.7	41.2	696.2
1300-1359	56.0	116.0	118.1	128.1	112.4	126.2	46.6	703.2
1400-1459	44.2	98.2	118.9	119.0	110.2	132.0	43.9	666.4
1500-1559	52.4	88.5	97.4	105.0	93.4	109.6	48.6	594.8
1600-1659	41.3	74.5	78.9	84.7	76.7	82.8	47.9	486.7
1700-1759	38.4	70.6	61.3	62.4	63.8	63.8	46.5	406.9
1800-1859	42.8	49.6	47.8	43.7	48.3	59.6	47.3	339.1
1900-1959	40.6	41.0	36.5	45.5	43.0	49.7	55.6	311.9
2000-2059	39.5	38.5	38.3	37.1	36.5	48.1	44.0	282.1
2100-2159	32.6	34.0	32.3	32.3	35.0	44.5	49.1	259.8
2200-2259	29.2	25.0	33.9	33.3	30.9	47.4	48.0	247.7
2300-2359	23.6	24.0	28.4	34.2	25.0	46.4	49.6	231.2
Total	879.4	1,354.3	1,384.7	1,429.7	1,374.0	1,521.7	916.4	n=8,860

Figure 75 is a graphical representation of the comparison of the aoristic temporal patterns for residential burglaries near and far from escape routes. The burglaries far from escape routes are shown with the red line and burglaries near escape routes are shown

with the blue line. This graph shows that the burglaries far from escape routes generally occur at the same time as those near escape routes. The difference on weekends is visible in the graph.

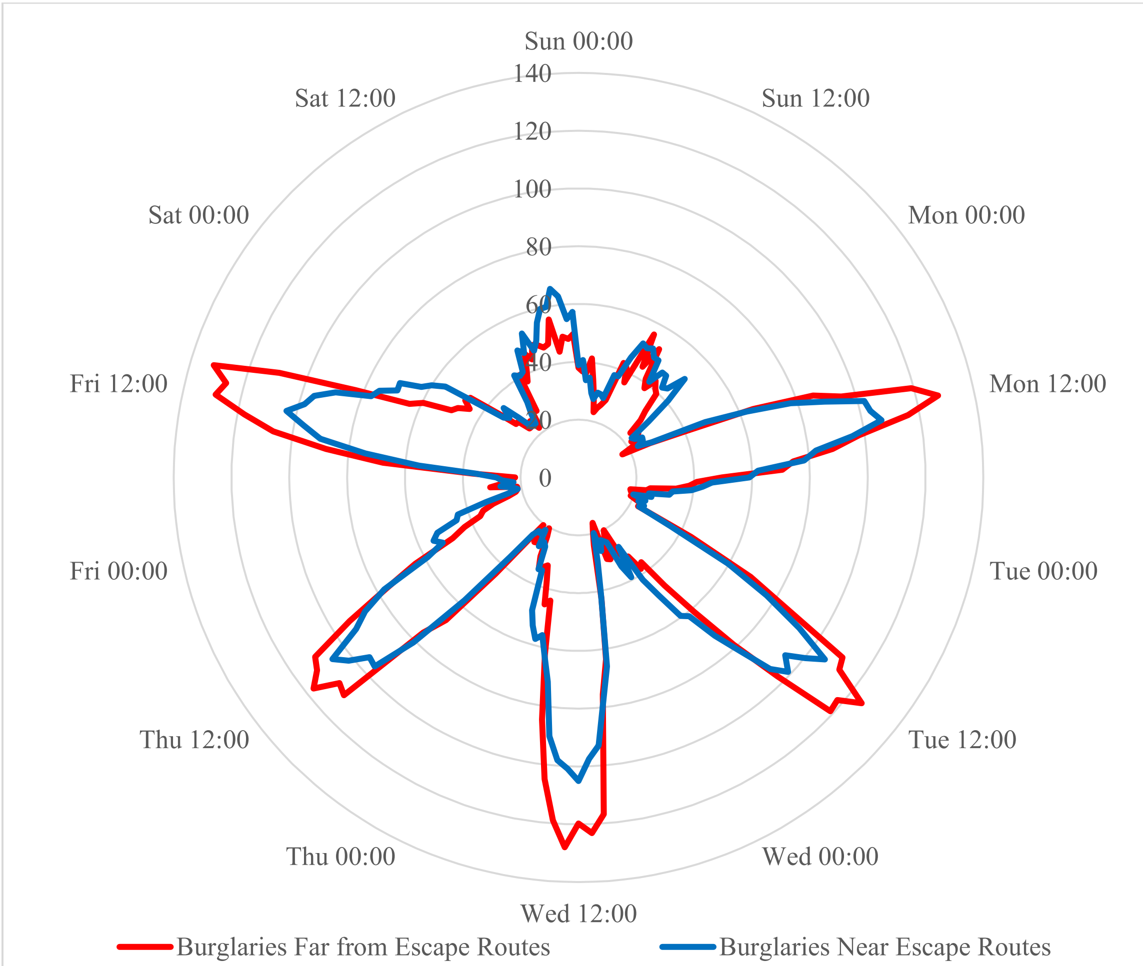

Figure 75: Comparison of Aoristic Temporal Patterns for Residential Burglaries Near and Far from Escape Routes

Occurrence Times for Residential Alarms that are Near Escape Routes

There were 24,155 residential alarms near escape routes. The distance ranged from a minimum of zero feet to a maximum of 1,504 feet. As discussed under the section on residential burglaries near escape routes, the low number of zero feet as a minimum distance refers to a residence located next to a highway or major thoroughfare.

Table 64 shows the occurrence times for residential alarms near escape routes. Comparing this data with the data in *Table 65* shows that alarms close to escape routes tend to occur at similar times alarms that are mid-distance from escape routes. Most residential alarms near escape routes happen during the work week (Monday through Friday), though quite a few alarms still occur on weekends. They also show similar daily patterns, with an increase in alarms beginning around 7:00 a.m., peaking around 10:00 a.m., and dropping to a low around 4:00 a.m. The largest difference appears to be in the exact numbers and times of the peaks on Tuesday and Friday.

Table 64: Occurrence Time for Residential Alarms Near Escape Routes

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
2400-0059	88	56	50	60	41	49	86	430
0100-0159	59	36	32	37	38	32	62	296
0200-0259	63	35	37	35	24	29	60	283
0300-0359	52	36	20	24	21	30	58	241
0400-0459	48	29	35	26	35	33	34	240
0500-0559	34	33	40	49	45	35	36	272
0600-0659	59	73	83	86	78	70	55	504
0700-0759	93	145	157	187	140	133	118	973
0800-0859	144	211	190	210	205	208	179	1,347
0900-0959	174	260	261	226	221	243	167	1,552
1000-1059	231	265	307	290	252	263	202	1,810
1100-1159	205	242	290	300	255	282	200	1,774
1200-1259	262	206	236	255	229	213	220	1,621
1300-1359	213	250	232	227	232	247	210	1,611
1400-1459	192	275	259	247	210	249	219	1,651
1500-1559	178	230	209	242	227	257	204	1,547
1600-1659	207	191	210	229	213	224	254	1,528
1700-1759	177	183	178	177	173	193	182	1,263
1800-1859	175	145	175	168	180	177	226	1,246
1900-1959	142	143	139	162	159	230	216	1,191
2000-2059	90	93	117	148	151	180	192	971
2100-2159	69	81	82	101	104	147	173	757
2200-2259	68	60	54	77	84	112	127	582
2300-2359	49	71	51	58	52	75	109	465
Total	3,072	3,349	3,444	3,621	3,369	3,711	3,589	n=9,935

Figure 76 is a graphical representation of the comparison of the temporal patterns for residential alarms near and mid-distance from escape routes. To keep the patterns on the approximately same scale, the number of alarms per hour for the alarms near escape routes was multiplied by two. The alarms near escape routes are shown with the red line and mid-distance residential alarms are shown with the blue line. This graph shows that the alarms near escape routes generally occur in a similar pattern to mid-distance residential alarms. The differences in peak numbers, especially on Tuesday and Friday are also visible in the graph.

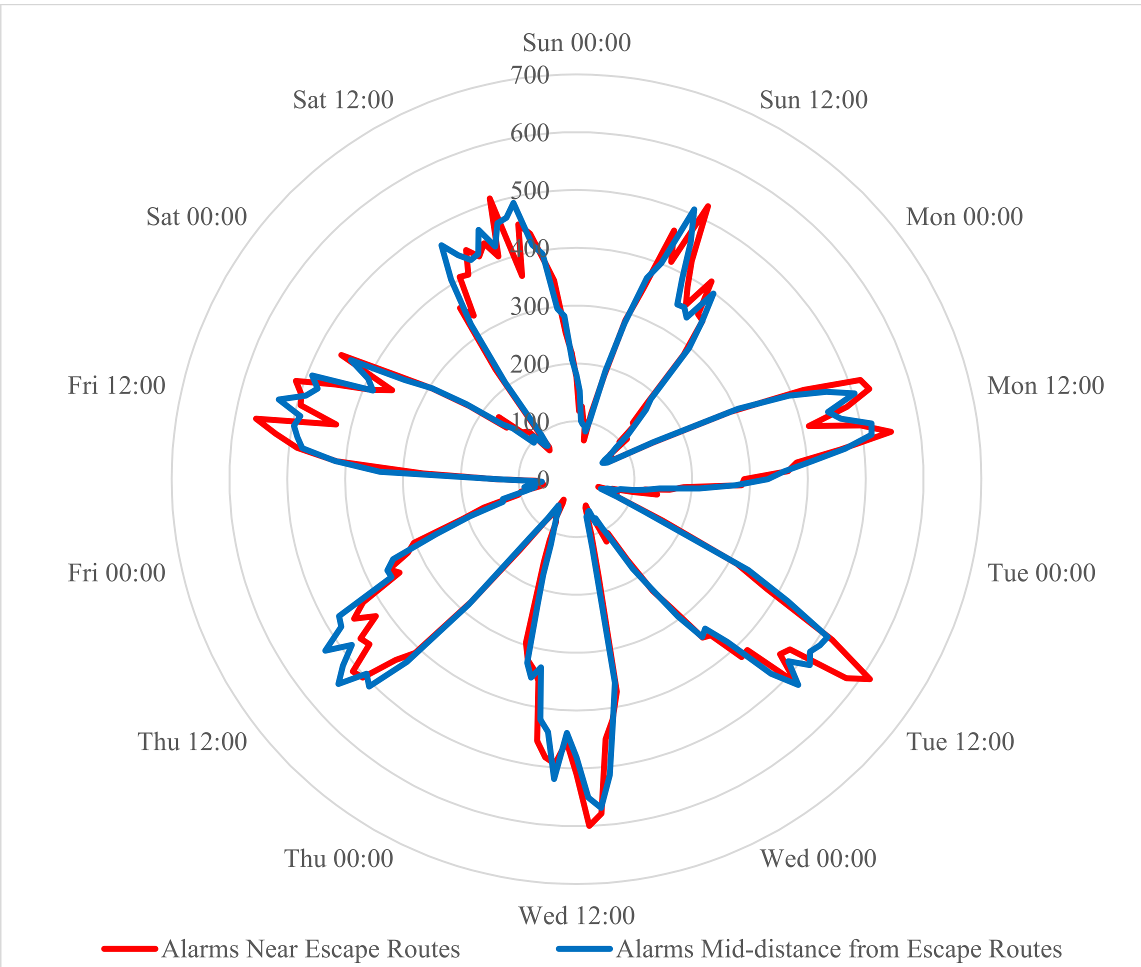

Figure 76: Comparison of Temporal Patterns for Residential Alarms Near and Mid-distance from Escape Routes

Occurrence Times for Residential Alarms that are Mid-Distance from Escape Routes

There were 48,306 residential alarms that occurred at a mid-distance from escape routes. The distance ranged from a minimum of 1,505 feet to a maximum of 4,492.

Table 65 shows the occurrence times for residential alarms located at a mid-distance from an escape route. Comparing this data with the data in *Table 66* shows that alarms mid-distance from escape routes tend to occur at similar times as alarms that are far from escape routes. There are some differences in the numbers and times of the peaks.

Table 65: Occurrence Time for Residential Alarms Mid-Distance from Escape Routes

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
2400-0059	180	87	78	75	86	91	141	738
0100-0159	153	74	72	83	75	73	97	627
0200-0259	101	59	55	59	60	91	106	531
0300-0359	96	53	52	60	60	76	105	502
0400-0459	93	57	45	69	55	60	79	458
0500-0559	84	61	78	67	85	81	76	532
0600-0659	105	148	132	124	128	137	97	871
0700-0759	195	305	336	358	286	340	208	2,028
0800-0859	282	395	422	423	431	419	324	2,696
0900-0959	369	458	513	515	507	477	408	3,247
1000-1059	401	503	510	570	495	488	467	3,434
1100-1159	509	450	502	551	543	497	438	3,490
1200-1259	455	469	516	481	517	490	421	3,349
1300-1359	391	519	483	439	483	533	425	3,273
1400-1459	349	516	523	520	526	490	463	3,387
1500-1559	351	467	476	440	480	474	426	3,114
1600-1659	338	407	384	420	474	491	463	2,977
1700-1759	399	359	341	331	362	384	468	2,644
1800-1859	348	331	349	352	363	400	490	2,633
1900-1959	299	275	295	329	346	441	412	2,397
2000-2059	189	213	228	229	261	343	394	1,857
2100-2159	170	145	183	175	195	295	297	1,460
2200-2259	139	122	122	121	133	231	283	1,151
2300-2359	117	101	95	99	132	159	207	910
Total	6,113	6,574	6,790	6,890	7,083	7,561	7,295	n=48,306

Figure 77 is a graphical representation of the comparison of the temporal patterns for residential alarms mid-distance and far from escape routes. To keep the two patterns

on the approximately same scale, the number of alarms per hour for the alarms far from escape routes were multiplied by two. The alarms mid-distance from escape routes are shown with the red line and all residential alarms are shown with the blue line. This comparison clearly shows that the alarms mid-distance from escape routes generally occur at the same time as all residential alarms. The differences in the peak numbers and times are visible, especially for Monday, Tuesday, and Friday.

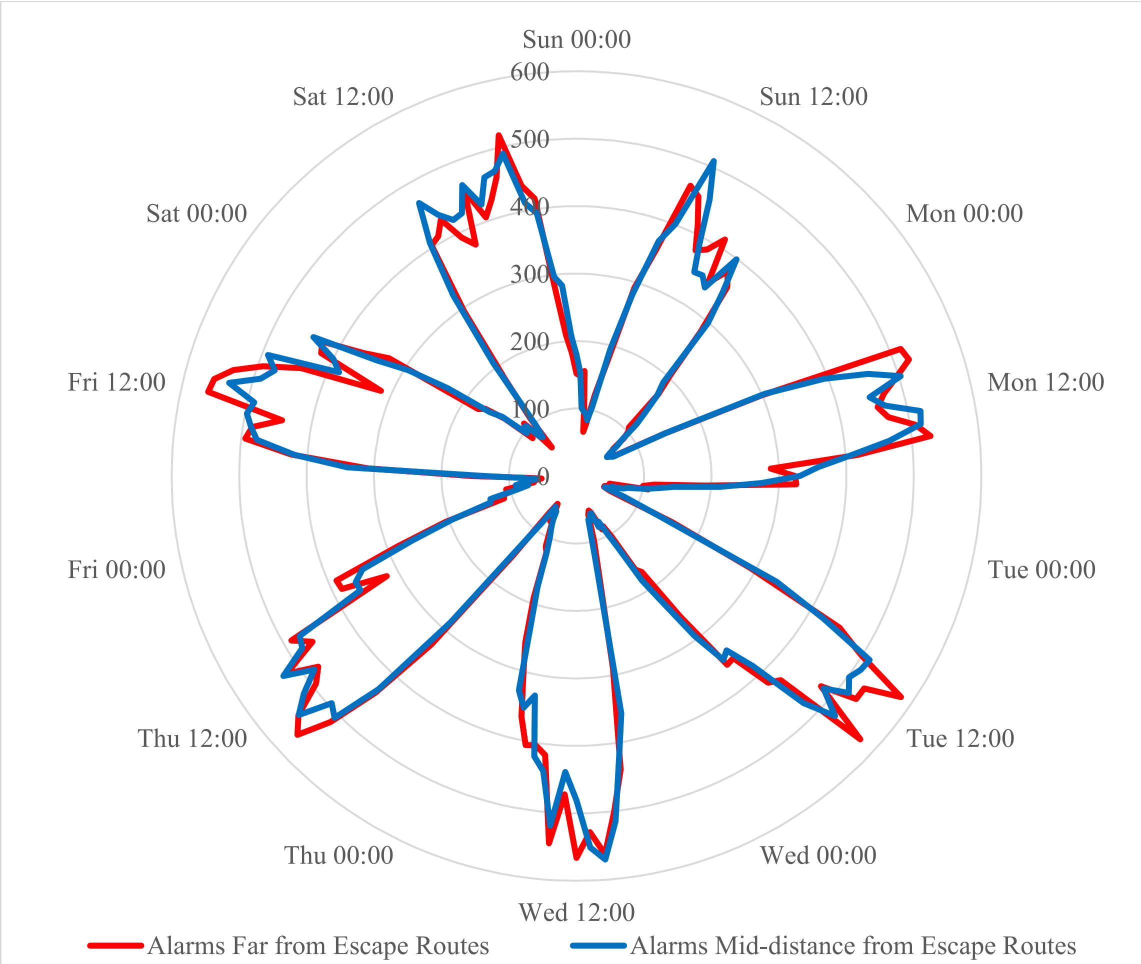

Figure 77: Comparison of Temporal Patterns for Residential Alarms Mid-Distance and Far from Escape Routes

Occurrence Times for Residential Alarms that are Far from Escape Routes

There were 24,152 residential alarms that occurred far from escape routes. The distance ranged from a minimum of 4,493 feet to a maximum of 12,792 feet.

Table 66 shows the occurrence times for residential alarms located far from an escape route. Comparing this data with the data in *Table 64* shows that alarms far from escape routes tend to occur at similar times as those near escape routes. There are some differences in the peak numbers on most days of the week.

Table 66: Occurrence Time for Residential Alarms Far from Escape Routes

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
2400-0059	76	45	25	44	46	48	68	352
0100-0159	74	34	30	35	38	53	43	307
0200-0259	78	31	26	29	39	32	49	284
0300-0359	51	27	22	27	28	35	55	245
0400-0459	33	31	22	30	25	26	39	206
0500-0559	40	33	27	50	34	36	28	248
0600-0659	62	72	79	76	75	78	55	497
0700-0759	87	149	146	145	165	155	89	936
0800-0859	146	258	225	220	219	212	148	1,428
0900-0959	177	261	249	250	258	247	202	1,644
1000-1059	231	248	291	281	282	243	205	1,781
1100-1159	226	236	265	264	272	222	215	1,700
1200-1259	207	229	265	283	247	280	196	1,707
1300-1359	189	235	239	236	238	278	187	1,602
1400-1459	194	254	287	273	260	266	227	1,761
1500-1559	207	264	214	208	231	246	203	1,573
1600-1659	173	209	209	202	244	219	214	1,470
1700-1759	189	144	178	203	159	158	229	1,260
1800-1859	179	162	179	183	193	210	259	1,365
1900-1959	141	163	129	152	194	213	219	1,211
2000-2059	102	96	86	129	142	182	208	945
2100-2159	86	58	82	96	103	164	139	728
2200-2259	53	50	52	61	56	88	105	465
2300-2359	51	54	42	57	58	84	91	437
Total	3,052	3,343	3,369	3,534	3,606	3,775	3,473	n=24,152

Figure 78 is a graphical representation of the comparison of the temporal patterns for residential alarms near and far from escape routes. The alarms far from escape routes are shown with the red line and the alarms near escape routes are shown with the blue

line. This graph clearly shows that the alarms near and far from escape routes generally occur in a similar temporal pattern. The differences in peak numbers are visible in the graph and it is clear how minor some of the differences are.

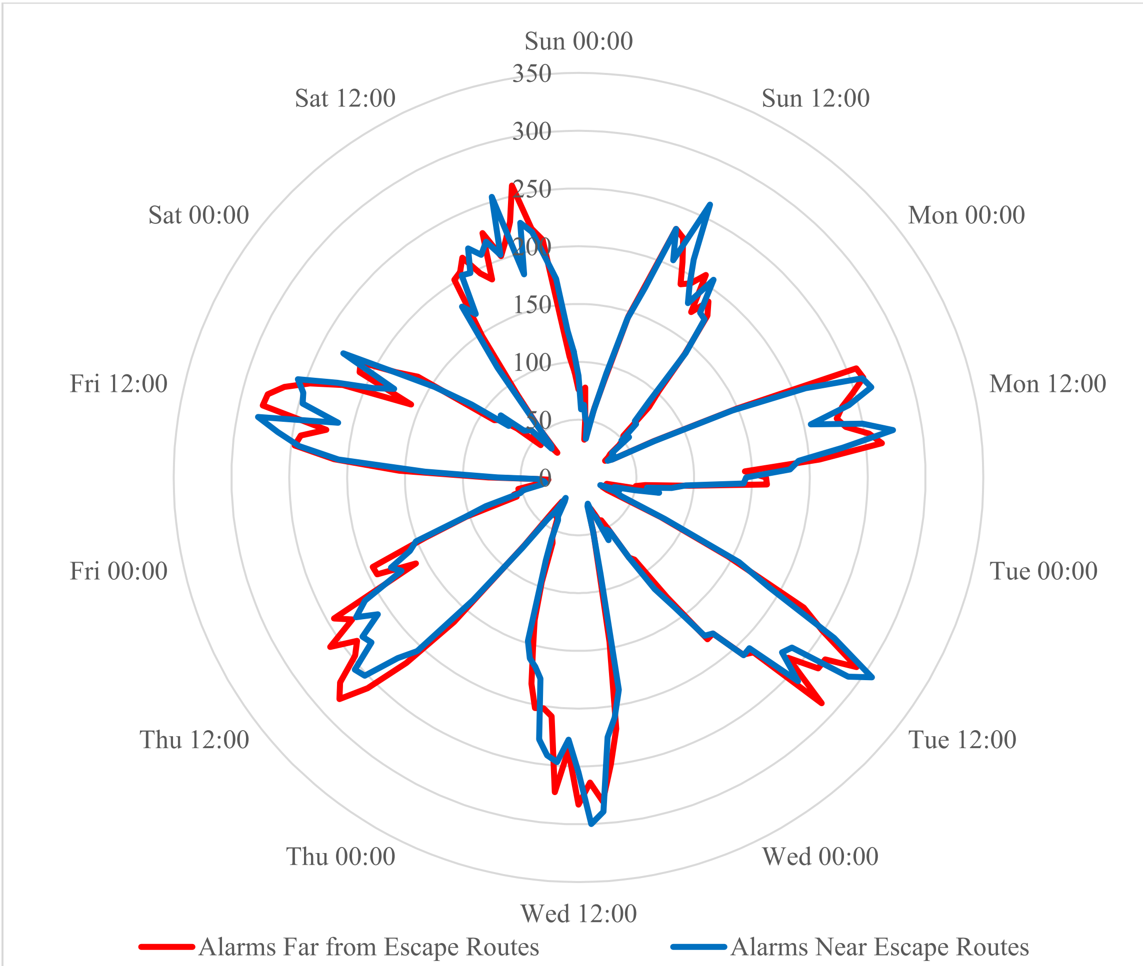

Figure 78: Comparison of Temporal Patterns for Residential Alarms Near and Far from Escape Routes

Aoristic Occurrence Times for Commercial Burglaries that are Near Escape Routes

There were 4,163 commercial burglaries near escape routes. The distance ranged from a minimum of zero feet to a maximum of 349 feet. The minimum recorded distance of zero feet for the distance of a commercial burglary to an escape route represents a burglary of a business that is located next to a highway or major thoroughfare.

Table 67 shows the aoristic occurrence times for commercial burglaries near escape routes. Comparing this data with the data in *Table 68* shows that burglaries close to escape routes tend to occur at similar times as burglaries mid-distance from an escape route. Most commercial burglaries near escape routes happen during on weekends (Friday evening through Monday morning) and the day with the most burglaries is Sunday. Both burglaries near and mid-distance from escape routes show similar daily patterns, with burglaries starting to increase beginning around 5:00 p.m., increasing the rate of increase beginning around 10:00 p.m., peaking around 3:00 a.m.., and dropping to a low around noon. For burglaries near an escape route, the low appears to drop further from the peak than it does for mid-distance burglaries. There are also some differences in the peak numbers particularly on Tuesday and Thursday.

Table 67: Aoristic Occurrence Time for Commercial Burglaries Near Escape Routes

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
2400-0059	35.8	42.2	38.2	47.4	36.7	38.4	36.4	275.1
0100-0159	50.8	51.6	40.8	53.5	42.6	46.7	47.8	333.7
0200-0259	46.2	57.0	47.9	51.8	52.6	48.3	46.8	350.7
0300-0359	47.1	49.4	65.5	62.2	64.8	49.3	52.2	390.4
0400-0459	53.5	53.6	50.5	51.4	50.1	46.1	50.5	355.8
0500-0559	42.8	34.8	37.6	42.2	38.6	45.9	36.5	278.3
0600-0659	33.6	31.5	26.4	25.3	27.0	25.7	36.2	205.6
0700-0759	26.4	25.9	16.3	18.1	22.8	18.4	21.8	149.6
0800-0859	24.7	16.7	14.7	17.4	14.2	11.9	19.0	118.6
0900-0959	19.8	18.3	13.0	12.6	14.4	14.0	17.6	109.5
1000-1059	17.9	14.3	10.8	10.6	7.8	12.3	16.5	90.3
1100-1159	20.8	11.8	10.6	9.7	8.2	11.8	13.0	86.1
1200-1259	20.6	11.8	11.5	12.8	9.4	12.3	12.1	90.6
1300-1359	18.4	16.9	14.3	9.6	10.9	10.0	11.8	91.9
1400-1459	15.8	8.0	13.8	8.7	9.3	10.4	14.1	80.1
1500-1559	18.8	9.2	9.8	11.5	10.5	9.4	10.8	80.0
1600-1659	16.6	9.7	9.2	8.1	11.3	7.7	13.7	76.2
1700-1759	18.5	9.7	11.9	10.2	11.9	10.3	16.5	88.9
1800-1859	16.8	18.5	15.1	15.2	15.4	15.4	13.9	110.3
1900-1959	25.0	14.7	14.1	13.5	16.0	15.3	17.4	116.0
2000-2059	20.1	19.9	16.2	17.7	18.6	15.9	15.0	123.4
2100-2159	25.5	22.6	23.3	20.6	23.2	20.5	22.7	158.4
2200-2259	33.6	26.4	30.9	23.0	18.8	19.6	26.5	178.7
2300-2359	43.6	35.3	33.7	29.8	30.8	25.7	25.7	224.6
Total	692.8	610.0	576.1	582.7	565.8	541.3	594.2	n=4,163

Figure 79 is a graphical representation of the comparison of the aoristic temporal patterns for commercial burglaries near and mid-distance from escape routes. To keep the two patterns on the approximately same scale, the number of burglaries per hour for the burglaries near escape route were multiplied by 1.5. The burglaries near escape routes are shown with the red line and the mid-distance commercial burglaries are shown with the blue line. This graph shows that the burglaries near escape routes generally occur in a similar pattern to the burglaries that are mid-distance from escape routes. The differences in peak numbers and in lows are visible in the graph.

