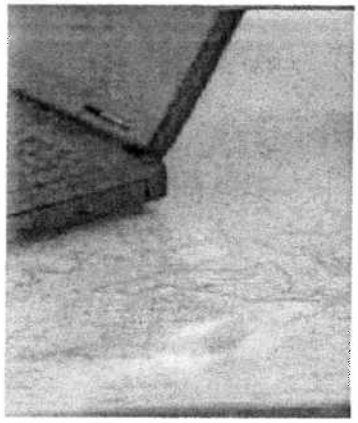
accessed. This connection may implicate issues of data and personal security for the individual involved and certainly raises questions about the need for stringent standards for data handling. In their report on privacy, the IACP compared data connected to a registered owner of a vehicle (step 2 on the continuum) with the collection of LPR data alone (step 1 on the continuum) and concluded that unconnected LPR data should not be considered "personally identifying information" (IACP, 2009, pp. 7–11). Since "a license plate number identifies a specific vehicle, not a specific person," the IACP concluded that the collection of license plate data alone does not rise to the level of personally identifying information (IACP, p. 10). However, even at space 1 on the continuum, the IACP noted the sensitive nature of this data and recommended that it be considered "For Official Use Only" (IACP, p. 11).



In contrast, at step 2 on the continuum, officers must access state DMV databases in order to link a vehicle to a registered owner and, therefore, an individual has been identified. Once this link has taken place, the information may be considered personally identifying (IACP, p. 8). Personally identifying information may also consist of multiple pieces of non-personal information to which one individual has access, for example, through different databases (IACP, p. 8). If these databases may be accessed by the same individual or if they are stored on the same system, these pieces of non-personal information may become the equivalent of personally identifiable information (IACP, pp. 8–9). Potential legal and legitimacy issues may increase if this data is stored for long periods of time (as discussed below).

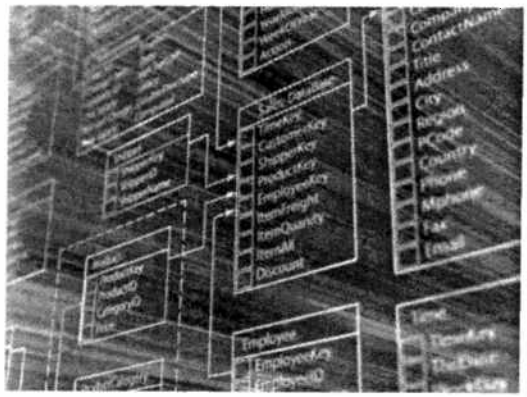
Practically speaking, this step on the continuum also begins to implicate substantial issues of personal security for individuals in the community. Yet, it is currently a common police investigatory practice to access DMV data. Prior to LPR systems, manual approaches often required motor vehicle records to be accessed by the police in the investigation of traffic and other offenses. Red light and speeding cameras, as well as toll-booth violations, are some further examples of this type of use. These approaches, however, have not previously involved the storage of large amounts of data by police (as discussed below).

### 3) TERTIARY DATA MINING

This location on the continuum involves connecting LPR data with "tertiary" databases by using motor vehicle information to identify persons of interest. Again, this type of investigation was done by the police prior to LPR and commonly involved the police running a tag for the registered owner and then running the owner for the existence of an open warrant. LPR accelerates and automates this function.

LPR is not limited to checks for open warrants. Rather, the uses of license plate readers that fall into this category can vary widely. For example, data that might be uploaded into LPR systems include the license plates of vehicles owned by registered sex offenders, those delinquent on child support payments, recently released violent offenders, or individuals arrested for selling drugs around schools or public parks. An example of this type of use might be LPR patrol around schools and parks for parked vehicles of registered sex offenders or drug dealers. All of these LPR uses involve the connection of LPR data to other data sources through motor vehicle information but for law enforcement purposes unrelated to motor vehicles or vehicular enforcement.

Similar to the second stage of the continuum, however, this step does not necessitate prolonged data storage of LPR scans (although the criminal data accessed may have been stored for some time). Despite this, novel legitimacy issues may still arise because the police have departed from using LPRs for vehicle-related law enforcement, which may seem its most obvious use. These uses of the technology are conceptually distinct from the previous step on the continuum for this reason. Since LPR is not being used as a technological tool for traffic or vehicular enforcement at this space on the continuum, people could view these uses as promoting more generalized surveillance. We could hypothesize that these uses may heighten the likelihood that LPR adoption will impact police legitimacy, job approval, and police-community relations. However, this hypothesis remains untested.



Even within this category, different uses may evoke varying responses. For example, members of the community may view sex offenses as grave enough to warrant the use of LPR to prevent sex offenders from entering school zones. Yet, the community might not tolerate other uses where the perceived benefits are too few or the perceived intrusion into the personal lives of community members seems too great (for example, using LPR to detect parents who don't pay child support). Though some authors writing on this topic have suggested hypotheses about the likelihood that some uses might be accepted over others, the only true way to gain an indication of community sentiment is through rigorous testing of the type conducted in this study.

### 4) USING LPR UNITS FOR DATA COLLECTION AND STORAGE FOR PROACTIVE USE

This step on the continuum involves the long-term storage of data from LPR readers themselves (most frequently, the location, date, time, and vehicle license plate) and its preservation for investigative purposes. For example, when attempting to view the last known locations of a wanted suspect, information saved from a LPR reader might demonstrate that a suspect's vehicle traveled to a certain location. Alibis of suspects might

also be corroborated or challenged from the information captured by LPR units placed at toll roads or near locations where an individual claimed to be. Such information applies not only to suspects. In a recent case, an Alzheimer's patient was located with the help of a license plate reader, which had detected his vehicle at a particular location. However, some have argued that this type of data retention may also prejudice the investigatory process against an individual, since LPR information may be presumed to be correct even in instances when the data may be misleading. For example, if an LPR unit records the presence of a vehicle at a particular location, this does not mean that the registered owner of the vehicle or even a particular suspect was driving the vehicle at the time. It may also be difficult for an individual to combat an assumption that the data presents an accurate picture of daily activities, since individuals do not normally keep detailed records of their day-to-day routines.

The IACP has identified a need to "establish a set of guidelines, including standard criteria, to assist law enforcement agencies in their development of retention policies for LPR data" (IACP, 2009, p. 3). Currently, however, "there is no formula for determining how long data should be retained" (p. 3), and no court has examined the issue of LPR data retention as of the writing of this report. In addition to the development of data retention policies, the IACP has also called for police agencies using LPR to undertake "regular and systematic audits [to] help ensure that the quality of data contained in a LPR system remains high." (p. 4) These audits are required because saved LPR data may become the basis for investigations.

As mentioned previously, data storage raises even more serious potential for abuse through either hacking or misuse; as a result, rigorous testing of policy in this area of the continuum is critical. Moreover, members of the community may also hold very strong opinions regarding whether or not this information should be considered private and also if data of this type should be collected and maintained by the police. The survey-experiment discussed below provides evidence regarding one community's response to these questions.

### 5) PREDICTIVE ANALYSIS

While proactive use of stored LPR data might apply to ongoing investigations and searches for individuals or their alibis, LPR data may also be used for more predictive analysis, an extension of this proactive use. Predictive analysis involves the analysis of collected data to determine patterns of behavior and movements in order to anticipate and prevent crime. One example might be the decision to place LPR units at locations around an arena prior to a major event. Unusual vehicular activity or multiple hits of particular vehicles in front of a location may be found by analyzing the saved data. Proactive investigations might then be generated. Similar to #1–#4 above, vehicles might also be scanned for connection to other databases in order to anticipate problems for prevention purposes.

This type of analysis may offer special challenges to the legitimacy and legality of police actions. On the one hand, large amounts of data, combining information from many incidents and individuals, would be examined for overall patterns of behavior. This type of procedure is commonly used in intelligence analysis, where patterns within what may seem like large amounts of mundane data may be found. However, such processes may also result in access to individual data and may turn the scrutiny of law enforcement toward individuals who may not pose any threat. Any type of predictive analysis runs the risk of false positives. Anticipating and reducing the negative impact of false positives is an important crime prevention goal of democratic police agencies. Again, predictive analysis utilizing LPR data may be undertaken in many different contexts, and the reaction of the community may be dependent upon the context of such use. It is useful to gauge how such deployment of LPR units might be received by the community, something we do in our survey-experiment below.

Each of these uses of LPR across the continuum can provide varying benefits and concerns for law enforcement agencies. The point that we emphasize here is that, prior to this study, hypotheses about LPR have too often remained unsupported by evidence. However, the extent to which these concerns matter and the impact that using LPR will have on police legitimacy are important empirical questions in understanding the effectiveness of license plate readers and any other police technology. In addition to secondary uses not contemplated by the community or by department policy, agencies must also consider whether or not they might be compelled to disclose information by courts presiding over civil matters wherein an individual's location is at issue. Community members may also fear that a law enforcement agency may share LPR data with other government or private entities. As Solove (2006) argues, when data is collected and stored, "the potential for secondary use generates fear and uncertainty over how one's information will be used in the future, creating a sense of powerlessness and vulnerability" (p. 522). The survey-experiment discussed below also includes information with respect to opinions about data sharing.