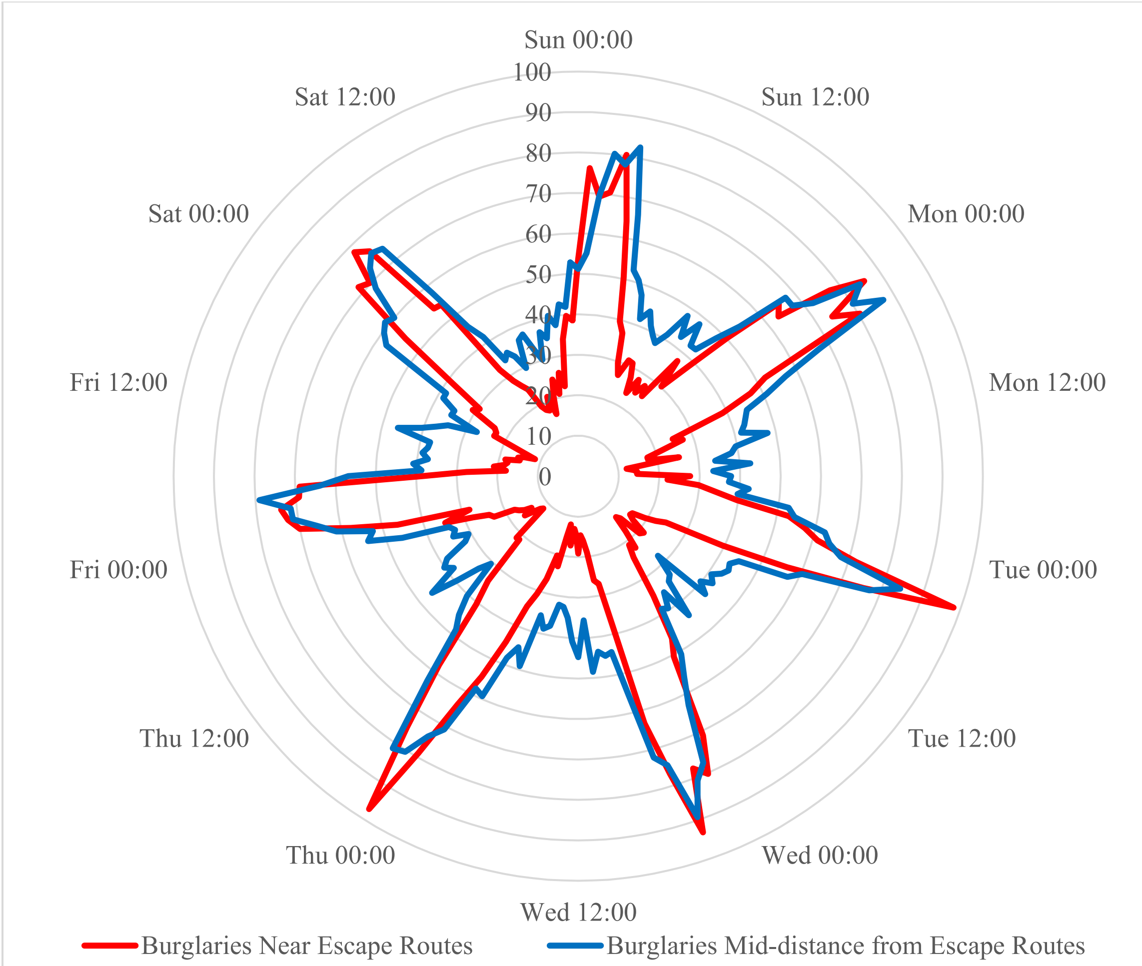

Figure 79: Comparison of Aoristic Temporal Patterns for Commercial Burglaries Near and Mid-distance from Escape Routes

Aoristic Occurrence Times for Commercial Burglaries that are Mid-Distance from Escape Routes

There were 8,326 commercial burglaries that occurred at a mid-distance from escape routes. The distance ranged from a minimum of 350 feet to a maximum of 3,353 feet.

Table 68 shows the aoristic occurrence times for commercial burglaries located at a mid-distance from an escape route. Comparing this data with the data in *Table 69* shows that burglaries mid-distance and far from escape routes tend to occur at similar times. There are small differences in the peak numbers.

Table 68: Aoristic Occurrence Time for Commercial Burglaries Mid-Distance from Escape Routes

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
2400-0059	51.3	67.6	62.5	62.8	58.2	61.3	61.1	424.7
0100-0159	55.1	72.1	64.3	77.3	70.8	65.8	60.0	465.4
0200-0259	69.6	84.3	67.9	80.8	74.3	71.3	68.3	516.5
0300-0359	80.2	80.1	84.3	89.3	80.5	71.5	72.7	558.6
0400-0459	77.9	87.1	77.3	74.8	81.4	79.0	75.2	552.6
0500-0559	82.7	67.5	60.4	72.0	62.9	63.9	74.2	483.6
0600-0659	66.2	56.9	57.4	54.8	48.4	56.8	58.0	398.5
0700-0759	52.7	50.8	44.9	44.3	45.2	38.8	45.9	322.6
0800-0859	50.6	44.8	43.2	44.9	40.4	40.9	41.6	306.5
0900-0959	47.5	43.8	43.8	43.7	30.6	37.4	33.8	280.5
1000-1059	41.7	42.9	42.8	48.5	33.6	38.9	35.3	283.7
1100-1159	44.4	41.7	40.9	35.6	39.4	37.8	33.4	273.3
1200-1259	41.3	48.0	42.4	44.7	46.2	37.6	29.7	290.0
1300-1359	39.4	39.6	39.8	40.8	38.2	46.1	36.7	280.6
1400-1459	38.0	38.3	42.9	35.1	40.1	40.6	37.7	272.5
1500-1559	41.3	34.0	27.8	32.5	38.3	37.1	33.2	244.2
1600-1659	47.9	42.7	33.2	32.1	32.3	34.5	30.1	252.8
1700-1759	42.7	33.4	34.3	37.6	30.6	27.3	36.8	242.8
1800-1859	48.1	37.8	43.9	38.6	34.3	34.8	35.0	272.5
1900-1959	42.5	37.3	35.7	35.6	33.2	34.6	40.3	259.2
2000-2059	42.7	42.2	39.5	49.2	34.3	38.5	37.8	284.2
2100-2159	48.1	39.6	38.7	44.8	46.0	38.5	42.7	298.6
2200-2259	54.4	52.6	50.9	48.2	54.4	57.5	41.9	359.8
2300-2359	67.6	54.4	56.0	59.4	52.5	59.6	52.9	402.4
Total	1,273.9	1,239.4	1,174.7	1,227.5	1,146.2	1,150.2	1,114.1	n=8,326

Figure 80 is a graphical representation of the comparison of the aoristic temporal patterns for commercial burglaries mid-distance and far from escape routes. To keep the patterns on the approximate same scale, the numbers of burglaries per hour for the burglaries far from escape routes are multiplied by two. The burglaries mid-distance from escape routes are shown with the red line and all commercial burglaries are shown with the blue line. This comparison clearly shows that the burglaries mid-distance from escape

routes generally occur in a similar pattern to burglaries far from escape routes. The differences in peak numbers are also clearly visible in the graph.

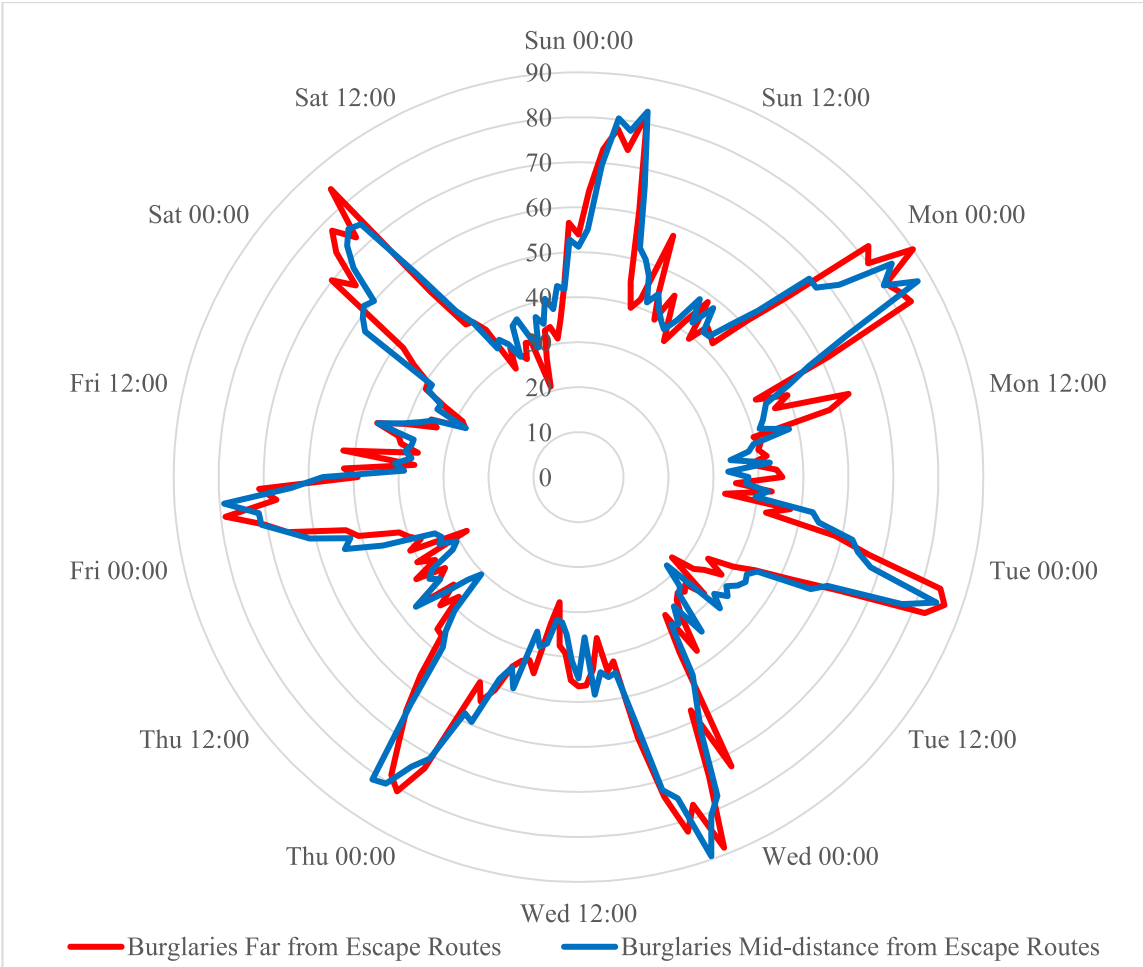

Figure 80: Comparison of Aoristic Temporal Patterns for Commercial Burglaries Mid-Distance and Far from Escape Routes

Aoristic Occurrence Times for Commercial Burglaries that are Far from Escape Routes

There were 4,163 commercial burglaries that occurred far from escape routes. The distance ranged from a minimum of 3,354 feet to a maximum of 116,365 feet.

Table 69 shows the aoristic occurrence times for commercial burglaries that happened far from an escape route. Comparing this data with the data in *Table 67* shows that burglaries near and far from escape routes tend to occur at similar times. There are some differences in the peak numbers, but there are more differences in the off-peak numbers.

Table 69: Aoristic Occurrence Time for Commercial Burglaries Far from Escape Routes

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
2400-0059	27.0	41.2	29.3	28.8	25.3	26.5	35.1	213.2
0100-0159	31.8	40.0	33.4	36.3	36.6	32.9	32.7	243.8
0200-0259	36.5	45.0	42.1	44.3	40.3	35.3	36.7	280.3
0300-0359	38.9	40.4	43.1	38.6	39.1	39.5	38.8	278.4
0400-0459	36.8	41.2	41.4	41.2	35.4	33.7	36.4	266.0
0500-0559	41.1	41.8	31.5	36.8	32.2	35.5	42.2	261.2
0600-0659	30.4	30.9	26.1	29.7	28.2	24.6	26.3	196.3
0700-0759	22.5	21.5	22.1	20.8	23.3	26.1	21.1	157.4
0800-0859	19.7	24.9	19.9	21.8	23.0	18.3	20.9	148.6
0900-0959	20.9	23.2	17.0	18.0	18.8	26.3	19.3	143.5
1000-1059	28.8	31.4	19.2	21.5	21.0	18.1	13.9	154.0
1100-1159	22.3	28.9	17.4	23.2	18.3	20.1	16.2	146.3
1200-1259	19.4	20.0	16.4	23.3	23.1	20.5	15.1	137.8
1300-1359	22.8	20.6	13.7	22.6	19.3	23.2	14.3	136.4
1400-1459	20.0	20.2	19.1	19.7	18.0	20.1	16.0	133.0
1500-1559	17.8	21.0	16.8	18.9	21.3	16.7	15.9	128.4
1600-1659	20.9	19.1	17.4	14.1	18.4	17.6	10.5	117.9
1700-1759	24.2	22.0	16.9	16.5	20.3	13.8	13.6	127.3
1800-1859	19.7	22.7	17.5	22.3	13.8	14.3	16.7	127.0
1900-1959	22.0	17.5	19.3	21.1	20.4	16.9	17.0	134.2
2000-2059	21.5	21.5	23.4	21.4	18.9	19.6	15.6	141.8
2100-2159	21.1	16.4	18.1	22.3	20.0	19.8	17.7	135.3
2200-2259	25.5	23.8	22.5	25.4	20.9	22.1	21.2	161.5
2300-2359	30.9	21.2	36.4	27.2	25.3	24.2	28.3	193.4
Total	622.6	656.5	580.0	615.7	581.1	565.5	541.5	n=4,163

Figure 81 is a graphical representation of the comparison of the aoristic temporal patterns for commercial burglaries near and far from escape routes. The burglaries far from escape routes are shown with the red line and burglaries near escape routes are shown in blue. This graph shows that the burglaries far from escape routes generally occur in a similar pattern as the burglaries near escape routes. The graph also shows how

the burglaries far from escape routes do not drop as low between the peaks as do the burglaries near escape routes.

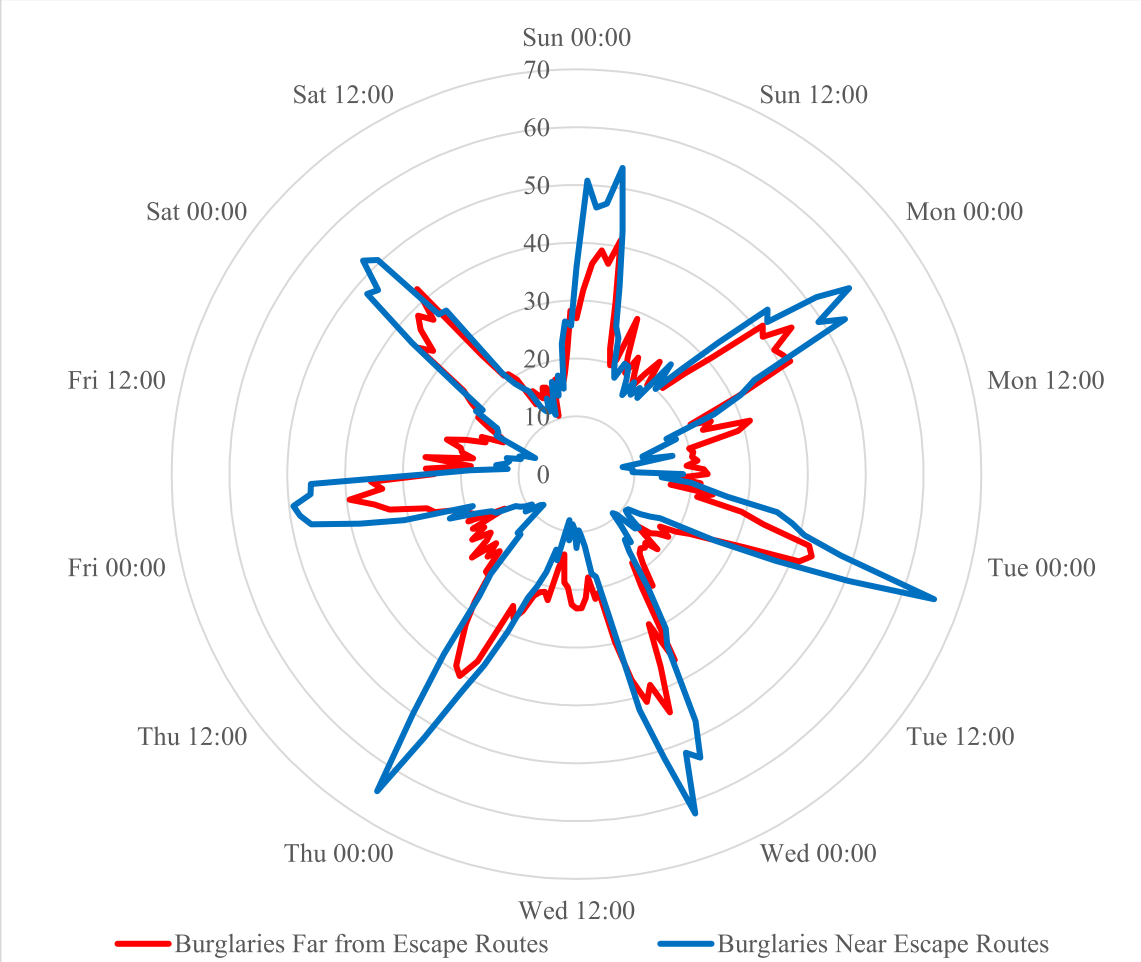

Figure 81: Comparison of Aoristic Temporal Patterns for Commercial Burglaries Near and Far from Escape Routes

Occurrence Times for Commercial Alarms that are Near Escape Routes

There were 32,004 commercial alarms near escape routes. The distance ranged from a minimum of zero feet to a maximum of 116 feet. As mentioned earlier, a distance of zero feet means the business that was burglarized lies alongside a highway or major thoroughfare.

Table 70 shows the occurrence times for commercial alarms near escape routes. Comparing this data with the data in *Table 71* shows that alarms close to escape routes tend to occur at similar times as alarms that occur mid-distance from escape routes. Most commercial alarms happen on weekends (Friday evening through Monday morning). Alarms near escape routes occur more often on Saturday while mid-distance alarms occur more often on Sunday. There are also differences in the times for the peak number of alarms.

Table 70: Occurrence Time for Commercial Alarms Near Escape Routes

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
2400-0059	275	299	297	323	327	336	317	2,174
0100-0159	295	278	315	312	279	263	285	2,027
0200-0259	285	231	275	290	246	297	301	1,925
0300-0359	269	227	286	252	250	264	290	1,838
0400-0459	254	279	229	257	256	270	267	1,812
0500-0559	211	234	287	264	222	278	268	1,764
0600-0659	178	236	254	254	242	257	237	1,658
0700-0759	205	215	231	224	195	249	256	1,575
0800-0859	263	226	223	237	202	206	313	1,670
0900-0959	240	127	164	137	137	122	245	1,172
1000-1059	205	60	56	71	74	55	159	680
1100-1159	212	50	46	44	50	47	94	543
1200-1259	169	50	39	31	47	34	89	459
1300-1359	186	33	28	37	41	40	149	514
1400-1459	172	45	34	33	26	39	130	479
1500-1559	156	52	37	39	48	59	142	533
1600-1659	175	53	54	42	43	57	175	599
1700-1759	182	98	80	85	96	76	180	797
1800-1859	236	178	145	151	159	163	200	1,232
1900-1959	220	196	205	221	206	218	215	1,481
2000-2059	189	212	240	189	243	229	207	1,509
2100-2159	181	246	270	243	277	280	202	1,699
2200-2259	255	280	286	268	272	269	244	1,874
2300-2359	263	341	287	277	302	276	244	1,990
Total	5,276	4,246	4,368	4,281	4,240	4,384	5,209	n=32,004

Figure 82 is a graphical representation of the comparison of the temporal patterns for commercial alarms near and mid-distance from escape routes. To keep the two patterns on approximately the same scale for ease of comparison, the number of alarms

per hour for the alarms near escape routes was multiplied by two. The alarms near escape routes are shown with the red line and the mid-distance alarms are shown in blue. This graph shows that the alarms near escape routes generally occur in a similar temporal pattern as the mid-distance commercial alarms. The differences in peak numbers is visible in the graph. The most outstanding point made with the graph is that the single highest number of alarms near escape routes happens on Tuesday at 3:00 a.m., even though Tuesday does not have the highest number of alarms overall.

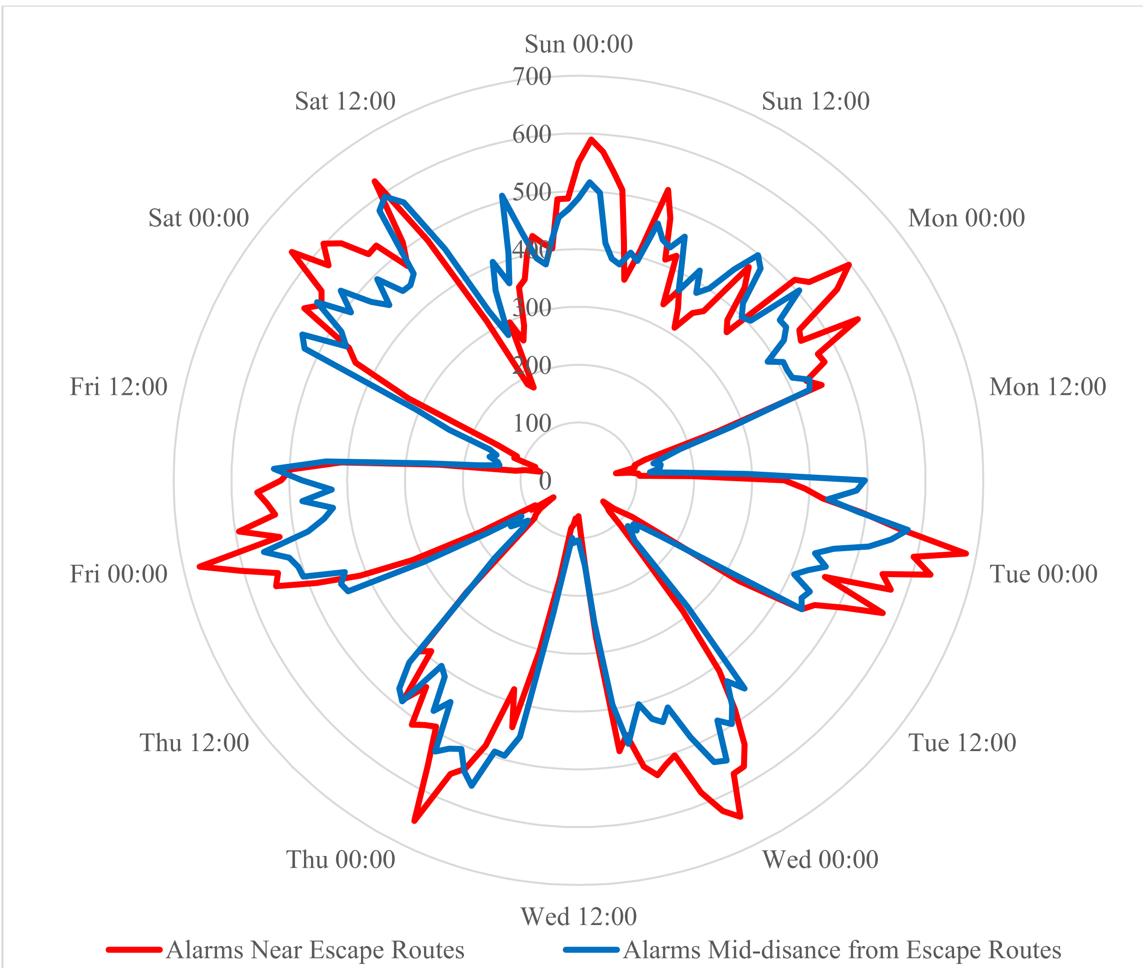

Figure 82: Comparison of Temporal Patterns for Commercial Alarms Near and Mid-distance from Escape Routes

Occurrence Times for Commercial Alarms that are Mid-Distance from Escape Routes

There were 63,959 commercial alarms that occurred at a mid-distance from escape routes. The distance route ranged from a minimum of 117 feet to a maximum of 2,434 feet.

Table 71 shows the occurrence times for commercial alarms located at a mid-distance from an escape route. Comparing this data with the data in *Table 72* shows that alarms mid-distance and far from escape routes tend to occur at similar times. There are some differences in the peak numbers, especially on Thursday evening and Saturday morning and evening.

Table 71: Occurrence Time for Commercial Alarms Mid-Distance from Escape Routes

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
2400-0059	488	445	515	541	515	558	526	3,588
0100-0159	516	446	457	485	531	476	473	3,384
0200-0259	499	430	428	422	443	445	446	3,113
0300-0359	413	386	453	443	471	427	492	3,085
0400-0459	388	409	426	432	411	479	447	2,992
0500-0559	380	408	407	401	399	427	445	2,867
0600-0659	404	410	444	429	489	478	457	3,111
0700-0759	393	436	436	464	475	527	580	3,311
0800-0859	465	429	446	392	430	438	594	3,194
0900-0959	441	280	251	249	266	260	568	2,315
1000-1059	433	183	172	148	197	174	462	1,769
1100-1159	460	154	136	122	125	139	331	1,467
1200-1259	411	133	122	104	112	143	279	1,304
1300-1359	371	145	133	105	126	159	358	1,397
1400-1459	419	142	116	109	141	148	406	1,481
1500-1559	383	124	131	100	116	163	361	1,378
1600-1659	402	178	142	138	181	240	412	1,693
1700-1759	454	292	290	235	302	306	510	2,389
1800-1859	498	495	461	455	442	526	440	3,317
1900-1959	483	481	432	493	448	540	391	3,268
2000-2059	418	433	471	491	434	464	378	3,089
2100-2159	399	487	498	560	504	484	417	3,349
2200-2259	406	576	480	541	507	547	456	3,513
2300-2359	504	550	548	507	518	489	469	3,585
Total	10,428	8,452	8,395	8,366	8,583	9,037	10,698	n=63,959

Figure 83 is a graphical representation of the comparison of the temporal patterns for commercial alarms mid-distance and far from escape routes. To keep the two patterns on approximately the same scale for ease of comparison purposes, the number of burglaries per hour that occurred far from escape routes was multiplied by two. The alarms mid-distance from escape routes are shown with the blue line and the alarms far from escape routes are shown in red. This graph shows that the alarms mid-distance and far from escape routes generally occur in similar patterns. The differences in peak numbers are also visible in the graph.