Also, it bears repeating that at all steps on the continuum, it is important for agencies to consider the potential for improper disclosure of saved LPR information, either by authorized users or through hacking. Improper disclosure implicates individuals' privacy and poses potentially very serious obstacles to police legitimacy. Improper disclosure may also result in serious physical harm to members of the community. Security safeguards or audits may help lessen some concerns (IACP, 2009, p. 17), but these have not been rigorously evaluated at this point.

## Review of Legal Issues and Their application to the LPR Continuum

As the LPR continuum indicates, various uses can present different legal and legitimacy challenges to the police. However, as noted above, few analyses of the legal issues

related to LPR have been published, and there are no tests of LPR (or any other police technology) on police legitimacy. Additionally, only a small number of courts have adjudicated cases involving LPR use, and those that have done so are state trial courts (*New York v. Davila*, 2010; *Machado v. City of New Haven*, 2006). Though much of the judicial business in a state is handled at the trial court level, these opinions represent first attempts by courts to grapple with situations where police have utilized LPR and cannot be regarded as either exhaustive or as binding precedent. Other courts may view these issues differently, and new questions will arise over time. Additionally, even in instances where state trial courts have authored opinions referencing LPR use, there are limitations to the guidance that can be obtained from those opinions. This is primarily because only a limited number of issues have been raised by litigants at the current time. Practically, this means that it will take some time for the law enforcement community to receive a more definitive answer to the legal questions related to LPR use.

In addition to a lack of definitive guidance from the courts for agencies considering LPR adoption, few scholarly legal analyses of LPR have been published to date. Two notable exceptions are found in the IACP's *Privacy Impact Assessment Report for the Utilization of License Plate Readers* (2009) and in the article published by Hubbard (2008). Both sources provide analyses of the privacy implications of LPR, though with some similar and some disparate results. In addition to a number of differences in issue coverage, some of the variation results from the fact that these analyses cannot rely upon a single case but must craft a discussion of the implications of LPR from prior court cases and scholarly work related either to other technologies or to privacy more generally.

This section will provide a brief review of some of the existing evidence base with respect to the constitutionality of LPR. At present, this evidence base is necessarily underdeveloped, and this review will require bringing potential legal arguments together from various sources, some specifically related to LPR and some not. The articles and court cases discussed within this section may inform an agency's decision to adopt LPR but cannot predict with complete accuracy how courts will rule once faced with LPR cases. However, one advance that can be accomplished at this time is to categorize and relate the existing legal evidence base to the continuum of LPR uses presented above. In addition to providing a useful foundation for future testing, the continuum of uses should supply a tangible way to think about the legal issues involved in LPR use.

The chief concern about LPR stems from LPR's implications for individual privacy. Though the U.S. Constitution does not explicitly guarantee a "right to privacy," the Fourth Amendment states, "[t]he right of the people to be secure in their persons, houses, papers, and effects, against unreasonable searches and seizures, shall not be violated...." (U.S. Const. art. IV). This provision of the Fourth Amendment is made applicable to actions of the states through the Due Process Clause of the 14th Amendment. Though the U.S. Supreme Court has not examined the constitutionality of LPR use specifically, some other Fourth Amendment cases can help to provide a foundation for our inquiry. We shall also discuss cases dealing with manual license plate checks to get a sense of what courts might decide with respect to LPR.

Though the U.S. Supreme Court has not specifically adjudicated the issue of license plate privacy in the face of manual checks, numerous courts (including several U.S. Courts of Appeals) have resolved this issue. Time and again, these courts have found manual checks of license plates by police to be constitutionally permissible (*U.S. v. Ellison*, 2006; *U.S. v. Walraven*, 1989; *U.S. v. Matthews*, 1980). These cases have relied upon the standard set forth by the U.S. Supreme Court in *Katz v. U.S.* (1967). The *Katz* test makes clear that no Fourth Amendment violation may occur unless there exists a "constitutionally protected reasonable expectation of privacy" (*Katz v. U.S.*, 1967, p. 360). In order for such an expectation to exist, "there is a twofold requirement, first that a person have exhibited an actual (subjective) expectation of privacy and, second, that the expectation be one that society is prepared to recognize as 'reasonable'" (*Katz v. U.S.*, 1967, p. 361). In this way, the expectation of privacy must be both "subjective" and "objective" in order to merit protection by the Fourth Amendment.