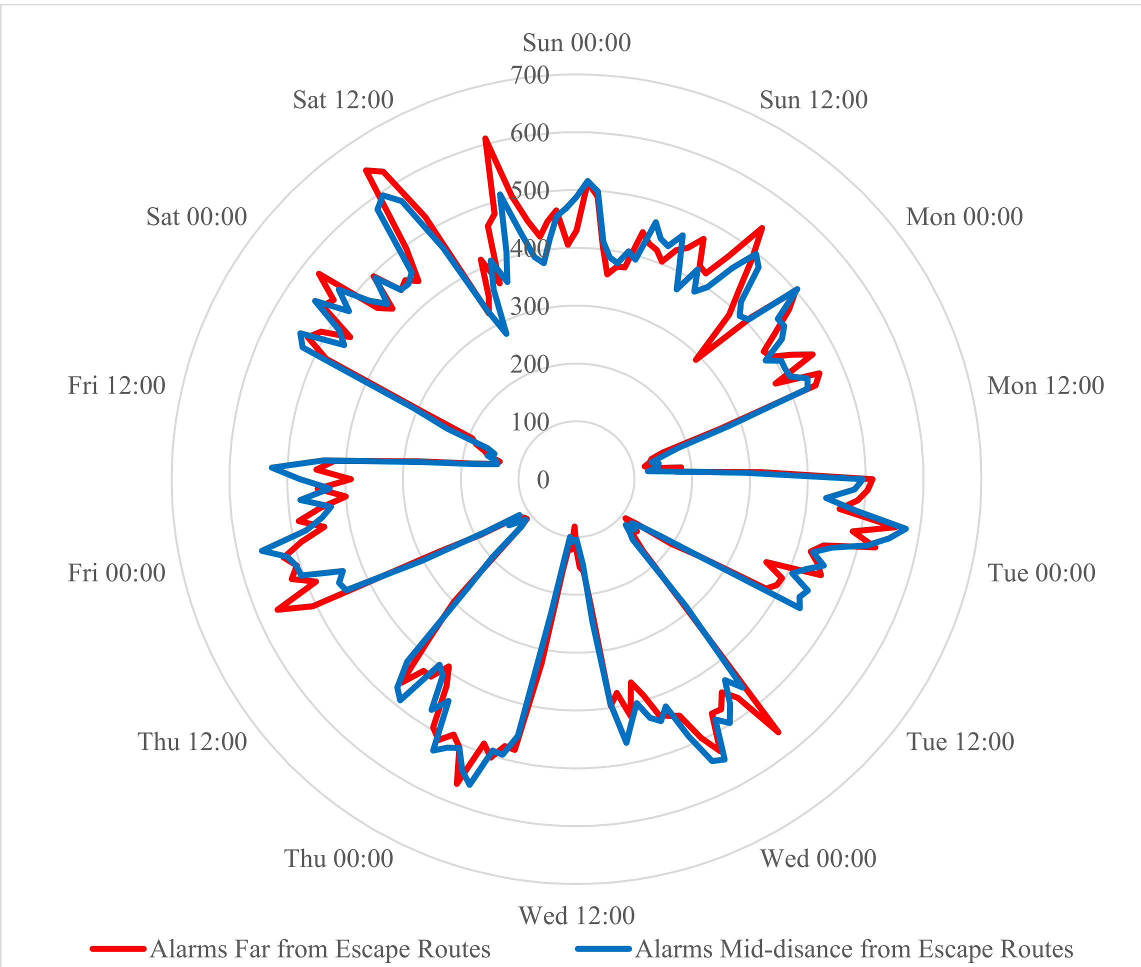

Figure 83: Comparison of Temporal Patterns for Commercial Alarms Mid-Distance and Far from Escape Routes

Occurrence Times for Commercial Alarms that are Far from Escape Routes

There were 32,003 commercial alarms that occurred far from escape routes. The distance ranged from a minimum of 2,435 feet to a maximum of 66,785 feet.

Table 72 shows the occurrence times for commercial alarms located far from an escape route. Comparing this data with the data in *Table 70* shows that alarms near and far from escape routes tend to occur at similar times. There are some differences in the peak numbers and when they occur. Alarms far from escape routes tend to occur more often on weekends while those near escape routes tend to occur more often on weekdays.

Table 72: Occurrence Time for Commercial Alarms Far from Escape Routes

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
2400-0059	215	235	265	248	245	244	285	1,737
0100-0159	257	214	221	223	255	222	227	1,619
0200-0259	245	196	212	220	248	243	217	1,581
0300-0359	203	199	221	216	211	223	248	1,521
0400-0459	179	215	227	195	196	200	223	1,435
0500-0559	187	231	179	182	212	224	227	1,442
0600-0659	188	191	197	210	212	195	219	1,412
0700-0759	221	229	196	188	232	225	248	1,539
0800-0859	213	222	189	198	185	210	323	1,540
0900-0959	210	132	123	109	150	138	314	1,176
1000-1059	202	78	99	80	91	91	262	903
1100-1159	216	67	65	76	64	72	162	722
1200-1259	222	65	54	62	55	68	175	701
1300-1359	235	60	69	41	56	79	207	747
1400-1459	213	64	64	61	59	83	182	726
1500-1559	210	91	71	59	65	92	232	820
1600-1659	233	86	84	80	96	97	240	916
1700-1759	270	160	135	162	134	142	305	1,308
1800-1859	243	256	280	240	253	240	251	1,763
1900-1959	215	252	235	239	282	263	227	1,713
2000-2059	194	244	223	252	242	255	212	1,622
2100-2159	146	229	235	242	261	231	224	1,568
2200-2259	206	279	234	283	253	266	233	1,754
2300-2359	250	243	266	253	262	261	203	1,738
Total	5,173	4,238	4,144	4,119	4,319	4,364	5,646	32,003

Figure 84 is a graphical representation of the comparison of the temporal patterns for commercial alarms near and far from escape routes. The alarms far from escape

routes are shown with the red line and the alarms near escape routes are shown in blue. This graph shows that alarms near and far from escape routes generally occur in similar patterns. The differences in which days have alarms most often are visible in the graph.

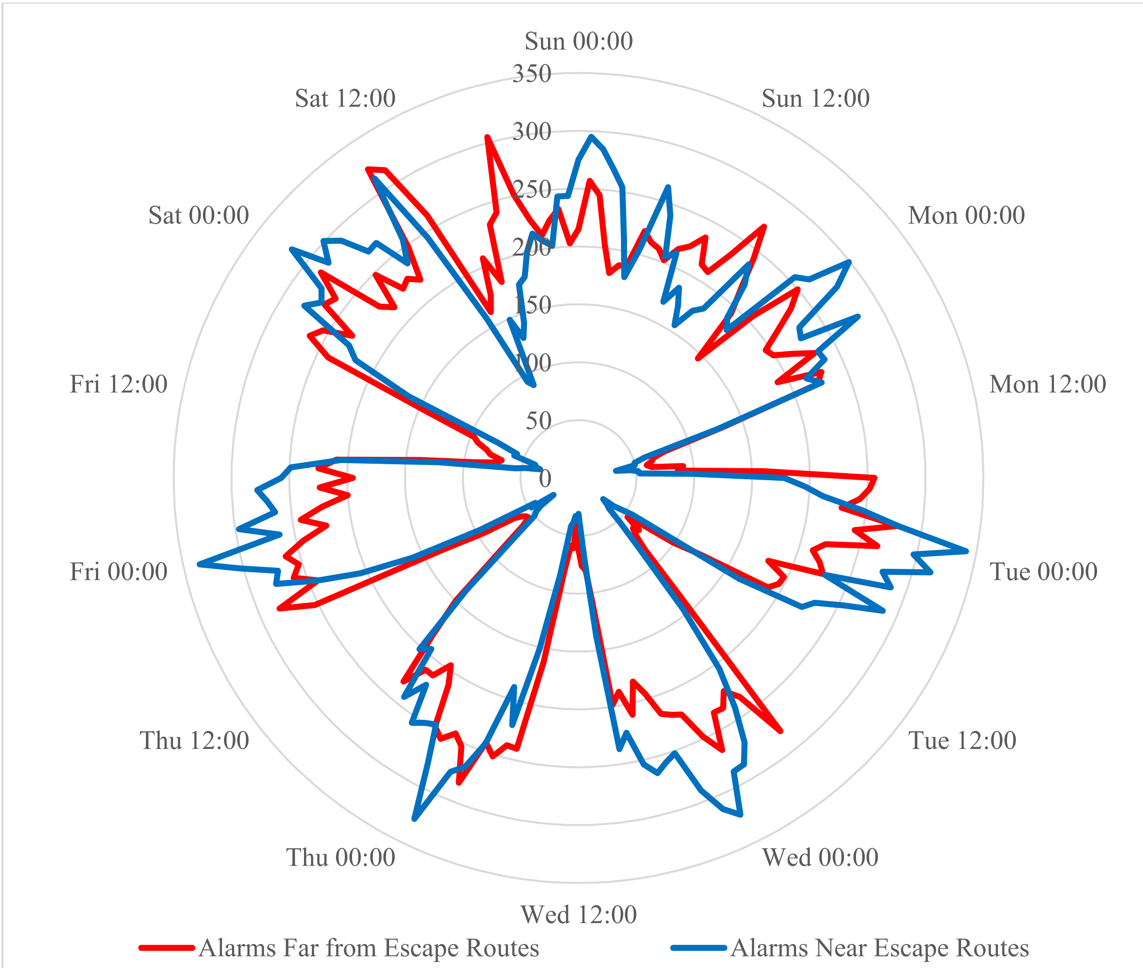

Figure 84: Comparison of Temporal Patterns for Commercial Alarms Near and Far from Escape Routes

Discussion

Comparison of Occurrence Times for Residential Burglaries by Proximity of Escape Routes. The distance from escape routes grouping for residential burglaries was based on quartiles. As a result, approximately one-quarter of the residential burglaries occurred near escape routes, half occurred at a mid-distance from escape routes, while the remaining quarter occurred far from escape routes. Residential burglaries in all three areas generally follow the same time patterns as each other, but there are small differences between the three areas.

Residential burglaries close to escape routes tended to see higher peaks on Saturday and Sunday while burglaries further from escape routes tended to see higher peaks during the work week. *Figure 73* showed the comparison of temporal patterns for burglaries near and mid-distance from escape routes, *Figure 74* showed the comparison of temporal patterns for burglaries mid-distance and far from escape routes, and *Figure 75* showed the comparison of temporal patterns for burglaries near and far from escape routes.

The study of the tables and graphs leads to the conclusion that the proximity of residential burglary to an escape route affects when they occur. If the burglary is close to an escape route (within approximately 0.25 mile), the burglary is slightly more likely to occur on a weekend.

Comparison of Occurrence Times for Residential Alarms by Proximity of Escape Routes. The distance from escape routes grouping for residential alarms also was based on quartiles and approximately one-quarter of the residential alarms occurred near escape routes, half occurred at a mid-distance from escape routes, while the remaining quarter occurred far from escape routes. Residential alarms in all three areas generally follow the same time patterns as each other. There are, however, small differences between the three areas.

Residential alarms near (closer than approximately 0.3 mile) from escape routes are slightly more likely to occur on Tuesday or Friday than alarms further from escape routes. Alarms in all three distance groupings had generally similar patterns with some variation in the exact peak times. *Figure 76* showed the comparison of temporal patterns for residential alarms near and mid-distance from escape routes, *Figure 77* showed the comparison of temporal patterns for mid-distance and far from escape routes, and *Figure 78* showed the comparison of temporal patterns for alarms near and far from escape routes.

The study of the tables and graphs leads to the conclusion that the proximity of residential alarm to an escape route affects when they occur, but only if it is close to the escape route and it has a very slight effect even then.

Comparison of Occurrence Times for Commercial Burglaries by Proximity of Escape Routes. The distance from escape routes grouping for commercial burglaries was based on quartiles. As a result, approximately one-quarter of the commercial burglaries occurred near escape routes, half occurred at a mid-distance from escape routes, while the remaining quarter occurred far from escape routes. Commercial burglaries in all three areas generally follow the same time patterns as each other. There are, however, differences between the three areas.

Figure 79 showed the comparison of aoristic temporal patterns for commercial burglaries near and mid-distance from escape routes, *Figure 80* showed the comparison of aoristic temporal patterns for mid-distance and far from escape routes, and *Figure 81* showed the comparison of aoristic temporal patterns for burglaries near and far from escape routes.

Commercial burglaries near escape routes (closer than approximately 350 feet) had a higher peak on Tuesday and Thursday mornings than other days. They also tended to have a narrower time period for a peak each day and had fewer burglaries that did not occur in peak times. Burglaries that occurred further from escape routes tended to spread out their occurrence time throughout the day and week more than those near escape routes.

The study of the tables and graphs leads to the conclusion that the proximity of commercial burglary to an escape route affects when they occur, burglaries near an escape route tending to occur more closely in time to each other.

Comparison of Occurrence Times for Commercial Alarms by Proximity of Escape Routes. The distance from escape routes grouping for commercial alarms was also based on quartiles. As a result, approximately one-quarter of the commercial alarms occurred near escape routes, half occurred at a mid-distance from escape routes, while the remaining quarter occurred far from escape routes. Commercial alarms in all three areas generally follow the same time patterns as each other, but there are observable differences between the three areas.

Figure 82 showed the comparison of temporal patterns for commercial alarms near and mid-distance from escape routes, *Figure 83* showed the comparison of temporal patterns for mid-distance and far from escape routes, and *Figure 84* showed the comparison of temporal patterns for alarms near and far from escape routes. The differences are primarily the number of calls at peak numbers, but with the time pattern at the peak also varying among them. The alarms that occurred near escape routes (within approximately 125 feet) tended to peak slightly later in the peak time period than alarms further from escape routes.

The study of the tables and graphs leads to the conclusion that the proximity of commercial alarms to an escape route affects when they occur, especially for alarms that are close to the escape route.

Chapter Conclusion

The occurrence time for residential alarms and burglaries based on the proximity of the nearest escape route was examined in this chapter. Separately examined in this chapter were the occurrence times for commercial alarms and burglaries when classified in the same way. The following sections compare the alarms and burglaries to each other, separated by target type.

Comparison of Occurrence Times for Residential Alarms and Burglaries by Proximity of Escape Routes. A comparison of the data in *Table 61* and *Table 64* shows that residential alarms and residential burglaries that are close to the nearest escape route follow the same time pattern fairly closely. There are some differences, mostly in the time and numbers of the peak. There is a difference in weekend patterns where alarms tend to have large peaks on Saturday and Sunday while burglaries do not increase as much.

Figure 85 shows a graphical representation of this comparison. To keep the two patterns on approximately the same scale for ease of comparison, the number of burglaries per hour was multiplied by 2.5. This graph shows the differences in the peaks that was discussed above.

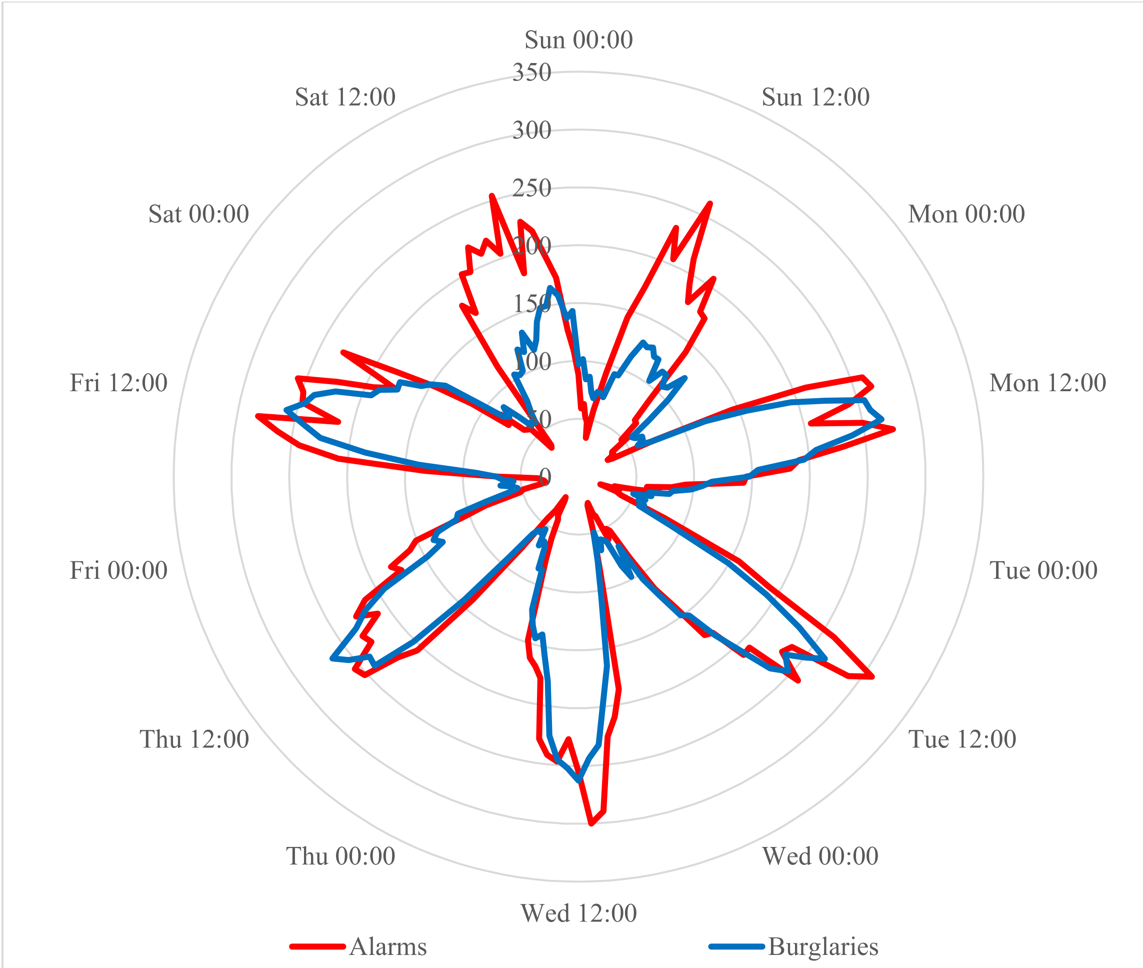

Figure 85: Comparison of the Aoristic Burglary Temporal Pattern to the Alarm Temporal Pattern for Residential Burglaries and Alarms Near Escape Routes

A comparison of the data in *Table 62* and *Table 65* also shows similar patterns for residential burglaries and alarms when they are mid-distance from the nearest escape route. There are slight differences in the details of the peaks. There is a difference in weekend patterns where alarms tend to have large peaks on Saturday and Sunday while burglaries do not increase as much.

Figure 86 shows a graphical representation of this comparison. To keep the two patterns on approximately the same scale for ease of comparison, the number of burglaries per hour was multiplied by two. This graph shows the differences in the peaks that was discussed above.

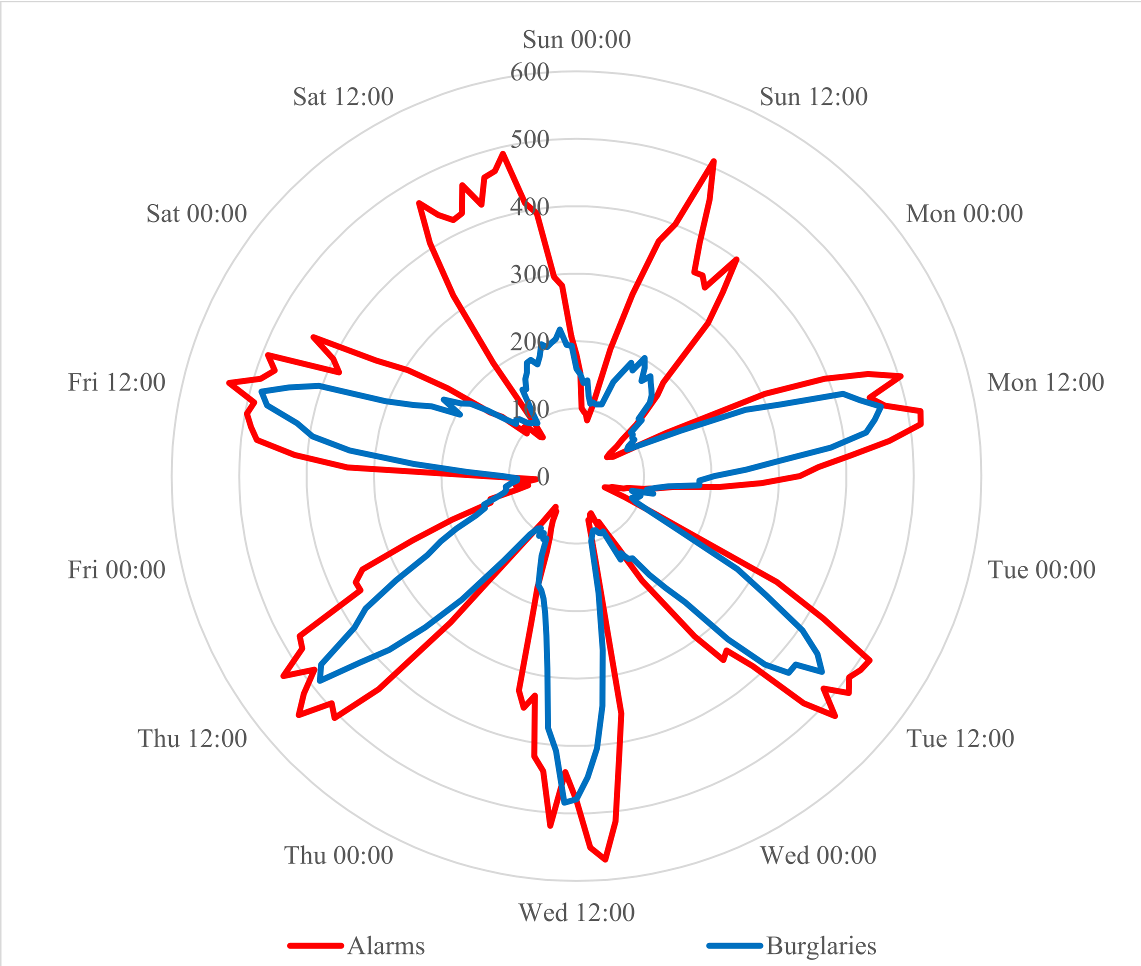

Figure 86: Comparison of the Aoristic Burglary Temporal Pattern to the Alarm Temporal Pattern for Residential Burglaries and Alarms Mid-distance from Escape Routes

A comparison of the data in *Table 63* and *Table 66* also shows similar patterns for residential burglaries and alarms that are far from escape routes. As with incidents that are close to or mid-distance from escape routes, both the burglaries and alarms have minor differences in the weekday peaks but show large differences on weekends, with alarms showing a peak in the range of the weekday peak and burglaries showing a much lower peak.

Figure 87 shows a graphical representation of this comparison. To keep the two patterns on approximately the same scale for ease of comparison, the number of burglaries per hour was multiplied by two. This graph shows the differences in the peaks that was discussed above.

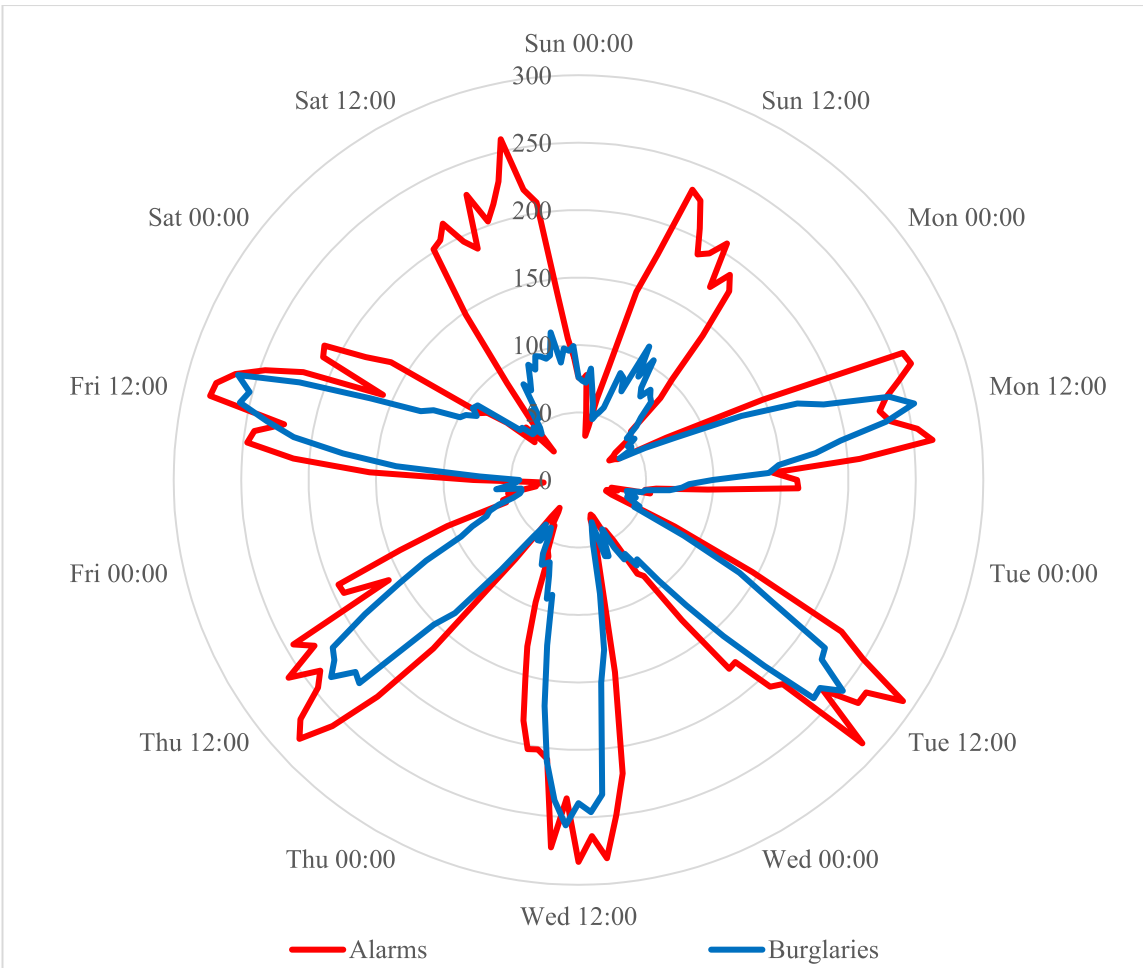

Figure 87: Comparison of the Aoristic Burglary Temporal Pattern to the Alarm Temporal Pattern for Residential Burglaries and Alarms Far from Escape Routes

Comparison of Occurrence Times for Commercial Alarms and Burglaries by Proximity of Escape Routes. A comparison of the data in *Table 67* and *Table 70* shows that commercial alarms and commercial burglaries that occur near escape routes follow generally similar time patterns. The largest difference appears to be that alarms tend to have a much wider peak in general, that is, the time period when the most alarms occur is wider than when the most burglaries occur. Alarms also tend to have a higher number occur during most hours on weekends while burglaries tend to drop during the non-peak times on weekends.

Figure 88 shows a graphical representation of this comparison. To keep the two patterns on approximately the same scale for ease of comparison, the number of burglaries per hour was multiplied by five. This graph shows the differences in the peaks and weekend patterns that was discussed above.

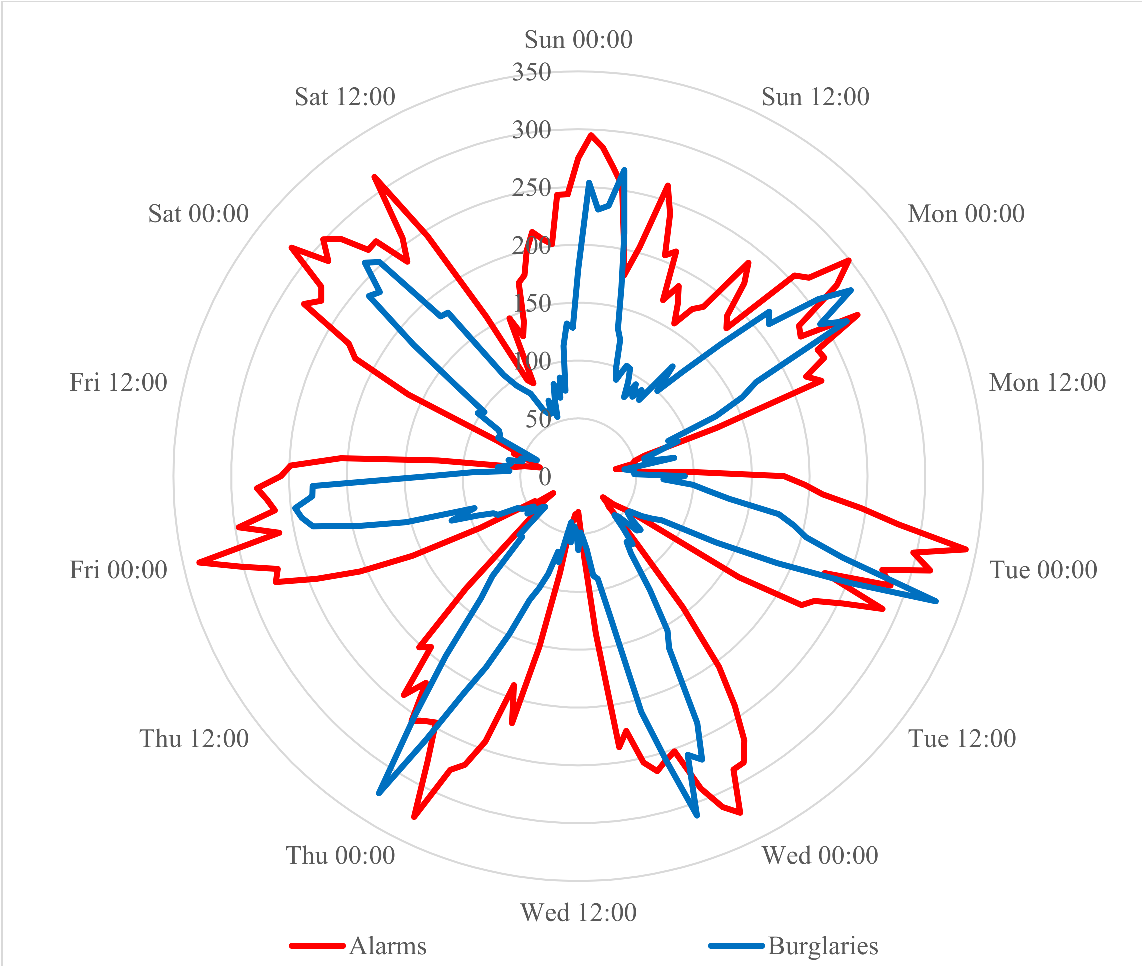

Figure 88: Comparison of the Aoristic Burglary Temporal Pattern to the Alarm Temporal Pattern for Commercial Burglaries and Alarms Near Escape Routes

A comparison of the data in *Table 68* and *Table 71* also shows similar patterns for commercial burglaries and alarms that occur a mid-distance from the nearest escape route. The differences between the alarms and burglaries is very similar to the differences that were observed in burglaries and alarms near escape routes.

Figure 89 shows a graphical representation of this comparison. To keep the two patterns on approximately the same scale for ease of comparison, the number of burglaries per hour was multiplied by six. This graph shows the differences in the peaks and weekend patterns that was discussed above.

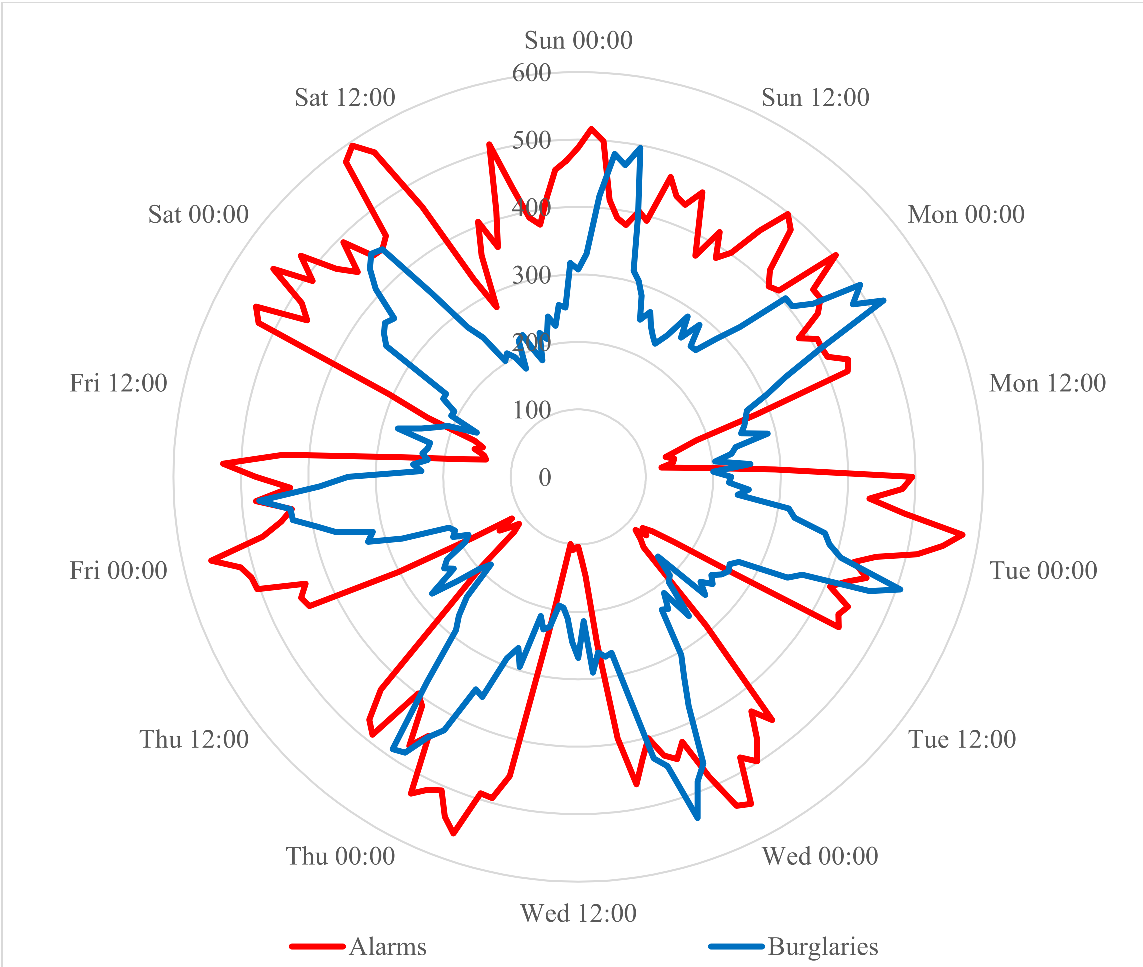

Figure 89: Comparison of the Aoristic Burglary Temporal Pattern to the Alarm Temporal Pattern for Commercial Burglaries and Alarms Mid-distance from Escape Routes

A comparison of the data in *Table 69* and *Table 72* also shows similar patterns for commercial burglaries and alarms that occur far from escape routes. The differences between the alarms and burglaries that occur far from escape routes is also very similar to the differences that were observed in burglaries and alarms near escape routes.

Figure 90 shows a graphical representation of this comparison. To keep the two patterns on approximately the same scale for ease of comparison, the number of burglaries per hour was multiplied by six. This graph shows the differences in the peaks and weekend patterns that was discussed above.

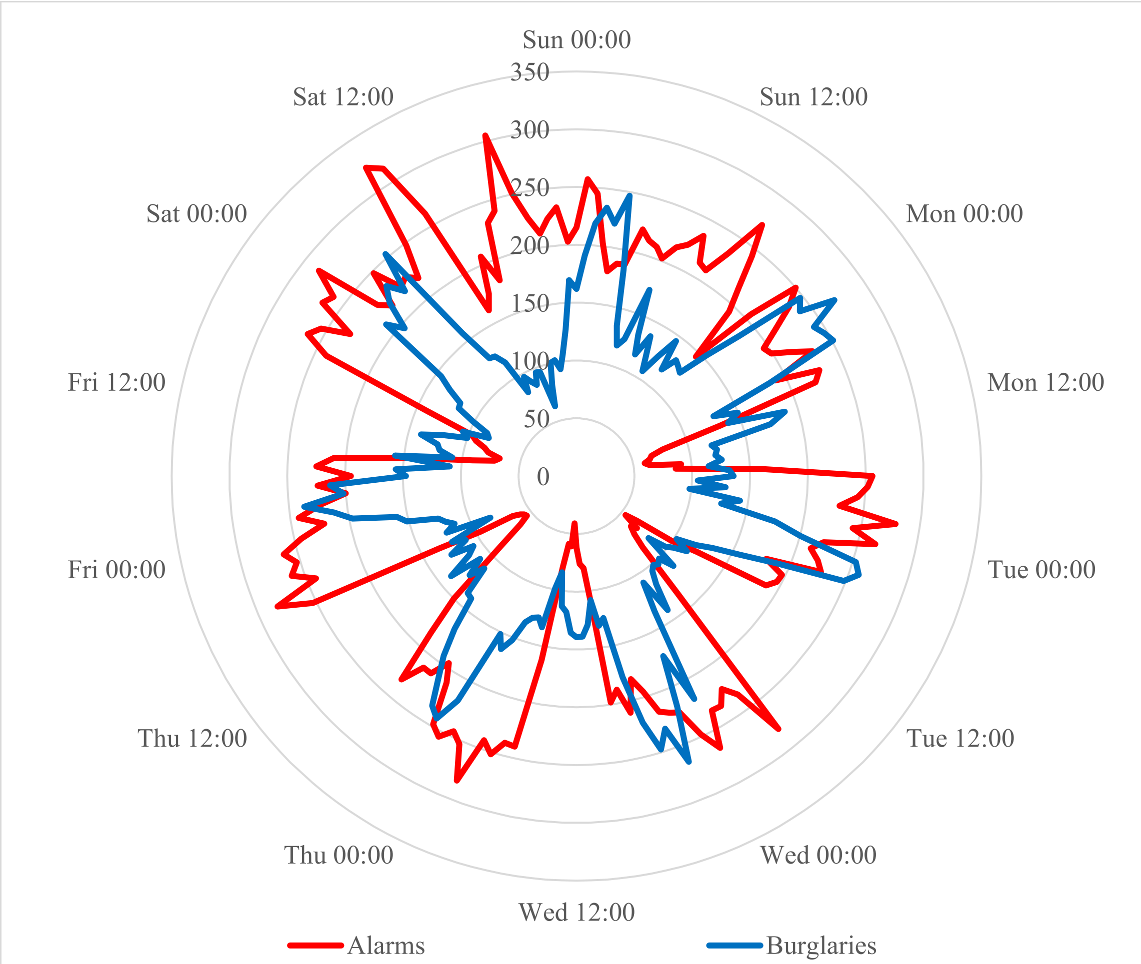

Figure 90: Comparison of the Aoristic Burglary Temporal Pattern to the Alarm Temporal Pattern for Commercial Burglaries and Alarms Far from Escape Routes

Conclusion. When viewing burglaries and classifying them by the proximity of the nearest escape route, it has been shown that there are differences in when these incidents occur. This is true whether the target type is commercial or residential. When examining alarms for the same effect, the time difference is also seen for residential and commercial alarms.

In the case of residential alarms and police-coded burglaries, escape-route patterns have very similar shapes. In the case of commercial burglary, these patterns are less dependable.

XI: CONCLUSION

This dissertation has reviewed that burglary is a problem worth studying and that one of the challenges in studying burglary is that we do not know precisely when they occur. In general, burglary is a crime that occurs at an unknown time when there are no witnesses and the victim can only give the police a range of times, from when he or she last knew the location was secure to when he or she found it had been burglarized.

During the initial research for this dissertation, an apparent correlation was noticed where burglar alarm calls to the police and burglaries appeared to be happening at approximately the same times. Burglar alarm calls happen at a single known point in time. The parallels in alarm times and police-coded burglary times opens up the future possibility for predicting overall burglary from alarm times.

Analyses

Target Type. Since the literature almost always separates burglaries by target type, this approach was followed. The alarms and burglaries were separated by whether they were for commercial locations, residential locations, or unknown. Locations where the target could not be identified as either commercial or residential were not included in further study.

When the burglaries and alarms are separated by target type, there is a similarity in the temporal patterns for alarms and burglaries. There is very little similarity in the temporal patterns of commercial and residential burglaries or alarms, confirming that the incidents should be studied separately. After verifying this distinction, all other testing was conducted for commercial and residential burglaries and alarms separately.

Repeat or Non-repeat Burglaries. The next question is whether parallel timing between alarm and police-coded burglaries holds up for repeat or near-repeat burglaries. To test if an alarm was a repeat, it was matched to if a burglary had occurred within two weeks prior to the alarm and within the distance specified (100 meters for a residential alarm or 200 meters if a commercial alarm).

Residential alarms and burglaries occurred in similar temporal patterns when classified as repeat or non-repeat. There is enough of a difference in the temporal patterns between repeat and non-repeat incidents to confirm that repeat status affects when the incidents occur.

Commercial repeat burglaries and alarms also occurred in similar temporal patterns. Commercial non-repeat burglaries and alarms had generally similar patterns, but with more differences than the repeat burglaries and alarms.

Number of Burglaries in Area. This analysis tested if the number of burglaries in an area made a difference in the ability of alarm times to predict the times of the burglaries. The area used was the police district that each incident was located in. The districts were assigned as high, medium, or low burglary areas based on the number of residential or commercial burglaries that occurred within it.

When the temporal patterns of burglaries and alarms were compared based on the level of burglary in an area, a similarity was observed in both residential and commercial incidents, though the similarity for commercial incidents was not as great. A difference in the patterns, especially for low burglary areas, was observed.

Proximity of Schools. This analysis checked if the there was a similarity in the temporal patterns of alarms and burglaries based on the proximity to a public school. A school was defined as any institution that taught 9th, 10th, 11th, or 12th grade and received public funding. This included schools run by the local school district as well as charter schools.

The residential alarms and burglaries had a greater similarity in their temporal patterns than did the commercial burglaries and alarms. In both commercial and residential incidents, there were differences in the temporal patterns observed based on the distance to the nearest public school.

Proximity of Bars. This analysis checked for the similarity in the temporal patterns of alarms and burglaries based on the proximity to a bar. A bar was defined as a business that makes more than 50% of its revenue from the sale of alcoholic beverages for consumption on the premises.

Similarities in the temporal patterns of residential burglaries and alarms were observed. The similarity observed was not as strong in commercial burglaries and alarms. In both commercial and residential alarms and burglaries, there was a difference observed based on the proximity of the nearest bar.

Proximity of Escape Routes. This analysis checked for similarities in the temporal patterns of residential and commercial burglaries and alarms based on the proximity of an escape route. An escape route was defined as a highway or major thoroughfare that was owned or maintained by the Texas Department of Transportation instead of the City of San Antonio.

Residential burglaries and alarms occurred in generally similar patterns. Commercial burglaries and alarms were not as similar. In both residential and commercial burglaries and alarms, differences were observed based on the straight-line distance to the nearest escape route.

Conclusion

The occurrence times for residential alarms and police-coded residential burglaries have very similar patterns. The occurrence times for commercial alarms and police-coded commercial burglaries are somewhat parallel, but not as similar as the temporal patterns for residential burglary. Burglaries appear to occur at different times depending on whether they are commercial or residential. Burglaries also appear to occur at different times when comparing repeat or near-repeat burglaries to non-repeat burglaries. Temporal patterns also vary with the level of burglary in an area and by proximity to schools, bars, and escape routes.

Further Research

There is disagreement in the literature on what land uses affect the odds of a burglary occurring. There was some research that suggested that the size of a business, what it sold, and whether it catered to local residents or other people affected burglaries (Yu & Maxfield, 2014). This study indicated that restaurants also affect the odds of a burglary. The research on proximity to schools indicates that part of the increase was based on after hours use as a gathering place (Roncek & LoBosco, 1983). The combination of these implies that there may be other types of land use, such as parks, which affect burglary. The lack of a definitive answer justifies more research into how land use in the area affects burglaries.

In this study we also found a similarity in the temporal patterns of alarms to burglaries. This was especially true with residential alarms. This similarity may be coincidental or may be revealing of a previously undetected relationship between burglaries and police-coded false alarms. More research is needed in this area to further explore the cause for the relationship between burglaries and false alarms.

Policy Implications

This research has implications for police patrol operations and policies. Currently, police patrols do not perform well at arresting burglars as they commit their offenses. Knowing when and where burglaries are occurring should help patrolmen in arresting burglars as they commit crimes or in deterring the crime by police presence in the area. Knowing to vary the patrol based on the time and the various factors that affect when burglaries occur should also improve the effectiveness of police in preventing burglaries or arresting burglars.

The similarity of the temporal patterns of alarms and burglaries should be considered by police. If there is a relationship between burglaries and alarms, then police may need to be more alert when answering an alarm call, especially looking for people in the area that may be leaving an attempted burglary.

Limitations

This research was conducted using the data from one police department in Texas. Several definitions in it are based on Texas law. Among these definitions that may make a difference in this research is the legal definition of a burglary in Texas. The traditional definition of a burglary is a person entering a property without permission, usually to take property. Texas includes in the definition entering the property with the intent to steal, with the intent to commit any felony, or with the intent to commit any assault. This may be different than the definition of a burglary used in another state, possibly affecting the results of a similar study done in that area.

Texas also defines a building as a habitat if it is used for human habitation. This dissertation used the definition of habitation to define residential burglaries. Texas does not identify burglaries of other buildings as commercial or not, just as burglary of a building. This dissertation used the building definition for commercial burglaries. If a garage is a separate structure from the house, in Texas it would be a building and not a habitation. This may have resulted in some burglaries being incorrectly classified as commercial when they were in fact residential. Information on the accurate use of the property may change the results of the study.

Texas has different agencies responsible for maintenance of the streets based on whether or not they are designated as part of the state or federal highway system. The definition of an escape route depended on this feature. In a different area, a different definition of an escape route might also change the results of this study.

Every police department makes their own procedures and policies for handling burglar alarms. In the data used for this dissertation, approximately one-third of the alarms could not be classified as either residential or commercial alarms. Different procedures on how to assign alarms as residential or commercial could affect the results of the study.

APPENDIX SECTION

APPENDIX A

SAPD Dispatch Call Types

Dispatch Call Type
911 Hang Up
Abandoned Vehicle
Accident Major
Accident Major Officer
Accident Minor
Accident Minor Officer
Accident Private Property
Animal Related
Assault
Assault In Progress
Assist the Public
Bomb with Device
Burglary
Burglary (In Progress)
Burglary Alarm
Burglary Alarm In Progress
Burglary Vehicle
Burglary Vehicle In Progress
Cancel Alarm
Child Locked in Vehicle
Criminal Mischief
Criminal Mischief In Progress
CRT Follow Up
Cutting
Cutting In Progress
Disturbance
Disturbance (Gun Involved)
Disturbance (Knife Involved)
Disturbance Barking Dog
Disturbance Child Protect Serv
Disturbance Family
Disturbance Family Gun Inv
Disturbance Family Knife Inv
Disturbance Fireworks
Disturbance Loud Music
Disturbance Neighbor
Disturbance Neighbor Gun Inv
Disturbance Neighbor Knife In

Dispatch Call Type
DOA
Drowning
Drunk
DWI
Family Violence
Family Violence Gun Inv
Family Violence Knife Inv
Fight
Fight Gun Involved
Fight Knife Involved
Fire
Fire Only-Grass
Fire Only-Grass
Forgery
Forgery In Progress
Graffiti In Progress
High Water
High Water Rescue
Holdup Alarm In Progress
ID Theft
Information
Injured/Sick Person
Internet Predator
Lewd Conduct
Liquor Law Violation
Miscellaneous
Missing Child
Missing Person
Missing Person - Endangered
Missing Person/Runaway
Narcotic Laws
Officer EMS In Trouble in Progress
Officer In Trouble In Progress
Ordinance Violation
Overdose
Overdose In Progress
Panhandler
Patrol By
Property Found
Property Lost
Prowler
Public Lewdness
Rape
Rape In Progress

Dispatch Call Type
Rape/Sex Offense
Recovered Stolen Property
Robbery
Robbery In Progress
Robbery of Individual
Robbery of Individual In Progress
Sexual Offense
Sexual Offense In Progress
Sexual Offense-Child
Shooting
Shooting In Progress
Shoplifting
Shoplifting In Progress
Suicide
Suicide In Progress
Suspicious Person
Suspicious Person with Gun
Suspicious Person with Knife
Suspicious Vehicle
Suspicious Vehicle with Gun
SWAT
Theft
Theft In Progress
Theft of Vehicle
Theft of Vehicle In Progress
Threat - Bomb with Device
Threats
Threats Bomb
Threats Bomb In Progress
Traffic Related
TRAFFIC STOP
Traffic Violation
Vice
Violation of Protective Order
Violation Sex Off Reg
Visitation Violation
Wanted Person
Weapons
Welfare Check
Wrong Way Driver
Y-AIRSIDE CHECKS
Y-ALARMS
Y-ALARMS CHECKPOINT
Y-ALARMS DOTL

Dispatch Call Type
Y-ALARMS ELEVATOR
Y-ALARMS FIRE
Y-ALARMS FIS-AOA
Y-ALARMS FORCED
Y-ASSIST ARFF
Y-ASSIST CUSTOMS
Y-ASSIST EMS
Y-ASSIST LEO
Y-ASSIST OUTSIDE AGENCY
Y-ASSIST TSA
Y-CROWD CONTROL
Y-ELEVATOR ALARM
Y-ESCORTS
Y-EVACUATIONS
Y-INSPECTION AIRSIDE
Y-INSPECTION FUEL FARM
Y-INSPECTION PERIMETER
Y-INSPECTION PRIM GATE
Y-INSPECTION RANDOM ID
Y-INSPECTION RANDON VEH
Y-INSPECTION VEH GATE 20
Y-INSPECTION VEH GATE 27
Y-PERIMETER CHECK
Y-SECURITY ALARM
Y-SECURITY BREACH
Y-SECURITY BREECH
Y-SECURITY VIOLATION
Y-SUSPECT DEVICE
Y-SUSPICIOUS ITEM
Y-TERMINAL INSPECTION
Y-UNATTENDED ITEM
Y-UNATTENDED VEH
Y-UNSECURED VEHICLES
Y-WEATHER RELATED
z-Move to Another Location
z-On Site Activity
z-Traffic Stop

APPENDIX B

San Antonio Police Department N-Codes

Code	Meaning	Use in This Study
N00	Clear and Available	Record Not Used
N01	Address Does Not exist	Record Not Used
N02	Occupant Did Not Call	Record Not Used
N03	Nothing Found	Record Not Used
N04BC	False Burglar Alarm - Commercial	False Commercial Burglar Alarm
N04BR	False Burglar Alarm - Residential	False Residential Burglar Alarm
N04G	False Burglar Alarm - Government	False Commercial Burglar Alarm
N04PC	False Panic Alarm - Commercial	Record Not Used
N04PR	False Panic Alarm - Residential	Record Not Used
N05	Return Call for Similar Problem	Record Not Used
N06	Incident Handled by a Different Agency	Record Not Used
N07	Cancelled by Dispatcher	Record Not Used
N08	Complainant Requested Patrol By	Record Not Used
N09	False Burglar Alarm - Weather	False Alarm Caused by Weather
N10	Recovered Stolen Vehicle	Record Not Used
N11	Cancelled by Communications Supervisor	Record Not Used
N12	Cancelled by Patrol Supervisor	Record Not Used
N13	Civil Disturbance	Record Not Used
N14	Exchange of Children - No Show	Record Not Used
N15SB	Exchange of Children - Uneventful	Record Not Used
N15	Stand By	Record Not Used
N16	Assist the Public	Record Not Used
N17	Animal Call	Record Not Used
N18	Repeat Call	Record Not Used
N19	Driver with No Insurance - Car Not Towed	Record Not Used

Code	Meaning	Use in This Study
N20	Driver with No Insurance - Car Towed	Record Not Used
N21	Accident with No Injury	Record Not Used
N22	Abandoned Vehicle on City Property	Record Not Used
N23	Driver with No Insurance - Car Not Towed Due to Children	Record Not Used
N24	Driver with No Insurance - Car Not Towed Due to Disability	Record Not Used
N25	Driver with No Insurance - Car Not Towed Due to Animals	Record Not Used
N26	Driver with No Insurance - Car Not Towed Due to Nature of Incident	Record Not Used
N27	Driver with No Insurance - Car Not Towed Due to Exigent Circumstances	Record Not Used
N28	Driver with No Insurance - Car Not Towed Due to Time of Day	Record Not Used
N29	Driver with No Insurance - Car Not Towed Due to Location of Incident	Record Not Used
N30	Accident with No Injury	Record Not Used
N31	Abandoned Vehicle on City Property	Record Not Used
N99	Administrative Reports Only	Record Not Used

APPENDIX C

Offense Codes for Burglaries

RMS OFFENSE CODE	RMS DESCRIPTION
220201	BURGLARY HABITATION - FORCE
220205	ATT BURGLARY BUILDING-NO FORCE
220206	BURG HAB-INTENT COMMIT FEL-FORCE
220207	BURG HAB. INT COM FEL-FORCE
220220	BURG HAB-INTENT COMMIT ASSAULT
220221	ATT BURG HAB - INT ASSAULT
220232	ATTEMPT ARMED BURGLARY
220233	ATTEMPT BURGLARY RESULT IN INJ
220251	CONSPIRACY ARMED BURGLARY
220253	CNSP-BURG W-INT MURDER-FRC-RES
220254	CONSP-BURG W-INTENT-FORC-RESID
220255	CNSP BURG W-INT SEXASLT-FRC-RE
220301	BURG W-INTENT COMMIT THEFT
220302	BURGLARY BUILDING-INTENT THEFT/FELONY
220303	ATT BURGLARY BUILDING - FORCE
220309	BURG W-INTENT COMMIT FELONY
220330	ATT BURG BLDG W-INTEN COMMIT THEFT
220333	ATT TO BURGLARIZE A BUILDING
220336	ATT BURG HAB W-INTEN COMMIT FELONY
220354	CONSP-BURG W-INTENT FRC-NONRES
220355	CON BURG W-INT SEXASLT FRC-NR
220401	BURGLARY HABITATION-NO FORCE
220402	ATT BURGLARY HAB-NO FORCE
220403	BURG HAB-INT COM FEL-NO FORCE
220404	ATT BURG HAB-INT COM FEL-NO FORCE
220437	AT BURG W-INT SEX ASLT NFRC-RE
220454	CONSP-BURG W-INT NO FORCE-RESID
220455	CON BURG W-INT SEXASLT NFRC-R
220502	BURGLARY BUILDING-NO FORCE
220553	CON-BURG W-INT MRDR NFRC-NRES
220554	CONSP-BURG W-INT NOFORC-NONRES
220555	CON BURG W-INT SEX ASLT NF-NR
220560	SOL-BURG W-INT THEFT NFRC-NRES
220562	SOL-BURG W-INT CMIT FELNF-NR
229945	ATT BURG-FEL ORG CRIME
229955	BURG-FEL ORG CRIME

APPENDIX D

Locations of Bars

Bar Name	Address	City	TABC License Number
	1420 S. Alamo Suite 001	San Antonio	MB806318
1st Round	7011 W Plaza Drive	San Antonio	MB700736
210 South Town	310 Riverside	San Antonio	MB899576
24K Gold Club	4102 Naco Perrin	San Antonio	MB611527
29 Restaurant and Wine Bar	255 E Basso Road Suite 940	San Antonio	BG707039
3 Bar	7460 Callaghan Road Suite 333	San Antonio	MB775483
301 LLC	23567 IH 10W Suite 102	San Antonio	MB915384
4 A's Sports Bar	11310 HWY 87 East	San Antonio	BG628345
410 Bar	2818 Loop 410 Northeast	San Antonio	MB828387
4th Quarter Sports Bar	8779 Wurzbach Road	San Antonio	MB759204
502	502 Embassy Oaks #138	San Antonio	MB772921
8811 Patio Bar	8811 Fredericksburg Rd	San Antonio	MB244823
90 West Bike Stop	15189 HWY 90 West #2	San Antonio	BG769902
A Taste of Texas Wine	200 River Walk Suite 111	San Antonio	BG670755
A-21	1331 Bandera Road	San Antonio	BG605389
A-21 Bar	1331 Bandera Road Suite A-21	San Antonio	BG880407
A.C.'s Corral	17490 Pleasanton Road	San Antonio	BG301908
Acapulco Drive In and Catering Service	609 S Alamo	San Antonio	BE085438
Ace Ice House	2638 Culebra	San Antonio	BG267790
Adelaide Services LLC	3915 San Pedro	San Antonio	MB828444
Afterburner	6515 W Military Drive	San Antonio	MB247399
AJ's Bar	3400 S Flores	San Antonio	BG935416
Alamo Beverage Barn	8010 Bandera Road	San Antonio	BG738449
Alamo City Bar	2603 Rigsby	San Antonio	BG849442
Alamo City Music Hall	1305 E Houston Street Building #2 Suite 2101	San Antonio	MB742279
Alamo Depot Sports Bar	1157 E Commerce including 1159 and 1161	San Antonio	MB413970
Alamo St. Eat Bar	609 S Alamo	San Antonio	BG800014
Alamodome Hideout	1228 E Durango	San Antonio	BG746801
Alberico Fine Wine	5221 McCullough Ave	Olmos Park	BG887604
Aldino At the Vineyard	1203 Loop 1604 North West '101'	San Antonio	MB524090
Alibis' Sports And Spirits	1141 E Commerce	San Antonio	MB539660

Bar Name	Address	City	TABC License Number
All Stars	9440 IH 10 West	San Antonio	MB243193
Allure Lounge	13550 O'CONNER ROAD SUITE 3 AND 4	San Antonio	MB855993
Aloft San Antonio Airport	838 LOOP 410 NORTHWEST	San Antonio	MB717247
Altar Society of St. Patrick's Catholic Church	1114 WILLOW STREET	San Antonio	BG294212
Ambiance Event Center	20740 HWY 281 SOUTH	San Antonio	BG906182
American Legion Alamo Post #2	3518 FREDERICKSBURG ROAD	San Antonio	NE212557
AMERICAN LEGION POST 579- SAN ANTONIO	3002 Gunsmoke	San Antonio	NE093968
AMERICAN LEGION SESQUINCENTENNIAL POST #592	2818 LOOP 410 NORTHEAST	San Antonio	NE187012
Amnesia	4250 Thousand Oaks Drive	San Antonio	MB783619
Andrew's	20740 HWY 281 SOUTH	San Antonio	BG621656
Angel's Sports Bar	2802 W Southcross	San Antonio	BG691920
Angelica's Cantina	2520 LOOP 410 SOUTHWEST	San Antonio	BG944349
Angie's Patio Bar	323 Fredericksburg Road	San Antonio	BG552819
Aragon's Blue Flame	1603-05 N COLORADO	San Antonio	BG237034
Aramark Education Services of Texas LLC	715 STADIUM DRIVE TIGERS DEN SKYLINE ROOM COATES UNIVERSITY CENTER	San Antonio	BG532688
Area Thirty-One	4553 LOOP 1604 NORTHWEST SUITE 1229	San Antonio	MB737722
Arjon's	8736 Tesoro Drive	San Antonio	MB263964
Arthur Gembler Post No. 375 The American Legion	9608 S Presa	San Antonio	BG412978
Arts	3727 SW Military Drive	San Antonio	BG751034
Arturo's	3310 Zarzamora	San Antonio	BG301083
ASOCIACION DE CHARROS DE SAN ANTONIO	6126 Padre Drive	San Antonio	BG746334
Aurora's Cafe	2360 FM 1518E SOUTH	Saint Hedwig	BG497226

Bar Name	Address	City	TABC License Number
Auxillar Group Concession	3211 W Commerce	San Antonio	BE262283
Avila's Ice House	4606 S Zarzamora	San Antonio	BG813052
B & D Ice House	1004 S Alamo	San Antonio	BE226671
B & N Sports Bar	3705 Roosevelt	San Antonio	BG546458
B&N Sports Bar #2	4910 S Flores	San Antonio	BG695419
B.P.O.E. San Antonio #216	15650 Market Hill	San Antonio	NE129136
B.P.O.E. San Antonio Elks Lodge #216	15650 Market Hill	San Antonio	NE913133
Babcock Bar	8826 Huebner Road	San Antonio	MB671074
Babes	4211 Sungate	San Antonio	MB264826
Babio's Eat Drink Dance	527 W Hildebrand Avenue	San Antonio	MB824935
Baby Dolls Sports Bar	3854 Nogalitas	San Antonio	BG679405
Baby's Place	6900 S Flores	San Antonio	BG878711
Backstage After Hours Lounge	830 LOOP 410 NORTHWEST SUITE 102	San Antonio	MB725722
Bad Dog'z Beer & Bites	12952 BANDERA ROAD SUITE 101	Helotes	MB864927
Baker Street Pub	4326 Gardendale	San Antonio	MB563460
Bananas	2003 San Pedro	San Antonio	MB531738
Bandera Sports Bar	1034 Bandera Road	San Antonio	BG453201
Bandera Sports Bar & Lounge	1034 Bandera Road	San Antonio	MB702289
Bandera Taproom	12030 Bandera Road Suite 104 and 105	San Antonio	BG899018
Bandolero Night Club	902 N New Braunfels	San Antonio	BG751765
Bar 11	126 W Rector Suite 136	San Antonio	MB708922
Bar 27	5042 Sherri Ann Road	San Antonio	MB942642
Bar America	721-23 S Alamo	San Antonio	BG167376
Bar America	721-23 S Alamo	San Antonio	MB866696
Bar Atrea	3635 Crooked Trail	San Antonio	MB732342
Bar Code	5402 Old HWY 90 West	San Antonio	BG867358
Bar Du Mon Ami	4901 Broadway Suite 130	Alamo Heights	MB855218
Bar Du Mon Ami	4901 Broadway Suite 130	Alamo Heights	MB698832
Bar Flys	8503 Broadway Suite 110	San Antonio	MB861388
Bar Louie	22610 HWY 281 North Suite 105	San Antonio	MB835979
Bar Louie	15900 La Cantera Parkway Suite 22100	San Antonio	MB845181

Bar Name	Address	City	TABC License Number
Barton's Boozery Inc.	7050 W Military Drive	San Antonio	MB446817
Basement Bar & Lounge	244 Losoya 'B'	San Antonio	MB614525
Beer Goggles	12702 TOEPPERWEIN SUITE 101	Live Oak	MB827644
Beer N' All	1331 SE Military Drive	San Antonio	BG704026
Beer N' All	823 San Pedro	San Antonio	BG704030
Beer N' All	5132 W Avenue	San Antonio	BG703852
Beer Runners Express	3817 Parkdale #121	San Antonio	BG780984
Beethoven Maennorchor Inc.	422 Pereida	San Antonio	BG030103
Below Zero	13550 O'Connor Road Suite 3 and 4	San Antonio	MB484803
Bermuda Triangle	10127 Coachlight	San Antonio	MB514902
Betty's Bar	1142 Old HWY 90	San Antonio	BG677333
Betty's Battallion	1524 E Grayson	San Antonio	BG202365
Bexar Bowling Club	15681 Bexar Bowling	Marion	BG274708
Bier Garten	126 Losoya	San Antonio	BG410089
Big Bib Too	106 Lanark Drive	San Antonio	MB885600
Big Fred's	21806 HWY 281 South Suite 1	San Antonio	BG904742
Big Hops	226 W Bitters Road Suite 108	San Antonio	BG831666
Big Hops Growler Station	11224 Huebner Road Suite 204	San Antonio	BG857570
Big Hops Growler Station	306 Austin Street Suite 101	San Antonio	BG897000
Big Mo Fresno Bar	1224 Fresno Street	San Antonio	BG872406
Big Mo Fresno Bar	1224 Fresno Street	San Antonio	BG540173
Bikini's Sports Bar	5010 Rittiman Road Suite 120	San Antonio	BG691395
Bikini's Sports Bar	5010 Rittiman Road Suite 120	San Antonio	BG869998
Billy D's Club	1805 Pat Booker Road	Universal City	MB400641
Black Diamond's Sports Bar	3114 Commercial Avenue	San Antonio	BG712748
Black Sheep Bar & Grill	4606 S Zarzamora	San Antonio	BG734664
Blanco Ballroom	3719 Blanco Road	San Antonio	BG118633
Blanco Tavern	7210 Blanco Road	San Antonio	MB458199
Blue Box	312 Pearl Parkway Building 2	San Antonio	MB806106
Blue Bubble Ballroom	9315 N Broadway	San Antonio	MB561316
Blue Sky Lounge	1543 Somerset Road	San Antonio	BG818002

Bar Name	Address	City	TABC License Number
Blue Sky Lounge	1543 Somerset Road	San Antonio	BG560995
Blue Wing Ballroom	10507 Spur 122 South	San Antonio	BG575462
Blush	2525 Loop 410 Northeast Suite 110	San Antonio	MB235811
Bobby's Shady Oaks Dance Hall	22115 HWY 281 South	San Antonio	BG415794
Bogart's Cocktails	8323 Culebra Road Suite 106	San Antonio	MB234677
Bogey's Club	6109 Callaghan	San Antonio	MB518907
Bohanan's	221 E Houston	San Antonio	MB731076
Bombay Bicycle Club	3506 N Saint Mary's Street	San Antonio	MB201728
Bombay Klub	4234 Culebra Road	San Antonio	BG866274
Bond's 007 Rock Bar	450 Soledad	San Antonio	MB546391
Boneheadz Sports Pub	9503 Console Drive	San Antonio	MB568024
Bonham Exchange	411 Bonham	San Antonio	MB087436
Bonnie Jean's Cocktails	5118 Fredericksburg Road	San Antonio	MB217922
Bootleggers	2407 N Saint Mary's Street	San Antonio	MB853516
Boozehounds	8531 Perrin Beitel Road	San Antonio	MB576166
Bosmans	672 Elks	San Antonio	BG566591
Bottom Bracket Social Club	1603 N Colorado Street	San Antonio	MB857145
Box 903	903 Bitters Road #313	San Antonio	MB471030
Bradley's-N-Billiards	7743 Montego Drive	San Antonio	MB403150
Brainfreeze	415 S General McMullen	San Antonio	BG887703
Branchline Brewing Company	3633 Metro Parkway	San Antonio	BG
Brass Monkey	2702 N Saint Mary's Street	San Antonio	MB794359
Brenda's 81 Bar	781 New Laredo HWY	San Antonio	BG617225
Brew Brothers	7403 Leslie Road Suite 214 and 216	San Antonio	MB887134
Brewer's Grill	22250 Bulverde RoadSuite 106	San Antonio	MB915034
Bridge Bar	112 College Street Suite A	San Antonio	BG838355
Broadway 50 50	9837 IH 10 West	San Antonio	MB736185
Broadway 5050	5050 Broadway	Alamo Heights	MB641853
Broadway Bar	8800 Broadway Suite 111	San Antonio	MB507347
Broadway Central Market Cafe	4821 Broadway	San Antonio	BG495106
Broadway Sports Bar	2411 Broadway Suite A	San Antonio	BG769092
Brooks Pub	3354 Lasses Boulevard	San Antonio	MB835366
Brooks Pub	3354 Lasses Boulevard	San Antonio	MB628796

Bar Name	Address	City	TABC License Number
Bruno's	1807 Mission Road	San Antonio	BG554852
Buck's Saloon	3751 Loop 1604 East South	San Antonio	BG
Buck's Saloon	3751 Loop 1604 East South	San Antonio	BG662036
Buckhorn Bar & Grill	15189 HWY 90 W #2	San Antonio	BG716228
Buddha Rok	18360 Blanco Road Suite 100	San Antonio	MB726812
Buddy's Place	19588 K Street	Somerset	BG736733
Buena Vista Family Garden	13792 Spur 1937	San Antonio	BG655892
Burleson Yard Beer Garden	430 Austin Street	San Antonio	MB930921
Burhouse Cigar & Martini	4553 Loop 1604 Northwest Suite 1229	San Antonio	MB924497
Burning It Down	3854 Nogalitos	San Antonio	BG909428
Burroland	800 Cincinnati Avenue	San Antonio	BG285073
Bushwood CC	13800 Jones Maltsberger Road	San Antonio	MB731430
C & E Ice House	3509 S Zarzamora	San Antonio	BG700730
C & L Sports Bar	205 Frio City Road	San Antonio	BG751099
Cadillac Club	7870 Culebra Road Suite 15	San Antonio	MB488520
Camelia Bar	1118 Pleasanton Road	San Antonio	BG934074
Camelia Bar	1118 Pleasanton Road	San Antonio	BG804032
Candilejas Restaraunt & Bar	725 Austin Street	San Antonio	MB457308
Cantina El Ultimo Trago	902 N New Braunfels	San Antonio	BG877913
Cantina Sports Bar & Grill	6565 Babcock RD Suite 9 and 10	San Antonio	MB902960
Carmelite Fathers of San Antonio Texas Inc	907 Kentucky Avenue	San Antonio	BG755149
Carmen's Ice House	7147 Somerset Road	San Antonio	BG437863
Carabba's Italian Grill	12506 IH 10 West	San Antonio	MB251509
Casa Blanca Ballroom	7402 Laredo HWY	San Antonio	BG793346
Casa Real Mexican Restaurant	6868 Ingram Road	San Antonio	MB536447
Casas Nite Club	3239 W Commerce	San Antonio	BG512054
Castillo's Ice House & Softball Complex	12567 Somerset Road	Von Ormy	BG700168
Castillo's Ice House & Softball Complex	12567 Somerset Road	Von Ormy	BG880755

Bar Name	Address	City	TABC License Number
Castro's Bar	1110 Pleasanton Road	San Antonio	BG878706
Cattleman's Beer Garden	1322 Quintana Road	San Antonio	BG617114
Cattleman's Patio Bar & Grill	915 W Houston	San Antonio	BG567540
Cattleman's Sports Cantina	1025 Nogalitos	San Antonio	BG830777
Chances Are	743 Old HWY 90 West	San Antonio	BG223596
Chances Are	743 Old HWY 90 West	San Antonio	BG929858
Chango's Havana Club LTD.	23535 IH10W Suite 1101	San Antonio	MB612145
Charlie Brown's Neighborhood Bar And Grill	11888 Starcrest #101	San Antonio	MB401210
Chasers Sports Bar And Lounge	1031 Patricia Suite 100	San Antonio	MB934354
Cheer's @ Bernie's	10606 Perrin Beitel	San Antonio	MB748740
Chelsea's Catering And Bar Service	217 Cactus	San Antonio	MB781168
Chicago Bar	19141 Stone Oak Parkway Suite 505	San Antonio	MB638228
Chicharo Ice House	734 Cantrell	San Antonio	BG231971
Chicharo's	734 Cantrell	San Antonio	BG903471
Chili Willie's Country Club	104 Daniel Road	San Antonio	BG262171
China Garden	801 S Presa	San Antonio	BG819432
China Garden	14355 Blanco Road	San Antonio	MB903884
China Grove General Store	7393 HWY 87 East	China Grove	MB649414
China Grove Trading Post LLC	7393 HWY 87 East	China Grove	MB828509
Chula's Sports Cantina	6420 Loop 410 Northwest Suite 110	San Antonio	MB856324
Ciel And Ciao 2	20626 Stone Oak Parkway #103 and 105	San Antonio	BG705734
Cielo Lounge Encore Club	300 E Commerce Street #100	San Antonio	MB711760
Cinderella Ballroom	3333 W Ave Suite 13 and 14	San Antonio	BG567542
City Base Bar & Grill	4710 S Presa Street	San Antonio	BG841779
Claude Hoppers	19178 Blanco Road Suite 205	San Antonio	BG885042

Bar Name	Address	City	TABC License Number
Clicks	5545 Loop 410 Northwest Suite 116	San Antonio	MB173076
Clicks Billiards	903 E Bitters Road Suite 307	San Antonio	MB537753
Cloak And Dagger	8338 Loop 1604 Northwest Building 1 Suite 101	San Antonio	MB731018
Cloud 9 Sports Bar	5251 Timberhill Suite 201	San Antonio	MB664197
Cloud 9 Sports Bar	5251 Timberhill Suite 201	San Antonio	MB738100
Clown Alley Inc	5518-20 SW Military Drive	San Antonio	MB446815
Club Altravete	5558 Old Pearsall Road Suite 1	San Antonio	BG720628
Club Carribe	10319 Perrin Beitel	San Antonio	MB814177
Club Carribe	10319 Perrin Beitel	San Antonio	BG710806
Club Cohiba	1015 Navarro Street	San Antonio	MB416373
Club El Chapparal	4500 W Avenue	San Antonio	MB527258
Club Essence	1010 N Main	San Antonio	MB821274
Club Fuego	7503 HWY 90 West	San Antonio	MB640701
Club Grand	1305 Loop 410 Southwest Suite 100	San Antonio	MB841741
Club Kalua	2600 S Flores Unit 1	San Antonio	BG425543
Club M.A.T.G.	836 Bynum Avenue	San Antonio	BG799271
Club Movida	306 E Mitchell	San Antonio	MB642916
Club Oasis	8303 S Presa	San Antonio	MB642572
Club Rancherita	445 Old HWY 90 West	San Antonio	BG665904
Club Rio	13307 HWY 281 North Suite A	San Antonio	MB666857
Club Rive	245 Commerce Street Suite 250	San Antonio	MB527414
Club Royal	4722 Rittiman Road	San Antonio	MB477075
Club Sa	408 Dolorosa #1	San Antonio	MB781493
Club Sirius	228 Losoya Street	San Antonio	MB544584
Club Space	229 E Houston Street Suite 10	San Antonio	MB536831
Club Supreme	236 Guthrie	San Antonio	BG197898
Club Venom	2407 N Saint Mary’s Street	San Antonio	MB615855
Clumsy Cricket	1410 Callaghan Road	San Antonio	MB785408
Coach's Corner Family Ice House	2403-07 Vance Jackson	San Antonio	BG301333
Cobalt Club	2022 McCullough	San Antonio	MB455254
Coco Beach	12159 Valliant	San Antonio	MB476887

Bar Name	Address	City	TABC License Number
Coco San Antonio	18402 HWY 281 North Suite 114	San Antonio	MB692084
College Park Pub	8202 Loop 1604 Northwest Suite 117	San Antonio	MB657963
Colt's 45 Lounge	11056 HWY 16 South	San Antonio	BG480532
Columbus Club	8284 Pearsall Road	San Antonio	BG478798
Columbus Club Bar	6909 Camp Bullis Road	San Antonio	BG294987
Conjunto Express	9214 Espada	San Antonio	BG664242
Connie's Ice House	1011 VFW Boulevard	San Antonio	BG212073
Conroy's Sports Pub & Grill	9091 Fair Oaks Parkway Suite 201	San Antonio	MB680693
Contreras Lounge	415 Milam Street	San Antonio	BG440561
Cool Arrows	1025 Nogalitos	San Antonio	BG503436
Cooter Browns	11881 Bandera Road Suite 101	San Antonio	MB818709
Copa Ultra Lounge	4429 Walzem Road	San Antonio	MB706748
Copa Wine Bar & Tasting Room	19141 Stone Oak Parkway Suite 704	San Antonio	BG576085
Corner Bar	25585 Pleasanton Road	San Antonio	BG715541
Corner Pocket Grill	2363 Austin HWY Including 2367	San Antonio	MB576740
Country Inn & Suites	8505 Broadway	San Antonio	MB903053
Country Nights	12130 O'Connor Road	San Antonio	MB923751
Country Rock Corp.	10704 Perrin Beitel Road Including 10706	San Antonio	MB853312
Courtyard By Marriott	6738 Loop 410 Northwest	San Antonio	MB672836
Courtyard San Antonio	5731 Rim Pass Drive	San Antonio	MB727088
Cowabunga	402 E Travis Street Suite 1	San Antonio	MB437875
Cowboys	3030 Loop 410 Northeast	San Antonio	MB547115
Cowgirls LTD.	12311 Nacogdoches Road Suite 111	San Antonio	MB783927
Coyote Crossing Saloon	23285 Mathis Road	San Antonio	BG538418
Coyote Ugly Saloon	409 E Commerce Street	San Antonio	MB560376
Crabby Jacks	16084 San Pedro	San Antonio	MB660373
Crazy 8 Ball Saloon	570 N WW White Road	San Antonio	BG797410
Crazy 8 Ball Saloon	570 N WW White Road	San Antonio	BG615703
Crazy D's Saloon	12234 Nacogdoches Road	San Antonio	MB647538
Crazy J's Sports Bar	126 Gembler	San Antonio	BG262633
Cross-Eyed Seagull	19141 Stone Oaks Parkway Suite 206	San Antonio	MB570905
Cuatro Aces	1110 Pleasanton Road	San Antonio	BG491852

Bar Name	Address	City	TABC License Number
Cunningham's Cantina In the Woods	20508 Trumbo Road	San Antonio	BG704460
Cupples Drive Inn	334 Cupples Road	San Antonio	BG538764
Cupples Sports Bar	334 Cupples Road	San Antonio	BG554213
Cycles Ice House	1701 S Hackberry	San Antonio	BG887690
D Z's Sports Bar	707 Old HWY 90 West	San Antonio	BG765029
Da Bunker Bar	210 E Aviation	Universal City	MB537257
Da Spanish Harlem Bar	8021 FM 78 Suite 109	San Antonio	MB616562
Da Traxx Sports Bar & Dance Club	442 W Hildebrand	San Antonio	BG260452
Dads	2615 Mossrock	San Antonio	MB790635
Dads	2615 Mossrock	San Antonio	MB206358
Dady G's Bar	310 Abshire	San Antonio	MB553970
Daiquiri Lounge	8275 FM 78 Suite 12	San Antonio	BG884826
Dakota's Dixie Rose	17680 IH 35 South	Lytle	MB821093
Dakota's Saloon	17680 IH 35 South	Lytle	MB731482
Davenport Lounge	203 N Presa Street	San Antonio	MB746580
David's	1500 Blanco Road	San Antonio	BG190647
Dayzee Dukes Saloon	1806 Quintana Road	San Antonio	BG739825
Deol Brothers Inc.	6851 Loop 1604 Northwest Suite 101	San Antonio	MB752738
Destiny's Grill & Bar	2205 S Gevers	San Antonio	BG769843
Desvelados Rodeo Doz	1619 W Malone	San Antonio	BG553763
Dezy's Place	2520 Loop 410 Southwest	San Antonio	BG746145
Dezy's Place	2520 Loop 410 Southwest	San Antonio	BG788521
Diablos Sports Bar & Grill	479 Loop 1604 Southwest	San Antonio	BG734048
Dillo	214 Losoya	San Antonio	MB553491
Doc Browns	6511 Loop 1604 Northwest #101	San Antonio	MB925556
Dodge City Trading Post	430 Loop 1604 West South '2'	San Antonio	BG548087
Don Carlito's	1230 Duke Road	San Antonio	BG
Don Oaks Inc.	25665 Boerne Stage Road	San Antonio	MB430894
Dora's Family Cafe	1225 S Brazos	San Antonio	BG275533
Dragon Sports Bar	1353 Bandera Road	San Antonio	MB891802
Dream Night Club	19314 HWY 281 N Suite 110	San Antonio	MB927552
Drink Coffee & Wine Bar	200 Navarro Street 100	San Antonio	MB631152
Duo Lounge	523 Med Court Suite 105	San Antonio	MB674784
E & G Sports Bar	2413 N Zarzamora Street	San Antonio	BG555366

Bar Name	Address	City	TABC License Number
E.N.E. Lounge	1209 N. Zarzamora Street	San Antonio	BG533830
E.R. Bar & Grill	8647 Wurzbach Road Building N	San Antonio	MB798932
Eagle Nest Pub	12130 O'Connor Road	San Antonio	MB617543
Easy Street	1503 Nacogdoches Road Suite 304	San Antonio	MB212631
Ebb Tide	2117 Harry Wurzbach	Terrell Hills	BG404328
Eclipse Nightclub	7250 Bandera Road Suite 3	San Antonio	MB747780
Eddie's Lounge	3106 Pleasanton Road	San Antonio	BG316485
Eddie's Pub	8125-31 Latigo Plaza	San Antonio	MB543070
Eddy's Tavern	11221 Perrin Beitel	San Antonio	MB525658
Eden	21003 Encinco Commons Suite 123	San Antonio	MB711758
Edison Experiment	1846 Loop 1604 Northwest Suite 110	San Antonio	MB852622
El Centenario Sports Bar	3854 Nogalitos	San Antonio	BG807394
El Columpio	1502 Camaron Street	San Antonio	BG831298
El Fuerte	7011 San Pedro	San Antonio	MB712813
El Jakarandas Nite Club	526 Roosevelt	San Antonio	BG871535
El Leon Rojo	507 Old HWY 90 West	San Antonio	BG786761
El Lugar	700 Ruiz Street	San Antonio	BG735722
El Morocco Lounge	9815 Roosevelt Avenue	San Antonio	BE153047
El Pantano Night Club	526 Sherman	San Antonio	BG915131
El Patio Bar	1001 Frio City Road	San Antonio	BG675070
El Rio Night Club	815 Pleasanton	San Antonio	BG628336
El Sauzeno Lounge	1628 1/2 S Presa Street	San Antonio	BG069615
El Tesoro Bar	314-16 N Flores	San Antonio	BG570200
El Vacilon Club	3862 Nogalitos	San Antonio	BG313089
El Zacatecano Lounge	5330 S Zarzamora	San Antonio	BG278389
Element Night Club	1581 Bandera Road	San Antonio	MB749846
Encino Inn	20317 Somerset Road	Somerset	BG407720
Encino Inn	20317 Somerset Road	Somerset	BG803648
Endless Music	19314 HWY 281 N Suite 110	San Antonio	MB764603
Epic Bar	1375 Austin HWY	San Antonio	MB908273
Eskimo Hut	18866 Stone Oak Parkway Suite 105	San Antonio	BG928932
Espana Bar De Tapas	5638 Hausman Road Suite 105	San Antonio	MB664230
Espiritus	102 9th ST 4th Floor Suite 400	San Antonio	MB888419
Essence	1010 N Main	San Antonio	MB733557

Bar Name	Address	City	TABC License Number
Estrada Grocery	1010 S Mittman	San Antonio	BE277833
Evil Olive	2950 Thousand Oaks #5 and 6	San Antonio	MB750814
Excelencia Night Club	1322 Quintana Road	San Antonio	BG809454
Executive Center	1319 March Road Building 2	San Antonio	BG823721
Fast Eddie's Neighborhood Billiards & Saloon	502 Embassy Oaks Suite 133	San Antonio	MB525656
Fast Eddies	9910 Loop 1604 Northwest Suite 113	San Antonio	MB728378
Fast Eddies Neighborhood Billiards & Saloon	7616 Culebra Road Suite 103	San Antonio	MB435697
Fat Racks Sports Bar & Billiards	11807-11813 West Avenue	San Antonio	MB920618
Faust Tavern	517 E Woodlawn Avenue	San Antonio	MB843088
Fecsa Investments LLC	7503 HWY 90 West	San Antonio	MB884689
Fiasco	2250 Thousand Oaks Suite 108	San Antonio	MB266581
Fiesta Texas Hospitality L.L.C	17000 IH 10 West	San Antonio	MB268358
Fiesta Winery San Antonio LLC	102 S Concho Street	San Antonio	BG895069
Finas Lounge	2217 Guadalupe Street	San Antonio	BG052393
Finnegan's	16260 San Pedro	San Antonio	MB423124
Fire Base Charlie	704 Hood Street	San Antonio	BG709521
Firehouse Pub & Grill	5380 Walzem Road	San Antonio	MB529191
Firewater Grill	26108 Overlook Parkway Suite 1100	San Antonio	MB764114
Fitzgerald's Bar & Live Music	437 McCarty Suite 101	San Antonio	MB812989
Fizz	1218 Bitters Road Suite 105	San Antonio	MB726484
Flying Tiger Sports Bar	2619 SE Military Drive Suite 111	San Antonio	MB811864
Flynn's	8123 Broadway Suite A	San Antonio	MB871121
Fountain Blue Banquet Hall	6737 Poss Road Suite 300	Leon Valley	BG684680
Fountain Room	918 Bandera Road	San Antonio	BG180003
Four Points By Sheraton San Antonio Downtown	524 S Saint Mary's Street	San Antonio	MB709905

Bar Name	Address	City	TABC License Number
Four Points Food Park	19120 HWY 16 South	San Antonio	BG848427
Fox & Hound English Pub & Grille #65022	12651 Vance Jackson Road Suite 110	San Antonio	MB874039
Fox & Hound English Pub & Grille	12651 Vance Jackson Road Suite 110	San Antonio	MB436533
Frank Mumme's The Other Woman	1123 Fair Avenue	San Antonio	MB251734
Frankie G's Sports Bar	2437 Frio City Road	San Antonio	BG621086
Franklin Park Alamo Heights	230 W Sunset Road	San Antonio	MB942021
Franky Diablos	1301 Roosevelt Avenue	San Antonio	MB930909
Fred Brock Post No 828 The American Legion	3415 Martin Luther King Drive	San Antonio	NE803485
Fred Brock Post No. 828 The American Legion	3415 Martin Luther King Drive	San Antonio	NE203420
Freddie's Eight Ball	531 Old HWY 90 West	San Antonio	BG622446
Freetail Brewing Co.	2000 S Presa	San Antonio	BG867751
Friendz Bar	2707 Lasses Boulevard	San Antonio	BG757055
Frio City Bar	2039 Frio City Road	San Antonio	BG578340
Frio Saloon	801 S Frio Street	San Antonio	BG646673
Full Throttle Lounge	6820 Ingram Road	San Antonio	MB773332
G Sports & Cafe	19903 Stone Oak Parkway Building 2 Suite 202	San Antonio	MB702184
Garden Bistro Bar	18360 Blanco Road Suite 100	San Antonio	MB837302
Garibaldi	2224 Commercial	San Antonio	MB159571
Gearhead Premier Icehouse	7250 Bandera Road Building 3	San Antonio	MB912161
Gem's Tavern	2110 Frio City Road	San Antonio	BG473476
Gema Activity Hall	706 New Laredo HWY	San Antonio	BG777697
Gene Ramirez American Legion Post #443	20295 Somerset Road	Somerset	BG418694
George's Keep	17101 La Cantera Parkway Suites P2-1 and P2-2	San Antonio	MB859136
Gil's Bar	1228 E Caesar Chavez Boulevard	San Antonio	BG797789
Gloria's Lounge	312 N Flores	San Antonio	BG281018
Go For Broke Saloon	3114 Commercial Avenue	San Antonio	BG702779
Golden Pyramid Bar	140 New Laredo HWY	San Antonio	BG652341
Golden Spur	21806 HWY 281 South #1	San Antonio	MB834550
Gone Fishing Sports Bar	509 Pleasanton Road	San Antonio	BG736165
Gonzales Ice	900 S Hackberry	San Antonio	BG141314

Bar Name	Address	City	TABC License Number
Gourmet Burger Grill	18414 HWY 281 N Suite 116	San Antonio	BG651727
Graham Central Station/South Beach	4902 Fredericksburg Road	San Antonio	MB511542
Grand Agave and Oshi Sushi	18326 Tuscany Stone	San Antonio	MB762854
Grasshopper Club	8308 Marbach Road	San Antonio	MB128044
Gravity Bar S.A.	1031 Patricia Suite 105	San Antonio	MB730269
Greenwood's Bar & Grill	301 N New Braunfels	San Antonio	MB458692
Groove I-10	3710 E Commerce	San Antonio	MB459503
Groove Lounge	501 E Crockett	San Antonio	MB929449
GS1221	1221 E Broadway Suite 116	San Antonio	BG868712
Guadalupe Cheers	2126 Guadalupe Street	San Antonio	BG748658
Gunter Hotel	205 E Houston Street	San Antonio	MB485046
Guzman's Ice House	2719 S Flores Street	San Antonio	BG664696
Gypsy's	18410 HWY 16 South	San Antonio	BG470506
H & R	1819 Goliad Road	San Antonio	BE277592
Half Time Lounge	8084 Pat Brooker Road	Live Oak	MB482367
Hangar Too	2323 Quintana Road	San Antonio	BG641342
Happy Hut	1902 W Avenue	San Antonio	BG861757
Hardbodies	2726 N Saint Mary’s Street	San Antonio	MB536984
Harlandale Memorial Post No. 4815 Veterans of Foreign Wars	3111 Commercial Avenue	San Antonio	NE066300
Harlandale Memorial Post No. 4815 VFW	3107 Commercial Avenue	San Antonio	BG301232
Headliners Showclub	1039 Loop 410 Northeast	San Antonio	MB732954
Heat	1500 N Main Avenue	San Antonio	MB163755
Helotes Country Club	14687 Bandera Road	Helotes	BG882052
Helotes Country Club	14687 Bandera Road	Helotes	BG097966
Helotes Hermann Sons Home Association	9721 Braun Road	San Antonio	BG263045
Hemingway's Tavern	8931 Wurzbach Road	San Antonio	MB579274
Hernandez Grocery	457 W Mitchell	San Antonio	BG242450
Hi Slope Ice & Ser. Sta.	1509 Clark	San Antonio	BG065500
Hi Tones	621 E Dewey	San Antonio	MB775982
Hideaway	119 El Mio	San Antonio	MB769892
High Street Wine Co.	302 Pear Parkway Suite 104	San Antonio	BG
Highland's Social Club	2929 S WW White Road	San Antonio	BG304847
Highlander Bar & Grill	5562 Fredericksburg Road	San Antonio	MB658530

Bar Name	Address	City	TABC License Number
Hill Country Beverages Inc	314-18 E Houston	San Antonio	MB229151
Hills & Dales Inc.	15403 White Fawn	San Antonio	BG312875
Home 2 Suites San Antonio Downtown-Riverwalk	603 Navarro Street	San Antonio	BG
Home Plate Bar & Grill Inc.	2533 Bandera Road	San Antonio	BG506763
Home Plate Sports Bar	2533 Bandera Road	San Antonio	MB930779
Hooks Billiards	5152 Fredericksburg Road Suite 150	San Antonio	MB613740
Hooligan's Bar & Grill	13920 IH 35 North	Live Oak	MB899888
Hooligan's Bar & Grill	13920 IH 35 North	Live Oak	MB557787
Hooz Cocktails	1711 Babcock Road	San Antonio	MB631660
Hospitality International Inc.	23808 Resort Parkway	San Antonio	BG740091
Host Services Inc.	9800 Airport Boulevard	San Antonio	MB232775
Host/True Flavors Sat Terminal A FB LLC	9800 Airport Boulevard	San Antonio	MB843328
Hot Shot Billiards	1255 Loop 410 Southwest '117'	San Antonio	MB556039
Hot Shot Billiards #2	4515 Blanco Road	San Antonio	MB697002
Hot Tin Roof	7710 IH 10 West	San Antonio	MB639828
Hottie's Sports Bar & Grill Inc.	2603 Vance Jackson	San Antonio	MB736889
Howard Johnson Inn & Suites	3817 IH 35 North	San Antonio	BG891257
Howl At the Moon Saloon	111 W Crockett '201'	San Antonio	MB749183
I Don't Know Yet Lounge	1229 Babcock Road	San Antonio	MB098986
I 10 Ice House	9518 Console Drive	San Antonio	MB629579
Ice Lounge & Sports Bar	5545 Loop 410 Northwest Suite 116	San Antonio	MB840745
Icehouse	401 Pearl Parkway	San Antonio	MB865978
Ivory Lounge	5152 Fredericksburg Road Suite 150	San Antonio	MB785939
J & B Bar	2850 Culebra	San Antonio	BG872479
J & O Cantina	1014 S Presa Street	San Antonio	MB812588
J & R Sports Bar	700 Ruiz Street	San Antonio	BG911611
J & R's Hideout	2139 Frio City Road	San Antonio	BG271200
J & V's Bar	16890 Shepherd Road	Atascosa	BG854005
J J's Tavern	7834 S Presa	San Antonio	BG421833

Bar Name	Address	City	TABC License Number
J J's Tavern	2209 Guadalupe Street	San Antonio	BG308478
J.C.'s Nostalgia	5516 Evers Road	San Antonio	MB246260
Jacalito's Pub	146 1/2 N WW White Road	San Antonio	MB137188
Jackrabbit	6322 San Pedro	San Antonio	MB922451
Jacks	3030 Thousand Oaks Suite 101	San Antonio	MB526901
James B. Sprague Memorial Post No. 8541 Veterans of Foreign Wars	2222 Austin HWY	San Antonio	NE067543
Jan Woo Food Store	3526 W Commerce	San Antonio	BE147994
Jazz TX	312 Pearl Parkway Building 6 Suite 6001	San Antonio	MB938748
JB Ice House	619 W Avenue	San Antonio	BG513826
JBM Event Services LLC	1635 S Zarzamora	San Antonio	BG904062
JD's Icehouse	10435 Loop 410 Southwest #1	Macdona	BG717744
Jerry Dean's	12536 Nacogdoches	San Antonio	MB470471
Jing's Lounge	3935 Eisenhauer	San Antonio	BG655157
Joe Blue's	1420 Alamo Street Building D Suite 142	San Antonio	MB630902
Joe's Beer Box	1332 E Durango Boulevard	San Antonio	BG704665
Joe's Corner Saloon	5320 S Presa	San Antonio	BG438902
Joe's Ice House	3711 West Avenue	San Antonio	BG532128
Joe's Ice House	3711 West Avenue	San Antonio	BG870255
Joe's Volcano	6844 Ingram Road	San Antonio	MB578073
Joey G's Sports Bar	8751 Grissom Road	San Antonio	MB633670
Joey's	2417 N Saint Mary’s Street	San Antonio	MB225830
John Cootey's Tavern And Kitchen	8318 Jones Maltsberger #128	San Antonio	MB134146
John F. Kennedy Post No. 485 Inc.	431 Kendalia Avenue	San Antonio	BG552821
John T. Floore Country Store	14464 Bandera Road	Helotes	MB525353
Josabi's	17200-01 HWY 16 North	Helotes	MB680713
Judson Post No. 2059 Veterans of Foreign Wars	3202 Ackermand Road	Kirby	MB613575
Juniper Tar	244 W Houston Street	San Antonio	MB893880
K & S Lounge	747 Bynum	San Antonio	BG213196
K5G LLC	9323 Perrin Beitel Suite 201	San Antonio	MB529162
Kantina Karaoke Bar	2512 SW Loop 410 Suite 2	San Antonio	BG647041

Bar Name	Address	City	TABC License Number
Kathy's	203 Moursund 'A'	San Antonio	BG790715
Kathy's	313 Moursund	San Antonio	BG448521
Katz Calico Club	1902 W Avenue	San Antonio	MB629188
Kazam	1843 Rigsby Avenue	San Antonio	BG758126
Kennedy's	19179 Blanco Road '113'	San Antonio	MB552659
Kike Ice House	1115 Roosevelt	San Antonio	BG226639
King Armadillo Club	3457 Fredericksburg Road	San Antonio	BG931027
King Armadillo Night Club	3457 Fredericksburg road	San Antonio	BG727646
Kirby Hermann Sons Home Association	210 Bauman	Kirby	BE281591
Klusoz Martini & Tapas	19314 HWY 281 N Suite 101	San Antonio	MB710311
Knights of Columbus Council Number 4315	5721 Rigsby	San Antonio	BG250525
Knuckle Head's	13777 Judson Road Suite 112	San Antonio	MB714428
Kocktails Bar & Lounge	2818 Loop 410 Northeast	San Antonio	MB715140
Korea House Lounge	4453 Walzem Road	San Antonio	MB798384
Korea House Lounge	4453 Walzem Road	San Antonio	MB527954
Kozy Korner Saloon	507 Ruiz	San Antonio	BG287356
Krave Ultra Lounge	8015 Bandera Road Suite 108	San Antonio	MB730719
Krudo's Sports Bar	1321 N Zarzamora	San Antonio	BG790038
Krystals Cocktails	12536 Nacogdoches Road	San Antonio	MB898223
L&J's Hideout	3854 Nogalitos Street	San Antonio	BG832731
La Bamba Club	1621 Quintana Road	San Antonio	BG406458
La Botanica Cafe	2911 N Saint Mary’s Street	San Antonio	MB909448
La China Bar	1234 Burleson	San Antonio	BG696369
La Coqueta	323 N Zarzamora	San Antonio	BG688890
La Estrella-De-Oro	2208 Blanco Road	San Antonio	BG151225
La Guera Lounge	910 N Zarzamora	San Antonio	BG269507
La Kantina	103 Denver Boulevard	San Antonio	BG268295
La Koma Recreation Club	2117 S Flores	San Antonio	BG409865
La Morenita Bar	507 Old HWY 90 West	San Antonio	BG882768
La Noche Linda Nite Club	504 Pleasanton Road	San Antonio	BG750561
La Quinta Inn & Suites	303 Blum	San Antonio	MB568312
La Reyna De Oro	9910 Roosevelt Avenue	San Antonio	BG732943
La Roleta Sports Bar	755 Steves Avenue Suite 1	San Antonio	BG865225
La Tuna	100 Probandt Street	San Antonio	BG298207
La Vikina Bar & Grill	3000 N Saint Mary’s Street	San Antonio	MB619221

Bar Name	Address	City	TABC License Number
Lackland VFW Post 9174	2410 Pinn Road	San Antonio	NE105810
Las 2 Sisters	5558 Pearsall Road Suite 1	San Antonio	BG790639
Las Coronas Bar & Grill	1925 S Loop 1604 East	San Antonio	BG568888
Las Desveladas	3316 S Presa Street	San Antonio	BG710282
Las Fuentes At Cordi-Marian	11624 FM 471W Building 9	San Antonio	BG720265
Las Gatitas Club	1921 N Zarzamora	San Antonio	BG728617
Las Potrancas	526 Sherman	San Antonio	BG761576
Last Call Saloon	2512 Loop 410 Southwest '2-3'	San Antonio	MB238987
Last Chance Lounge	4435-37 Rittiman Road	San Antonio	MB605310
Le Rose Ballroom	1324 Callaghan Road	San Antonio	BG442899
Leaky Barrel	7959 Fredericksburg Road #131	San Antonio	MB847390
Leapin Lizard Pub	302 E Commerce	San Antonio	MB548459
Lefty's Draft House	15179 Judson Road Suite 101	San Antonio	MB801642
Legend Outdoors	18826 Bandera Road	Helotes	MB798830
Legends Sports Bar And Billiards	1305 Loop 410 Southwest Suite 208	San Antonio	MB256917
Leon 1883	8123 Broadway Suite A	San Antonio	MB553144
Leon Rojo	507 Old HWY 90 West	San Antonio	BG847710
Leons Ice House	1953 S WW White Road	San Antonio	BE627258
Lerma's Night Club	1602 N Zarzamora	San Antonio	BG128982
Lilly's Ice House	5535 Roosevelt Avenue	San Antonio	BE626168
Lily's King Lounge	111 Whitewood	San Antonio	MB692145
Limelight	2718 N Saint Mary’s Street	San Antonio	MB619233
Limelight	2718 N Saint Mary’s Street	San Antonio	MB907436
Linda's Lounge	2003 Austin HWY	San Antonio	BG783693
Lion & Rose	5148 Broadway	Alamo Heights	MB565406
Liquid Monkey Lounge	248 Losoya Street	San Antonio	MB686527
Little Joe's Country Gold	7405 Pearsall Road	San Antonio	BG814636
Little Joe's Country Gold	7405 Pearsall Road	San Antonio	BG056621
Little Rudy's	16890 Shepherd Road	Atascosa	BG731027
Little Woodrow's	606 W Afton Oaks Boulevard	San Antonio	MB905911
Little Woodrows	2535 Babcock Road	San Antonio	MB525654
Live Ultra Lounge	19314 HWY 281N Suite 101	San Antonio	MB868062
Locoe's Sports Bar	1375 Austin HWY	San Antonio	MB253160
Lojax Lounge	4947 Seguin Road	Kirby	MB632054

Bar Name	Address	City	TABC License Number
London Sub & Pub	8425 Bandera Road Suite 140	San Antonio	MB506615
Lone Star Bar & Grill	5520 Randolph Boulevard	San Antonio	MB111229
Loose Moose Pub	19178 Blanco Road Suite 201	San Antonio	MB842150
Los Amigos Ballroom & Training Center	16490 IH 35 South	San Antonio	BG506585
Los Amigos Bar	6925 Old Pearsall Road	San Antonio	BG639002
Los Cocos Lounge	803 Pleasanton Road	San Antonio	BG209740
Los Gallos Bar & Grill	434 Old HWY 90 West	San Antonio	BG277589
Los Jacalitos	1407 Ruiz	San Antonio	BG213097
Los Primos	1118 Pleasanton	San Antonio	BG721247
Los Vegas Sports Bar	5558 Old Pearsall Suite 1	San Antonio	BG878594
Lucky Monkey Sports Bar And Lounge	8143 Latigo Plaza	San Antonio	BG762298
Lucky Monkey Sports Bar And Lounge	8143 Latigo Plaza	San Antonio	MB825573
Lucky's Dude Ranch	1020 Joe Louis Drive	San Antonio	BE161735
Ludus Bar	3400 S Flores	San Antonio	BG908152
Luna	6740 San Pedro	San Antonio	MB540291
Lush Ultra Lounge	453 Loop 1604 Northwest Suite 1201	San Antonio	MB730298
Lyons Lounge	1907 Lyons Street	San Antonio	BG306243
Mad Pecker Brewing Co.	6025 Tezel Road #122	San Antonio	BG911592
Main Street	13477-81 Wetmore Road	San Antonio	MB602457
Mainland Sports Complex	8002 Sand Pebble	San Antonio	BG914904
Make My Day Lounge	12114 Nacogdoches Road	San Antonio	MB496440
Mambo Martini Ultra Lounge	19314 HWY 281 North Suite 101	San Antonio	MB820029
Mango's Sports Bar	115 General Krueger Drive	San Antonio	MB878718
Mansion Delmar Restaurant & Bar	6890 Loop 410 Northwest	San Antonio	MB750264
Manuel Alvarado Post No. 1866 Veterans of Foreign Wars	650 VFW Boulevard	San Antonio	BG451417
Margarita Mania & Party Rentals	3533 Pitluk Avenue	San Antonio	MB821217
Margie's Bar	1135 Old HWY 90 West	San Antonio	BG510642
Margie's Bar & Grill	4823 S Flores Street	San Antonio	BG294797
Market Depot	3339 General Hudnell	San Antonio	BG736051
Martini Club	8507 N McCullough A-9	San Antonio	MB123520
Martini Ranch	4904 W Avenue	San Antonio	MB541627

Bar Name	Address	City	TABC License Number
Marty's Cocktails	603 Isom Suite 101	San Antonio	MB073779
Mary & Bobby's Corner	1621 S New Braunfels	San Antonio	BG313821
Mary's Hideaway	5558 Old Pearsall Road Suite 1	San Antonio	BG770440
Maui Klub	1305 S General McMullen	San Antonio	BG549115
Mc Mullen Bar	619 Old HWY 90 West	San Antonio	BG647721
McFinnigan	7210 Blanco Road	San Antonio	MB724274
MD Bevco Inc.	123 Losoya Street	San Antonio	MB251209
Me And C.A.	8373 Perrin Beitel	San Antonio	MB421813
Me And C.A.	8373 Perrin Beitel	San Antonio	MB827685
Me And C.A.	8373 Perrin Beitel	San Antonio	MB759447
Media Luna Bar & Lounge	308 N Presa	San Antonio	MB828362
Melody's Sports Bar	1821 Bandera Road Suite D	San Antonio	BG944690
Melody's Sports Bar #2	1821 Bandera Road Suite D	San Antonio	BG747664
Memories Lounge	332 Somerset Road	San Antonio	MB717096
Mercado Concessions	227 New Laredo HWY	San Antonio	BG724169
Mercado Concessions	2502 Pleasanton Road	San Antonio	MB900165
Mercado Concessions	2502 Pleasanton Road	San Antonio	BG859413
Mequite Trail Drivers Association Inc.	11663 Ford Road	San Antonio	BG246048
MGM Sports Bar	13580 IH 35 South '1'	Von Ormy	BG562729
Mi Casa Cantina	3316 S Presa Street	San Antonio	BG760027
Miami Bar	602 Loop 410 Northwest Suite 144	San Antonio	MB785409
Michael W Elben VFW Post 8111	704 Hood	San Antonio	BG462708
Midnight Rodeo	12260 Nacogdoches Road Suite 101	San Antonio	MB609708
Midtown Cocktails	2014 E Houston Street	San Antonio	MB632368
Mike's Place Sandra's Billiard	2007 Pleasanton Road	San Antonio	BG521677
Mike's Tavern	3735 Culebra	San Antonio	BG618949
Mink	903 Bitters Road Suite 300	San Antonio	MB714173
Minnie's Ice House	3415 S Presa Street	San Antonio	BG865417
Mirage Club	310 Valley Hi Drive #103	San Antonio	MB707030
Mision Ranch Gran Charro	14524 HWY 281 South	San Antonio	BG881519
Miso Lounge	4435-37 Rittiman Road	San Antonio	MB855183
Missions Untapped	8123 Broadway Suite B	San Antonio	BG873087

Bar Name	Address	City	TABC License Number
Mitchell St. Bar	426 W Mitchell	San Antonio	BG480425
Mitchell's	1923 Lochill Selma Suite 106	San Antonio	MB477356
Mocambo Sports Bar	755 Steves Avenue Suite 1	San Antonio	BG938667
Moe's Zone Sports Bar	1515 S Gevers	San Antonio	BG734363
Monte Carlo Club	4542 W Durango	San Antonio	MB473876
Monterrey Lounge	401 Arbor Place	San Antonio	BG424862
Moonlight Ballroom & Conference Center	7711 Guilbeau Road	San Antonio	BG904220
Morales Ice House	903 Frio City Road	San Antonio	BG529175
Moses Rose's Hideout	516 E Houston Street	San Antonio	MB559546
Mother Teresa Santoyo Center	3311 S Pine Street	San Antonio	BG757991
Motor Transport Post No. 1533 Veterans of Foreign Wars	107 Elm Hurst	San Antonio	NE267476
Motorcycle Club House	1850 E Houston Street	San Antonio	BG906839
Mr. B's Bar B Q	1833 Bandera Road	San Antonio	BG425682
Mulligans	19314 HWY 281 North Suite 109	San Antonio	MB671954
Murphy’s	3302 Clark Avenue	San Antonio	BG485937
Mustang Sally's	3428 Roosevelt Avenue	San Antonio	MB419731
My Brother's Bar	845 N Saint Mary’s Street	San Antonio	BG424517
My Friends Backyard & Sports Bar	442 W Hildebrand	San Antonio	MB792063
My House Lounge	8075 Culebra Road	San Antonio	MB503976
N & L Casino Bar	1552 W Poplar	San Antonio	BG473737
Nairobi Bar & Grill	514 N. Hackberry Street	San Antonio	MB547111
Nalc Alamo Branch 421 Inc.	125 W Grayson	San Antonio	BG265003
Nancy's Place	6900 S Flores	San Antonio	BG825347
Nando's Ice House	18460 IH 37 South	San Antonio	BG255613
Neal's Ice Station	4904 S Presa	San Antonio	BG200795
Nectar	214 Broadway Suite 103	San Antonio	BG906061
Nektar	19239 Stone Oak Parkway Suite 110	San Antonio	MB806859
Nesta	122 Nogalitos	San Antonio	BG863728
New Orleans Bar	226 W Bitters Road Suite 105	San Antonio	MB771464
New York Bar	2838 Loop 1604 Northeast Suite 105	San Antonio	MB715828

Bar Name	Address	City	TABC License Number
Nexus Martini Bar & Grill	4553 N Loop 1604 West Suite 1101	San Antonio	MB788288
Nightrocker	605 San Pedro	San Antonio	MB736544
Nirvana	18730 Stone Oak Parkway Suite 108	San Antonio	MB825361
Nite Owlz Bar	1843 Rigsby Avenue	San Antonio	BG830045
Noche Caliente	2502 Pleasanton Road	San Antonio	MB500415
Nola Tropical Winery	849 E Commerce Street Suite 661	San Antonio	BG787807
North Frio Cantina	904 W Houston	San Antonio	BG567477
North Stone Street Pub & Bistro	1827 Loop 1604 East North Suite 103	San Antonio	MB848597
Northeast Golf Center	450 Ira Lee Road	San Antonio	BE508708
Northwest Beverage Corporation	611 Loop 410 Northwest	San Antonio	MB427777
Northwoods Ice Center	17530 Henderson Pass	San Antonio	BG538415
Nothing To Do Sports Bar	5525 FM 78	Kirby	BG741308
O Malley's	8637 Fredericksburg Road Suite E	San Antonio	MB246169
Oak Hills Tavern	7920 Fredericksburg Road Front Building 'A'	San Antonio	MB252250
Oasis Lounge	502 Embasy Oaks Suite 142	San Antonio	MB529501
Ojos Locos Sports Cantina	5809 Loop 410 Northwest	San Antonio	MB756644
OK West	2502 Pleasanton Road	San Antonio	MB828648
Ol Richter's	4642 Risgby	San Antonio	BG237392
Old Tin Barn Saloon	1405 N Colorado #1	San Antonio	BG316744
Olga's Bar & Grill	1903 S Brazos	San Antonio	BG803410
Oma Services LLC	203 Loop 1604 North West #180	San Antonio	MB701628
On The Corner	8839 Culebra Road Suite 101	San Antonio	BG909729
On The Half Shell	202 Navarro	San Antonio	MB568546
On The Rocks Pub	270 Losoya	San Antonio	MB884551
One-O-Six Off Broadway	106 Pershing	San Antonio	MB239042
Original Cadillac Bar of Nuevo Laredo Inc.	212 S Flores Street	San Antonio	MB159568
Orphan Annie's Lounge	3621-23 W Avenue	San Antonio	MB193009
Ounce Steakhouse	1401 FM 1604 W North Suite 105	San Antonio	MB762385

Bar Name	Address	City	TABC License Number
Our Glass	1301 Pat Booker Suite A	Universal City	MB220331
Our Lady Queen of Heaven Catholic Church	11150 Macdona Lacoste Road	Atascosa	BG749748
Our Place	910 W Avenue	San Antonio	BG548652
Overtime Sports Bar	1843 Rigsby Avenue	San Antonio	BG796323
Ozuna's Party House	19579 HWY 16 South	Von Ormy	BG469666
Padilla's Ice House	8510 HWY 81 South	San Antonio	BG269116
Paisano's Bar	5501 S Flores	San Antonio	BG694480
Pan Am Plaza	1419 Commercial	San Antonio	BG445508
Pan American Party House And Restaurant	1446 Division	San Antonio	BG096361
Pancho's	17125 Old Pleasanton Road '1'	San Antonio	BG650854
Papa Woody's Roadhouse	8902 S Presa	San Antonio	MB676606
Paper Tiger	2410 N Saint Mary’s Street	San Antonio	MB903950
Pat O'Brien's - San Antonio	121 Alamo Plaza	San Antonio	MB520118
PDMV Productions LLC	1223 E Houston Street	San Antonio	MB880134
Pecan Grove Drive Inn	1526 Roosevelt	San Antonio	BG218428
Pegasus	1402 N Main	San Antonio	MB516824
Pepper Patch Lounge	2402 Pinn Road	San Antonio	MB759957
Perfect Ten Mens Club	111 Loop 410 Northwest	San Antonio	MB256471
Pete's Bar	2622 W Southcross	San Antonio	BG575581
Pete's Place Spirits & More	14743 Old Bandera Road Unit 9	Helotes	MB903021
Phantom Room	2106 N Saint Mary’s Street	San Antonio	MB898882
PHX	7959 Broadway Suite 500	San Antonio	MB804044
Picks	4553 N Loop 1604 West Suite 1101	San Antonio	MB897525
Pigpen's	106 Pershing	San Antonio	MB927329
Pinks Patio	930 Broadway	San Antonio	BG920185
Pipo's Lounge	18881 FM 1937	San Antonio	BG168314
Pipo's Lounge	18881 FM 1937	San Antonio	BG944262
Pirate Tavern	8748 Grissom Road Suite 2	San Antonio	MB768173
Plaza Mexico	13455 HWY 16 South	San Antonio	BG679587
Plaza Party House	4045 Commercial	San Antonio	BG212349
Plumber Joe's	5320 S Presa Street	San Antonio	BG938924
Pole Vaulter's	3830 Parkdale Suite 103	San Antonio	MB827887
Polly Esther's And Acapulco Sam's	212 College Street	San Antonio	MB443456
Polo's Bar	507 HWY 90 West	San Antonio	BG755096

Bar Name	Address	City	TABC License Number
Polonia Woodrow Wilson Society Lodge 2540	2611 Mission Road	San Antonio	BG479341
Pop's Ice House	1046 Bandera Road	San Antonio	BG281382
Pops Tavern	4604 S Zarzamora	San Antonio	BG769762
Port S.A. Patio Sports Bar & Grill	2007 Frio City Road	San Antonio	BG764760
Pour House	4750 Seguin Road	San Antonio	MB249239
Presidents Club	9710 Airport Boulevard Terminal B Suite B2A048	San Antonio	MB452448
Pressure Cooker	8024 Fredericksburg Road	San Antonio	MB420082
Prestige Bar & Lounge	5207 McCullough	San Antonio	MB686159
Pretty Girl Lounge	2127 Frio City Road	San Antonio	BG841659
Pretty Nice Saloon	1016 Cincinnati	San Antonio	BG249737
Pronto's Ice House	5801 S Flores Street	San Antonio	BG521971
Pub 9 Cocktail Lounge	914 Burr Road	San Antonio	MB612401
Pulse Bar & Night Club	523 Med Court Suite 105	San Antonio	MB798396
Puzzles Lounge	3111 TPC Parkway Suite 106	San Antonio	MB739717
Python Partners	12311 Nacogdoches Road Suite 111	San Antonio	MB752229
Q Curve	206 Menefee Boulevard	San Antonio	BE056321
Quarry Hoffbrau & Beer Garden	7310 Jones Maltsberger	San Antonio	MB697769
R & J Lounge	1102 Pleasanton Road	San Antonio	BG577827
R & J Lounge #2	18086 Pleasanton Road	San Antonio	BG746785
R & J Music Pavilion	18086 Pleasanton Road	San Antonio	MB861488
R Bar	5310 Rittiman Road	San Antonio	MB687871
R Sala	9710 Airport Boulevard Terminal B Suite TS-207	San Antonio	MB761457
Rad Bar & Grill	19239 Stone Oak Parkway Suite 101	San Antonio	MB840467
Raffles Restaurant & Bar	1039 Loop 410 Northeast	San Antonio	MB198707
Raffles Restaurant & Bar	1039 Loop 410 Northeast	San Antonio	MB920935
Rainbow Lounge	4970 W Military Drive	San Antonio	MB856786
Rainbow Lounge	4970 W Military Drive	San Antonio	MB108000
Ramiro Cervera's Club Miami	3534 Fredericksburg Road Suite 14	San Antonio	BG285325
Rancho 3 Potrillos	17021 FM 1937	San Antonio	BG621659
Rancho Bar & Grill	2606 W Southcross	San Antonio	BG641278
Rancho Charro El Milagro	10415 Colwell Road	Atascosa	BG503438
Rancho Los Compadres	175 Loop 1604 South East	San Antonio	BG937935

Bar Name	Address	City	TABC License Number
Rascal & Tina's Nite Club	2127 Frio City Road	San Antonio	BG841662
Raven's Cabaret - The Devil's Point	13952 HWY 181 South	San Antonio	MB903778
Raven's Cabaret - The Devil's Point	13952 HWY 181 South	San Antonio	BG885859
Ray Rangel Post 399 American Legion	2628 W Southcross Boulevard	San Antonio	BG826408
RC's Burgundy Ballroom	1906 Fredericksburg Road	San Antonio	BG628295
Ready-Mix Lounge	619 Old HWY 90 West	San Antonio	BG410120
Rebar	8134 Broadway	San Antonio	MB525561
Recovery Room	1139 Harry Wurzbach Including 1143	San Antonio	MB535339
Red Cliff's Place	140 Kiefer	San Antonio	BG762353
Red Square Bar	11851 Bandera Road Suite 119	San Antonio	MB768126
Red Zone Sports Bar	1353 Bandera Road	San Antonio	MB651923
Redland Roadhouse	19314 HWY 281 N Suite 107	San Antonio	MB749199
Reggae Bar	2016 Austin HWY	San Antonio	MB898947
Reggae Bar	2016 Austin HWY	San Antonio	BG729956
Rehab Ultra Lounge	7460 Callaghan Road Suite 202	San Antonio	MB782524
Reina's Cantina Sports Bar	2312 Guadalupe	San Antonio	BG691249
Rejects Sports Bar	2102 Quintana Road	San Antonio	BG745776
Reptilez Venue	5418 Old HWY 90 West	San Antonio	MB540267
Residence Inn San Antonio	5707 Rim Pass Drive	San Antonio	BG734119
Residence Inn San Antonio	2838 Cinema Ridge	San Antonio	BG
Retox Bar	1031 Patricia Suite 105	San Antonio	MB674813
Reyes Bar & Cafe	113 N Flores	San Antonio	BE236246
Rick's	836 Bynum	San Antonio	BG725604
Rick's Cabaret	5418 Brewster Street	San Antonio	MB520521
Rick's MVP	2432 Nogalitos	San Antonio	MB497763
Ringside Sports Bar	1163 E Commerce	San Antonio	BG563272
River City Sports Bar	4710 S Presa	San Antonio	BG646660
RJ'S Lounge	4234 Culebra Road	San Antonio	BG494903
Roadhouse Saloon	6159 FM 78	San Antonio	MB443256
Roadrunner Cantina	14541 Roadrunner Way	San Antonio	MB654700
Rock & Roll Inn	1302 E Carson	San Antonio	BG436327

Bar Name	Address	City	TABC License Number
Rocky's Tavern	11403 O'Connor Road Suite 106	San Antonio	MB857919
Rod Dog's	2617 Wagonwheel	San Antonio	MB401212
Rookie's Bar	6402 Callaghan Road	San Antonio	MB433093
Rookies Too	9200 Broadway Unit 101	San Antonio	MB135861
Roosevelt Buffet	119 S Flores Street	San Antonio	BG156988
Rosie's Lounge	439 Fredericksburg Road	San Antonio	BG664580
Rosie's Tavern	160 New Laredo HWY	San Antonio	BG730044
Roxy Sports Bar	2801 Pat Booker Road	San Antonio	MB760071
Roxy Sports Bar	3249 Wurzbach Road	San Antonio	MB516055
Royal Palace Ballroom	3506 W Military Drive	San Antonio	BG660494
RPM Sports Bar	9431 Southton Road	San Antonio	BG737427
RTI Beverage Company L.L.C.	3855 IH 35 North	San Antonio	MB699086
Ruben's	15069 IH 35 North	Selma	BG297484
Ruby Red Cocktails	6715 HWY 90 West	San Antonio	MB695636
Rumors Lounge	5139 W Commerce	San Antonio	BG736344
Run TMJ LLC	9091 Fair Oaks Parkway Suite 201	San Antonio	MB781790
Rupo's Sports Bar	5704 S Presa	San Antonio	BG790555
Rush	7959 Broadway Suite 500	San Antonio	MB666979
S W C Club	1210 E Elmire Suite 1	San Antonio	MB638231
SA Colt 45 LLC	11056 HWY 16 South	San Antonio	BG
Sabor	6809 Loop 1604 Northwest	San Antonio	MB854440
Sacred Heart Civic Center	2123 W Commerce	San Antonio	BG401575
Saddle Up Saloon	1031 Patricia Suite 105	San Antonio	MB777206
Saint James Catholic Church	907 W Theo	San Antonio	BG492990
Saint Vincent de Paul Bar And Grill Club Inc.	5763 Ray Ellison Drive	San Antonio	BG567342
Sally's Happy Hut	1902 W Avenue	San Antonio	BG673803
Salon San Martin	1742 Dahlgreen Building 2	San Antonio	BG429672
Salsalito Cantina	14535 Nacogdoches Road	San Antonio	MB845401
Salsalito Cantina	11703 Bandera Road	San Antonio	MB845614
Salud	8123 Broadway Suite D	San Antonio	MB572021
Salute	2801 N Saint Mary's Street	San Antonio	MB222813
Sam Houston Post No. 76 Veterans of Foreign Wars	10 10th Street	San Antonio	BG305064
San Antonio Aerie No. 70 Order of Eagles	2230 Hunt Lane	San Antonio	MB539662
San Antonio Hermann Sons Home Association	525 S Saint Mary's Street	San Antonio	BG025819

Bar Name	Address	City	TABC License Number
San Antonio Lodge No. 744 Loyal Order of Moose Incorporated	826 Highland Boulevard	San Antonio	NE082336
San Antonio Mens Club	8244 Interchange Parkway	San Antonio	MB539794
San Antonio Target Hunting And Fishing Club	6722 Hausman Road	San Antonio	BG538747
San Juan Nite Club	1515 S Gevers	San Antonio	BG748473
Sanchez Ice House	819 S San Saba	San Antonio	BG259051
Sanchez Ice House #2	701 Seguin Street	San Antonio	BG533104
Sandra's	1006 VFW Boulevard Building 1	San Antonio	BG777699
Santa's Place	417 Spriggsdale	San Antonio	MB733949
Schooner's	1325 Loop 410 Northeast	San Antonio	MB562588
Secrets Gentleman's Club of San Antonio	118 New Laredo HWY	San Antonio	MB705443
Security Service V.F.W. Post 6012	4810 SW Military Drive	San Antonio	NE066217
Senor Tequila Mexican Grill & bar	110 Produce Row Suite 2-3 And 4	San Antonio	MB741815
Sepio's Ice House	4219 Culebra Road	San Antonio	BG473304
Serna's Backyard	12023 Potranco Road	San Antonio	MB762864
SGT WM J Bordelon Post 4700 VFW	2217-19 Frio City Road	San Antonio	BG277391
Shady Acre Tavern	12003 HWY 90 East	Schertz	BG296851
Shady Lady Saloon	3603 S WW White Road	San Antonio	MB426760
Sharkey's	2101 W Martin	San Antonio	BG437203
Shenanigans Sports Bar And Lounge	6422 Babcock Road Suite 101	San Antonio	MB725311
Shenanigans Sports Bar And Lounge II	8827 HWY 151 Suite 106	San Antonio	MB866203
Shenanigans Club	4032 Vance Jackson	San Antonio	MB819621
Sherlock's Baker Street Pub-Park Oaks	16620 HWY 281N Suite 1	San Antonio	MB751104
Sideliners Grill	15630 Henderson Pass	San Antonio	MB669634
Silk Ultra Club	7959 Fredericksburg Road Suite 131	San Antonio	MB484829
Silver Bullet	10929 Nacogdoches '3'	San Antonio	BG266529
Silver Dollar Saloon	1812-18 N Main Avenue	San Antonio	MB726741
Silver Fox	24802 Ima Ruth Parkway	San Antonio	MB791188
Silver Rio Beverages L.L.C.	420 W Market	San Antonio	MB460231

Bar Name	Address	City	TABC License Number
Silverado Event Center Inc.	16490 IH 35 South	Atascosa	BG929394
Silverado Rodeo	7030 Old Pearsall Road	San Antonio	BG693371
Silverado Rodeo	7030 Old Pearsall Road	San Antonio	MB756766
Silverado Sports Bar	1230 Probandt Suite 101	San Antonio	BG907452
Sin Bar Club Lounge	18322 Sonterra Place Suite 107	San Antonio	MB631013
Sin City Nite Club	820 San Pedro Avenue	San Antonio	MB893578
Sir Winston's Cigar Bar	2522 Nacogdoches Road	San Antonio	MB482223
Sir-Vesa's Cantina	10693 HWY 87 East	Adkins	BG735724
Sista's Marker 21	6690 FM 1346	San Antonio	BG815330
Sista's Sports Bar	1228 E Cesar Chavez Boulevard	San Antonio	BG941882
Sister's Bar	1228 E Cesar Chavez Boulevard	San Antonio	BG871247
Skinny's Place	303 Bellinger	San Antonio	BG182957
Slacker's	12234 Nacogdoches Road	San Antonio	MB934333
Slackers	126 W Rector Street Suite 136	San Antonio	MB791784
Slick Willie's Family Pool Hall	6436 Loop 410 Northwest	San Antonio	MB545356
Smitty's Pub	4121 Gardendale	San Antonio	MB244327
Smoke BBQ Restaurant	700 E Sonterra Boulevard Suite 1117	San Antonio	MB903894
Sociedad Fraternal Cruz Blanca	1619 W Poplar	San Antonio	BG662358
Socorro's Bar	802 N Alamo	San Antonio	BG757476
Soho Wine & Martini Bar	235 E Commerce Street	San Antonio	MB647339
Solari Reception Hall	111 Daniels Road	San Antonio	BG881528
Sombras Night Club	851 Cincinnati Avenue	San Antonio	BG318395
Somebody's Bar	2603 Rigsby Avenue	San Antonio	BG666126
Somerset Gene Ramirez American Legion Post 443	20295 Somerset Road	Somerset	NE841466
Sonterra Beverage	18323 Sonterra Place	San Antonio	MB762321
Sonterra Beverage	18323 Sonterra Place	San Antonio	MB910556
South Presa Ice House	3415 S Presa	San Antonio	BG573752
Southend Bar	116 W Mitchell	San Antonio	BG821007
Southside Bar	7507 New Laredo HWY	San Antonio	BG611700
Southtown 101	101 Pereida	San Antonio	BG730712
Southtown 101	101 Pereida	San Antonio	MB814536

Bar Name	Address	City	TABC License Number
Spanky's #2 Sports Bar	10875 Pleasanton Road Suite 1	San Antonio	BG888909
Spanky’s	5103 Randolph Boulevard	San Antonio	MB766586
Spanky’s	5103 Randolph Boulevard	San Antonio	MB445161
Spanky’s Clubhouse Bar	5042 Sherri Ann	San Antonio	MB834051
Sparks	8009-11 Webbles	San Antonio	MB166202
Sparky's Pub	1416 N Main	San Antonio	MB736385
Spectrum	226 N Saint Mary’s Street	San Antonio	MB429604
Spectrum	224 E Houston Street	San Antonio	MB418155
Spice Asian Bistro	434 Loop 1604 North Suite 2101	San Antonio	MB633721
Spinners	2308 Blanco Road	San Antonio	BG509625
Splach	905 Nogalitos	San Antonio	MB536687
Sportsman's Bar	9204 FM 78	Converse	MB802606
Sportsman's Bar	101 Gibbs Sprawl Road	Converse	BG624165
Spotlight Lounge	826 San Pedro Avenue	San Antonio	MB608389
Springhill Suites - San Antonio	3636 Loop 410 Northwest	San Antonio	BG878717
Springhill Suites San Antonio Seaworld/Lackland	136 Richland Hills Drive	San Antonio	BG
Springhill Suites San Antonio Airport	514 Loop 410 Northwest	San Antonio	BG
Spurr 122 Cocktails	10620 HWY 181 South	San Antonio	MB657250
Squeeze Box Saloon	743 Old HWY 90 West	San Antonio	BG861097
Squeeze Inn Sports Bar & Club	1755 S General McMullen	San Antonio	BG858981
SSG Hospitality Inc.	1174 E Commerce Street Suite 2	San Antonio	MB463932
St Henry's Catholic Church Hall	110 Keller	San Antonio	BG429631
St Leo the Great Community Center	4423 S Flores Building 2	San Antonio	BG540645
St. Bonaventure Activity Center	1918 Palo Alto Building 2	San Antonio	BG555550
St. Clare Parish Center	7701 Somerset Road BLDG 3	San Antonio	BG778522
St. Hedwig Post 529 American Legion	14410 FM 1346	Saint Hedwig	BE133020
St. Joan of Arc Church	2829 Ackerman Road	Kirby	BG754999

Bar Name	Address	City	TABC License Number
St. Josephs Roman Catholic Benevolent Association	420 E Cesar Chavez Boulevard	San Antonio	BG135053
St. Lawrence Catholic Church	236 E Petaluma	San Antonio	BG527787
St. Leonard's Parish Hall	8510 S Zarzamora	San Antonio	BG545387
St. Leonard’s Parish Hall	8510 S Zarzamora Street	San Antonio	BG936269
St. Luke's Catholic Church Family Center	4603 Manitou	San Antonio	BG711621
St. Margaret Mary's Activity Center	1314 Fair	San Antonio	BG537854
St. Mary Magdalene Pastoral Council Inc.	1720 Clower	San Antonio	BG263140
St. Paul Catholic Church Concessions Inc.	1201 Donaldson	San Antonio	BG575112
Stacy's Sports Bar	3805 Blanco Road	San Antonio	MB461584
Stats	4110 Naco Perrin	San Antonio	MB542694
Staybridge Suites Downtown at Sunset Station	123 Hoefgen	San Antonio	BG811422
Steely Nevada's	7530 Bandera Road Suite 138	San Antonio	MB553137
Stone Street Pub	16525 Huebner Suite 105	San Antonio	MB750140
Stokers Sports Bar	703 Roosevelt	San Antonio	BG498666
Suede Lounge	231 E Houston	San Antonio	MB604310
Suga A's	9291 IH 10 East	San Antonio	BG295114
Sugah's Shady Oaks	22115 HWY 281 South	San Antonio	BG833879
Sugars	2731 Loop 410 Northwest	San Antonio	MB437968
Sugartime	2730 Bill Miller Lane	San Antonio	MB254649
Sulema's Lounge	2850 Culebra #2	San Antonio	BG719360
Sumthing Different	6525 Walzem Road	San Antonio	BG744138
Sunday Rivers Bar	755 Steves Avenue 1	San Antonio	BG804125
Sunset Bar	3601 Nogalitos	San Antonio	BG482780
Sunset Cocktail Club	2026 Austin HWY	San Antonio	MB649110
Sunset Ice	3601 Nogalitos	San Antonio	BG788152
Sunshine Wine On Sunset	362 W Sunset Road	San Antonio	BG728094
Surf Food And Beverage Inc.	3600 IH 35 North	San Antonio	BG318030
Sweet Dreams Event Center	822 N Alamo	San Antonio	MB891774
Swig Inc.	111 W Crockett Street Suite 205	San Antonio	MB408468

Bar Name	Address	City	TABC License Number
T J's Drive Thru	403 Culebra Road	San Antonio	BE401216
Tabooze	1134 W Hildebrand	San Antonio	BG610656
Taco Palenque	1002 Loop 410 Northeast	San Antonio	MB767595
Tacoland	103 W Grayson	San Antonio	MB861661
Tahoe	5930 S Flores	San Antonio	MB656162
Tampico Bar	2241 Cincinnati	San Antonio	BG766165
Tank's Pool and Darts	4714 S Hackberry	San Antonio	BG747637
TBA	2801 N Saint Mary's Street	San Antonio	MB839599
TC's Sports Bar	3503 Commercial Avenue	San Antonio	BG821425
TC's Sports Bar	3503 Commercial Avenue	San Antonio	BG721551
Tee Time Sports Bar	1805 Roosevelt	San Antonio	BG621015
Tee's Mixer	2512 Loop 410 Southwest Suite 2 & 3	San Antonio	MB803873
Tejano Country	6525 Walzem Road	San Antonio	BG865346
Tejano Country	6525 Walzem Road	San Antonio	MB925295
Tejano Pride	1321 N Zarzamora	San Antonio	BG708835
Tejano Ranch	3206 Pleasanton Road	San Antonio	BG944480
Tejano South	836 Bynum	San Antonio	BG562628
Tekila's Sports Bar & Cantina LLC	2512 Loop 410 Southwest Suite 2	San Antonio	MB929788
Tequila Island	622 Roosevelt	San Antonio	BG746202
Tequila Island Grill	622 Roosevelt Avenue	San Antonio	BG774520
Tequila Night Club	119 El Mio	San Antonio	MB701205
Tequila Texas	9323 Perrin Beitel Suite 201	San Antonio	MB890548
Tex Mart #3	7121 New Laredo HWY	San Antonio	BE533349
Texan Ice House	10875 Pleasanton Road Suite 1	San Antonio	BG299005
Texas Boiler Room	8800 Broadway Suite 102	San Antonio	MB723864
Texas "T" Pub	121 Broadway	San Antonio	MB185676
Texas Ice House	12291 HWY 181 South	San Antonio	BG939959
Texas Ice House	12291 HWY 181 South	San Antonio	BG697238
Texas Ice Service	4102 Blanco Road	San Antonio	BG526649
Texas Latino Ice House	1501 S Zarzamora	San Antonio	BG615677
Tha Gemini Bar	160 New Laredo HWY	San Antonio	BG785359
The 151 Saloon	10619 Westover Hills Boulevard	San Antonio	MB848431
The Amp Room	2407 N Saint Mary's Street	San Antonio	MB900248
The Angry Elephant Cigar Bar	23535 IH 10 West Suite 1101	San Antonio	MB854815
The Angry Elephant/The Roo Pub	19314 HWY 281N Suite 107-109	San Antonio	MB810408

Bar Name	Address	City	TABC License Number
The Annex	330 San Pedro Avenue	San Antonio	MB409424
The Aquifer Bar	19178 Blanco Road Suite 201	San Antonio	MB752003
The Army Residence Community	10000 Rhineland Drive	San Antonio	BG793662
The Army Residence Community	7400 Crest Way	San Antonio	BG793662
The Aztec Bar	9870 Wurzbach Road	San Antonio	BG943038
The Aztec Theater	104 N Saint Mary's Street Suite 200	San Antonio	MB921295
The Bang Bang Bar	119 El Mio	San Antonio	MB471035
The Bar On Broadway	2411 Broadway Suite A	San Antonio	BG656896
The Bar On Walzem	4422 Walzem	San Antonio	BG742229
The Beach	231 E Cevallos	San Antonio	MB473879
The Beer Depot	1304 S Laredo	San Antonio	BG888135
The Bend Sports Bar	7730 Bandera Road	San Antonio	MB429142
The Big T Ice House	11781 FM 1346	Saint Hedwig	BE101342
The Big T Ice House	11781 FM 1346	Saint Hedwig	BG851167
The Big T Road House	11781 FM 1346	Saint Hedwig	BG857915
The Boss	1006 E White	San Antonio	BG539799
The Boss Bar	3538 Pin Oak Drive	San Antonio	MB631550
The Brick	108 Blue Star	San Antonio	BG896102
The Brooklynite	516 Brooklyn	San Antonio	MB647636
The Bubbleroom LLC	1846 Look 1604 North West Suite 110	San Antonio	BG729911
The Bunratty Pub	4515 Fredericksburg Road #4	Balcones Heights	MB470467
The Club House	2300 Ave B	San Antonio	BG708291
The Concept	4250 Thousand Oaks	San Antonio	MB664236
The Crazy Ape	9930 San Pedro	San Antonio	MB206003
The Daquiri Lounge	8275 FM 78 Suite 12	Converse	BG637231
The Dorm	9527 Poteet Jourdanton Freeway	San Antonio	MB746920
The Draft Sports Bar & Grill	22015 IH 10W Suite 101	San Antonio	MB915735
The Eleventh Hour	5103 Randolph Boulevard	San Antonio	MB832172
The Esquire Tavern	115 E Commerce Street	San Antonio	MB732953
The Falls	226 Bitters Road Suite 120	San Antonio	MB712131
The Fifth Room	523 Med Ct Suite 105	San Antonio	MB782850

Bar Name	Address	City	TABC License Number
The Filling Station Tap Room	701 S Saint Mary’s	San Antonio	BG660780
The Flying Saucer Draft Emporium	11255 Huebner Road Building 2 Suite 212	San Antonio	BG504425
The Friendly Spot Ice House	943 S Alamo	San Antonio	BG702780
The Gatsby San Antonio	18730 Stone Oak Parkway Suite 108	San Antonio	MB444032
The Good Life Sports Bar	6820 Ingram Road	San Antonio	MB856391
The Grand Ballroom	3711 Roland	San Antonio	BG677005
The Grape Wine Company of San Antonio	1747 Citadel Plaza Suite 112	San Antonio	BG222851
The Green Lantern	20626 Stone Oak Parkway Suite 120	San Antonio	MB701041
The Growler Exchange	8313 Broadway Street	San Antonio	BG933742
The Hangar	8203 Broadway	San Antonio	MB750932
The Hangar	8203 Broadway	San Antonio	MB913835
The Hangar Tavern	14532 Brook Hollow Boulevard	San Antonio	MB649676
The Hidden Tavern	11407 W Avenue	San Antonio	MB552024
The Hidden Treehouse	4103 Rittiman Road	San Antonio	MB745498
The Hideaway Bar	1134 W Hildebrand	San Antonio	MB791017
The Hoppy Monk - San Antonio	1010 Loop 1604 Northeast	San Antonio	MB871142
The House LLC	732 S Alamo	San Antonio	MB907219
The Industry	8021 Pinebrook	San Antonio	MB667584
The Irish Pub	9726 Datapoint Drive	San Antonio	MB541348
The Josephine Theatrical Company Inc.	339 W Josephine Street	San Antonio	MB525721
The Korner Klub	1301 Roosevelt Avenue	San Antonio	BG628732
The Korova	107 E Martin	San Antonio	MB738081
The Last Word Cocktail Bar	229 E Houston Street Suite 10	San Antonio	MB893317
The Local Bar	600 N Presa	San Antonio	MB748778
The Long Bar	18402 HWY 281 North Suite 128	San Antonio	MB723079
The Longbranch	11070 HWY 87E #1	San Antonio	BG528985
The Looking Glass	1720 McCullough	San Antonio	MB846927
The Lost Bar & Grill	12730 NW Military HWY Suite 110	San Antonio	MB703452
The Lucky Saloon Bar	17680 IH 35 South	Lytle	MB938368
The Mad Marlin	8123 Broadway Suite A	San Antonio	MB894862

Bar Name	Address	City	TABC License Number
The Mansion Club/Grotto VIP	7460 Callaghan Road Suite 333	San Antonio	MB568766
The Marketplace at Fairfield Inn & Suites	422 Bonham Street	San Antonio	BG779370
The Marketplace at Springhill Suites	411 Bowie	San Antonio	BG779371
The Mix	2423 N Saint Mary's Street	San Antonio	MB419069
The Moose Club	3345 Cato	San Antonio	MB491500
The Night Owl Lounge	2313 S Flores Street	San Antonio	BG005762
The Office	4836 Rittiman Road	San Antonio	MB640229
The Original Texas Ice House	12291 HWY 181 South	San Antonio	BG889623
The Palace Men's Club	2482 Loop 410 Northeast	San Antonio	MB416551
The Park Sports Bar	6565 Babcock Road Suite 9 and 10	San Antonio	MB749341
The Parlor	8015 Bandera Road Suite 108	San Antonio	MB795972
The Pawn Pub	100 Village Green	Universal City	MB098238
The Pedicab Bar & Grill	415 E Cevallos	San Antonio	BG719680
The Playhouse San Antonio	800 W Ashby Place	San Antonio	MB870350
The Point Park and Eats	24188 Boerne Stage Road Including 24192	San Antonio	BG780995
The Pointe Martini Lounge	19178 Blanco Road Suite 201	San Antonio	MB644470
The Reservoir Bar	306 N Presa	San Antonio	MB947027
The Rib Train	7401 Wurzbach Road	San Antonio	MB765649
The Ringer Pub	2626 Thousand Oaks Drive	San Antonio	MB922423
The Road House Saloon	6159 FM 78	San Antonio	MB816219
The Roadhouse Saloon	6159 FM 78	San Antonio	MB884342
The S.A. Country	10127 Coachlight	San Antonio	MB818839
The Safe House Drinkery	5450 Babcock Road #140	San Antonio	MB483946
The Saint	800 Lexington Avenue	San Antonio	MB733558
The Saint	800 Lexington Avenue	San Antonio	MB821369
The Saint	800 Lexington Avenue	San Antonio	MB865617
The Silverado	1230 Probandt Suite 101	San Antonio	BG626120
The Social House	19160 Stone Oak Parkway Suite 104	San Antonio	MB722268
The Speedway Sports Bar	8811 Grissom Road	San Antonio	MB618964
The Speedway Sports Bar	9055 Marbach Road Suite 112	San Antonio	MB689866

Bar Name	Address	City	TABC License Number
The Spot	10738 Braun Road Suite 1	San Antonio	MB
The Squeezebox	2806 N Saint Mary's Street	San Antonio	MB941494
The Steer	735 SE Military Drive	San Antonio	MB151457
The Stetson Bar Inc.	7350 Tezel Road #108	San Antonio	MB197416
The Stockyard Saloon	10619 Westover Hills Boulevard	San Antonio	MB431357
The Tap Exchange	22250 Bulverde Road Suite 106	San Antonio	MB790393
The Texan	4518 West Avenue	San Antonio	BG533347
The Texan	4518 West Avenue	San Antonio	MB860180
The Texan II	114 Jefferson	San Antonio	MB543972
The Ticket	2617 Pat Booker Road Suite 102	Universal City	MB727339
The Ticket Sports Pub	420 E Houston Street	San Antonio	MB658636
The Trap	4711 Pecan Valley	San Antonio	MB099917
The Turning Point	753 Isom Road	San Antonio	MB736581
The Watering Hole	9809 Fredericksburg Road #2	San Antonio	MB722395
The Watering Hole At the Range	26254 IH 10 W Suite 500	San Antonio	BG758954
The Web House Cafe & Bar	320 Blanco Road	San Antonio	MB636763
The White Rabbit Pizzeria	2410 N Saint Mary’s Street	San Antonio	BG667786
The Wild Rhine Sportsbar	1422 SW Military Drive	San Antonio	MB703064
The Wild Rhine Sportsbar	1422 SW Military Drive	San Antonio	MB857841
The Wine Loft	20079 Stone Oak Parkway Suite 3100	San Antonio	MB748512
The Worm	123 Losoya Suite 7	San Antonio	MB737986
Thirsty Horse Saloon	2335 NW Military	San Antonio	MB722632
Thirsty Monkey	1321 N Zarzamora Street	San Antonio	BG919996
Thirsty Turtle	1626 Loop 410 Northeast	San Antonio	MB512483
Thirsty's Sports Bar	5704 S Presa	San Antonio	BG738488
Three Legged Monkey	2313 NW Military HWY Suite 115	San Antonio	MB681017
Tierra Caliente Bar	22855 HWY 16 South	Von Ormy	BG812997
Tiffany	338 Valley Hi Drive	San Antonio	MB640156
Tiffany's Cabaret of San Antonio	8736 Wurzbach	San Antonio	MB252497
Tiki Tiki	1628 S Presa	San Antonio	MB880775
Tilted Kilt Pub & Eatery	2070 N Loop 1604	San Antonio	MB768256
Timberhill Tavern	5251 Timberhill Suite 201	San Antonio	MB807339

Bar Name	Address	City	TABC License Number
Time Out	719 N General McMullen Drive	San Antonio	BG931322
Time Out Sports Bar	8021 FM 78 #109	Converse	MB242538
Time Out Sports Bar	719 N General McMullen Drive	San Antonio	BG726756
Time Warner Cable Park	12001 Wetmore Drive	San Antonio	BG427733
Timeline	2831 Loop 410 Northwest	San Antonio	MB731130
Timeout Sports Bar	719 N General McMullen Drive	San Antonio	BG876752
Timeout Sports Bar	719 N General McMullen Drive	San Antonio	BG817252
Tom's Cats	4922 SW Military Drive	San Antonio	MB435946
Tomate's Sports Bar	5702 S Presa	San Antonio	BG687539
Tonic	5500 Babcock Road #117	San Antonio	MB668496
Tony's	206 Brooklyn	San Antonio	BG484765
Townplace Suites San Antonio Downtown	409 E Houston Street	San Antonio	BG
Tra's Country	4422 Walzem Road	San Antonio	MB835473
Trail Riders Bar	13585 Luckey Road	Atascosa	BG633198
Tres Aces Sports Bar	2127 Frio City Road	San Antonio	BG659604
Tres Amigas	10703 Pleasanton Road	San Antonio	BG811839
Triple J's Pub	3400 S Flores	San Antonio	BG736340
Triple J's Pub	3400 S Flores	San Antonio	BG859411
Triple J's Tavern	5402 Old HWY 90 West	San Antonio	BG672517
Tropical Hideaway Sports Bar	3003 Colt Drive	San Antonio	BG830267
Tropicana Sports Bar	1515 S Gevers	San Antonio	BG893747
Tropicana Sports Bar	1515 S Gevers	San Antonio	BG838032
Tropicana Sports Bar	1515 S Gevers	San Antonio	BG786295
Troy's Other Place	2006 Austin HWY	San Antonio	BG638935
Tryst	11881 Bandera Road Suite 201	San Antonio	MB676055
Tubby's Tavern	1402-04 Cupples Road	San Antonio	BG742939
Tucker's Kozy Korner	1338 E Houston Street	San Antonio	MB650341
Twenty Grand	5943 Bandera Road	San Antonio	MB231315
Two Of Hearts	619 Old HWY 90 West	San Antonio	BG775167
Tyler's Place	907 S Pine Street	San Antonio	MB121873
Un Sueno Bar	1619 W Malone	San Antonio	BG717359
Union Fraternal Latino Americana	923 Frio City Road	San Antonio	BG436326
Universal City American Legion Post No. 667	504 Bowie Drive	Universal City	NE099584

Bar Name	Address	City	TABC License Number
University Bowl	12332 IH 10 West	San Antonio	MB205879
Uno Mas Bar & Grill	1619 W Malone	San Antonio	MB921469
Upper Deck Sports Bar	8020 Pat Booker Road	Live Oak	BG938164
Uptown 78 Lounge	8250 FM 78 Suite 108	Converse	MB865167
Uptown 78 Lounge	8250 FM 78 Suite 108	Converse	MB747784
UR Bar On Walzem	4422 Walzem	San Antonio	BG770275
V J's Squeeze Inn Club #2	1755 General McMullen	San Antonio	BG441101
V.F.W. Post 7108	8795 FM 1560 North	San Antonio	BG281752
Valentina Night Club	1430 Somerset Road	San Antonio	BG716841
Vanity Factory	2831 Loop 410 Northwest	San Antonio	MB737900
Vegas Bar	8826 Huebner Road	San Antonio	MB744818
Ventura	1011 Ave B	San Antonio	BG700142
Veterans of Foreign Wars Post 4676	202 W Aviation	San Antonio	NE080347
Veterans of Foreign Wars Post 4676	4436 Valleyfield	San Antonio	NE660064
Vic Zavala's Ice House	1502 Camaron Street	San Antonio	BG941886
Vicki's Bar	526 Roosevelt Avenue	San Antonio	BG301918
View Tequila Bar	8647 Wurzbach Road Building N	San Antonio	MB662898
Vino Volo	9800 Airport Boulevard San Antonio International Airport Terminal A Space 118	San Antonio	BG701978
Vortex	26108 Overlook Parkway Suite 1100	San Antonio	MB866779
Wades Place	6900 S Flores	San Antonio	BG255742
Waldo's Bar	14532 Brook Hollow Boulevard	San Antonio	MB135476
Watermark Grill	18740 Stone Oak Parkway	San Antonio	MB734640
Wax Club Lounge	2211 San Pedro	San Antonio	MB567132
Waxy O'Connor's	234 Riverwalk	San Antonio	MB621088
Weathered Souls Brewing Company LLC	606 Embassy Oaks Suites 350 & 500	San Antonio	BG944345
Westside Post 8936 Veterans Of Foreign Wars	3001 Guadalupe Street	San Antonio	BG663423
Wetmore City Limits	12329 Wetmore Road	San Antonio	MB190963
What's It To Ya? Lounge	5725 Evers Road	San Antonio	MB520528
Whiskey Girls	11855 Perrin Beitel Road	San Antonio	MB930513
Whiskey River	1581 Bandera Road	San Antonio	MB484570
Whiskey Smith's	6310 Callaghan Road	San Antonio	MB640081

Bar Name	Address	City	TABC License Number
Who Knows	5660 FM 78	Kirby	MB540970
Who's Who	1711 Babcock Road	San Antonio	MB910047
Wild West	21025 Encino Commons Suite 111	San Antonio	MB741742
William J. Bordelon Post No. 300 The American Legion	3290 Grosenbacher Road	San Antonio	NE265254
William M. Randolph Post No. 593 The American Legion	326 W Legion Drive	Converse	NE145297
Wind Jammer's Pop A Top	2520 Loop 410 Southwest	San Antonio	BG855180
Wine 101	14743 Old Bandera Road '3'	Helotes	BG710045
Wine Styles	700 E Sonterra Boulevard Suite 1105	San Antonio	BG681069
Winestyles	17503 La Cantera Parkway Suite 115	San Antonio	BG721853
Wing Zone	7863 Callaghan Road Suite 108	San Antonio	BG821532
Wolff's Bar	122 Nogalitos	San Antonio	BE495548
Wonderland Concessions	5106 David Edwards Drive	San Antonio	MB835272
Woodlake Sports	2667 Roland Drive	San Antonio	BG796313
Woodrow Wilson Post No. 399 The American Legion	2628 W Southcross Boulevard	San Antonio	BG493772
World of Beer	22810 HWY 281 North Suite G1	San Antonio	BG819963
Wurzbach Ice House	10141 Wurzbach Road	San Antonio	MB763594
X X X Bar	5042 Sherri Ann	San Antonio	MB708877
XX Bar	2818 Loop 410 Northeast	San Antonio	MB766789
Yanez Bar	607 W Avenue	San Antonio	BG697944
Yellow Rose Tavern	5616 Old Pearsall Road	San Antonio	BG540954
You Know Sports Bar	1821 Bandera Road Suite D	San Antonio	BG732736
Ziquid	18730 Stone Oak Parkway Suite 108	San Antonio	MB766357
Zombies	4202 Thousand Oaks	San Antonio	BG719914
Zombies	4202 Thousand Oaks	San Antonio	MB785311
Zona	12066 Starcrest Suite 640 Building 6	San Antonio	MB703063

APPENDIX E

Locations of Public High Schools

School_Name	Site_Street_Address	Site_City
ACADEMY OF CREATIVE ED	3736 PERRIN CENTRAL BLDG2	SAN ANTONIO
ADVANCED LEARNING ACADEMY	621 W EUCLID	SAN ANTONIO
ALAMO HEIGHTS H S	6900 BROADWAY ST	SAN ANTONIO
ALTERNATIVE H S	103 W RAMPART	SAN ANTONIO
ALTERNATIVE CENTER	900 S SAN EDUARDO	SAN ANTONIO
ALTERNATIVE H S	144 HUNT LN	SAN ANTONIO
ALTERNATIVE SCHOOL	8634 LARKIA	SAN ANTONIO
ANNE FRANK INSPIRE ACADEMY	11216 BANDERA RD	SAN ANTONIO
BASIS SAN ANTONIO-SHAVANO CAMPUS	2220 NW MILITARY DR	CASTLE HILLS
BEXAR CO J J A E P	102 GENEVIEVE ST	SAN ANTONIO
BEXAR CO J J A E P	1402 N HACKBERRY	SAN ANTONIO
BEXAR CO J J A E P	5622 RAY ELLISON BLVD	SAN ANTONIO
BEXAR CO J J A E P	7101 BROADWAY ST	SAN ANTONIO
BEXAR CO J J A E P	8012 SHIN OAK	SAN ANTONIO
BEXAR COUNTY LRN CTR	3621 FARM RD	SAN ANTONIO
BRACKENRIDGE H S	400 EAGLELAND ST	SAN ANTONIO
BRANDEIS H S	13011 KYLE SEALE PKWY	SAN ANTONIO
BRENNAN H S	2400 COTTONWOOD WAY	SAN ANTONIO
BREWER ACADEMY	906 MERIDA ST	SAN ANTONIO

School_Name	Site_Street_Address	Site_City
BROOKS ACADEMY OF SCIENCE AND ENGINEERING	3803 LYSTER RD	SAN ANTONIO
BROOKS COLLEGIATE ACADEMY	4802 VANCE JACKSON	SAN ANTONIO
BURBANK H S	1002 EDWARDS ST	SAN ANTONIO
CARPE DIEM SCHOOLS	8038 W MILITARY DR	SAN ANTONIO
CHAVEZ EXCEL ACADEMY	11937 IH 10 W	SAN ANTONIO
CHRISTUS SANTA ROSA	333 SANTA ROSA N	SAN ANTONIO
CHURCHILL H S	12049 BLANCO RD	SAN ANTONIO
CLARK H S	5150 DE ZAVALA RD	SAN ANTONIO
COMPASS ROSE ACADEMY	8005 OUTER CIR DR	SAN ANTONIO
COOPER ACADEMY AT NAVARRO	623 S PECOS LA TRINIDAD	SAN ANTONIO
EAST CENTRAL H S	7173 FM 1628	SAN ANTONIO
EDISON H S	701 SANTA MONICA ST	SAN ANTONIO
ESTRADA ACHIEVEMENT CTR	1112 S ZARZAMORA ST	SAN ANTONIO
FENLEY TRANSITIONAL H S	9131 YETT BLDG 4	SAN ANTONIO
FOX TECHNICAL H S	637 N MAIN AVE	SAN ANTONIO
FRANK L MADLA EARLY COLLEGE H S	1400 W VILLARET BLVD	SAN ANTONIO
FRANK M TEJEDA ACADEMY	12121 S E LOOP 410	SAN ANTONIO
GEORGE GERVIN ACADEMY	6944 S SUNBELT DR	SAN ANTONIO
GREAT HEARTS MONTE VISTA NORTH	319 MULBERRY AVE	SAN ANTONIO

School_Name	Site_Street_Address	Site_City
GREAT HEARTS WESTERN HILLS	8702 INGRAM RD	SAN ANTONIO
HARLAN H S	14350 CULEBRA RD	SAN ANTONIO
HARLANDALE H S	114 E GERALD AVE	SAN ANTONIO
HARLANDALE ISD STEM ECHS-ALAMO COLLEGES AT PAC	4040 APOLLO	SAN ANTONIO
HARMONY SCIENCE ACAD (SAN ANTONIO)	8505 LAKESIDE PKWY	SAN ANTONIO
HEALTH CAREERS H S	4646 HAMILTON WOLFE	SAN ANTONIO
HEALY-MURPHY	618 LIVE OAK ST	SAN ANTONIO
HENRY FORD ACADEMY ALAMEDA SCHOOL FOR ART + DESIGN	318 W HOUSTON	SAN ANTONIO
HIGHLANDS H S	3118 ELGIN AVE	SAN ANTONIO
HOLMES H S	6500 INGRAM RD	SAN ANTONIO
HOLMGREEN CENTER	8580 EWING HALSELL	SAN ANTONIO
HOMEBOUND	6632 BANDERA	SAN ANTONIO
HOUSTON H S	4635 E HOUSTON ST	SAN ANTONIO
JAY H S	7611 MARBACH RD	SAN ANTONIO
JEFFERSON H S	723 DONALDSON AVE	SAN ANTONIO
JHW INSPIRE ACADEMY - AFTON OAKS	620 E AFTON OAKS BLVD	SAN ANTONIO
JOHN F KENNEDY H S	1922 S GENERAL MCMULLEN DR	SAN ANTONIO
JOHNSON H S	23203 BULVERDE RD	SAN ANTONIO
JUBILEE - LAKE VIEW UNIVERSITY PREP	535 NEW LAREDO HWY	SAN ANTONIO
JUBILEE HIGHLAND HILLS	1515 GOLIAD RD	SAN ANTONIO
JUBILEE SAN ANTONIO	4427 CHANDLER RD	SAN ANTONIO

School_Name	Site_Street_Address	Site_City
JUDSON CARE ACADEMY	102 SCHOOL ST	CONVERSE
JUDSON EARLY COLLEGE ACADEMY	8230 PALISADES	LIVE OAK
JUDSON H S	9142 FM 78	CONVERSE
JUDSON LEARNING ACAD	6909 N LOOP 1604 E STE 2010	SAN ANTONIO
JUVENILE DETENT CTR	600 MISSION RD	SAN ANTONIO
KAREN WAGNER H S	3000 N FOSTER RD	SAN ANTONIO
KIPP UNIVERSITY PREP H S	239 STARK ST	SAN ANTONIO
LANIER H S	1514 W CESAR E CHAVEZ BLVD	SAN ANTONIO
LEE H S	1400 JACKSON KELLER RD	SAN ANTONIO
LIGHTHOUSE CHARTER SCHOOL	2718 FRONTIER DR	SAN ANTONIO
LIGHTHOUSE CHARTER SCHOOL - B CAMPUS	8138 WESTSHIRE DR	SAN ANTONIO
MACARTHUR H S	2923 MACARTHUR VIEW	SAN ANTONIO
MADISON H S	5005 STAHL RD	SAN ANTONIO
MARSHALL H S	8000 LOBO LN	SAN ANTONIO
MCCOLLUM H S	500 W FORMOSA BLVD	SAN ANTONIO
MEMORIAL H S	1227 MEMORIAL ST	SAN ANTONIO
MILTON B LEE ACADEMY OF SCIENCE & ENGINEERING	1826 BASSE RD	SAN ANTONIO
NEW DIRECTIONS	1258 AUSTIN HWY BLDG 2	SAN ANTONIO
NISD INTERVENTION	5900 EVERS RD	SAN ANTONIO
O'CONNOR H S	12221 LESLIE RD	HELOTES
POR VIDA ACADEMY CHARTER H S	1135 MISSION RD	SAN ANTONIO

School_Name	Site_Street_Address	Site_City
POSITIVE SOLUTIONS CHARTER	1325 N FLORES ST STE 100	SAN ANTONIO
RANDOLPH H S	BLDG 1225	RANDOLPH A F B
REAGAN H S	19000 RONALD REAGAN	SAN ANTONIO
REDDIX CENTER	4711 SID KATZ	SAN ANTONIO
ROBERT G COLE MIDDLE/HIGH SCHOOL	4001 WINANS RD	SAN ANTONIO
ROOSEVELT H S	5110 WALZEM RD	SAN ANTONIO
ROY MAAS YOUTH ALTERNATIVES/THE BRIDGE	3103 W AVE	SAN ANTONIO
RUTH JONES MCCLENDON MIDDLE	3460 NE PKWY	SAN ANTONIO
SCHOOL OF SCIENCE AND TECHNOLOGY	1450 NE LOOP 410	SAN ANTONIO
SEIDEL LEARNING CENTER	6711 S NEW BRAUNFELS	SAN ANTONIO
SHIRLEEN ZACHARIAS EARLY CLGE LEADERSHIP ACADEMY	7790 E 3RD ST	SOMERSET
SOMERSET H S	7650 S LOOP 1604 W	SOMERSET
SOUTH SAN ANTONIO H S	2515 NAVAJO	SAN ANTONIO
SOUTHSIDE ALTER CTR	3223 S LOOP 1604 E	SAN ANTONIO
SOUTHSIDE H S	1460 MARTINEZ LOSOYA RD	SAN ANTONIO
SOUTHWEST ACADEMY	11914 DRAGON LN	SAN ANTONIO
SOUTHWEST LEGACY H S	4495 VERANO PKWY BLDG 100	VON ORMY
SOUTHWEST PREPARATORY SCHOOL-NORTHWEST	6535 CULEBRA RD	SAN ANTONIO

School_Name	Site_Street_Address	Site_City
SOUTHWEST PREPARATORY SOUTHEAST CAMPUS	735 S WW WHITE RD	SAN ANTONIO
ST PHILIP'S COLLEGE EARLY COLLEGE H S WITH SAISD	1801 MARTIN LUTHER KING DR RM 119	SAN ANTONIO
STEAM AT THE FINE ARTS ACADEMY	607 SW 34TH ST	SAN ANTONIO
STEVENS H S	600 ELLISON N	SAN ANTONIO
TAFT H S	11600 CULEBRA RD	SAN ANTONIO
TRAVIS EARLY COLLEGE H S	1915 N MAIN AVE	SAN ANTONIO
VETERANS MEMORIAL H S	7618 EVANS RD	SAN ANTONIO
VIRGINIA ALLRED STACEY JR/SR H S	2460 KENLY AVE BLDG 8265	SAN ANTONIO
WARREN H S	9411 MILITARY DR W	SAN ANTONIO
YOUNG WOMEN'S LEADERSHIP ACADEMY	2123 W HUISACHE AVE	SAN ANTONIO

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