These requirements are difficult to satisfy with respect to license plates. Driving is not a private activity but rather an activity that one engages in while out in public. While on the road, the vehicle and, most importantly, the license plate, remain in public view (*U.S. v. Diaz-Castaneda*, 2007, pp. 1150–1151; *U.S. v. Ellison*, 2006, pp. 561–562; *Olabisiomotosho v. City of Houston*, 1999, p. 529; *U.S. v. Walraven*, 1989, p. 974). The state has a legitimate interest in motor vehicle and highway safety (*Delaware v. Prouse*, 1979) and, as a result, can properly require that license plates remain unobstructed. It is not surprising, then, that these arguments have resolved the question of an individual's privacy interest in his/her license plates for the courts that have examined the issue of manual checks. At first glance, these arguments might also seem to resolve the constitutional issues related to privacy and the use of LPR.

Moreover, while the U.S. Supreme Court has not examined license plates per se, it has examined whether or not a vehicle's VIN number is to be considered private. In the case of *New York v. Class* (1986, p. 87), the Court was asked to decide whether or not a police officer had conducted an unreasonable search when he reached into a private car and moved some papers so that he could see the car's VIN number. Much like the other courts'

holdings with respect to license plates, the Supreme Court decided that this act of reaching into the car did not violate the Fourth Amendment because the motorist did not possess a legitimate privacy interest in the VIN (*New York v. Class*, 1986, p. 91). Instead, the Court held that a VIN number must remain uncovered because "the VIN is a significant thread in the web of regulation of the automobile" (*New York v. Class*, 1986, p. 88). There is no reason to believe that the Supreme Court would consider the question of privacy with respect to license plate numbers any differently, since license plate numbers must also remain in public view according to law.

Yet, when the issues surrounding LPR use (as opposed to individual, manual license plate checks) are examined, the courts may have some additional concerns. Several authors have made the argument that LPR technology simply automates a process that could be carried out legally by individual officers (IACP, 2009, p. 12; Hubbard, 2008, pp. 6–9). However, this assertion relies on the fact that there is no significant legal distinction between individual officers checking license plates by hand and the use of LPR. In fact, several authors have argued that there is a substantial difference, even with respect to the most common use of LPR, that of detecting stolen vehicles (Hubbard, 2009). Essentially, Hubbard argues that LPR use does not merely make an officer's job more efficient and less costly but also allows the police to gain new abilities that no human could possess. "As a Los Angeles police officer pointed out concerning the technology's ability to read license plates at 60 mph and at night, '[i]t's physically impossible for an officer to do this kind of work ... It's reshaping the way we do policing'" (Hubbard, 2009, p. 34). Hubbard points to a number of U.S. Supreme Court cases (discussed in more detail below) in which the Court has expressed concern about the use of increasingly invasive technologies by police.

Additionally, the argument that LPR simply automates a process that has always been used by police relies upon the fact that there is no difference between manual checks and the *widespread use* of license plate readers at other points on the continuum. In fact, while this "automation" argument might possibly resolve the constitutional issues involved with some uses of LPR, it does not address the act of linking data to other databases or saving data for extended periods of time. This distinction again illustrates why the continuum of LPR uses is important. The continuum represents a clearer framework for agencies considering LPR adoption and also underscores the potential for disparate legal and legitimacy implications connected with different uses. Indeed, a single check of a license plate and the widespread and varied uses of LPR may be viewed differently by future courts adjudicating LPR issues for a variety of reasons.

For example, the second and third steps on the continuum involve connecting a license plate to an individual's motor vehicle records or connecting the license plate with tertiary data unrelated to motor vehicles through the use of vehicular information. These locations on the continuum may be viewed as distinct from the primary use of LPR at step 1 on the continuum because they involve linking LPR data to specific individuals and their records.

This may greatly increase the chance of harm to individuals in the community and may raise serious legitimacy issues if data is misused (IACP, 2009, pp. 11–12). Though the cases mentioned earlier in this section have repeatedly shown that individuals do not have an expectation of privacy in their license plates, the courts have been more willing to find it reasonable that individuals have an expectation of privacy in certain items of personal data. Since the uses at steps two and three of the continuum involve linking LPR data to personal data, courts examining these uses may be unwilling to allow police (or LPRs) to connect with the information contained in some other databases without any suspicion of wrongdoing by the individual. In fact, in *State v. Donis* (1998, p. 40), the New Jersey Supreme Court held that it was permissible for police officers to run random [Mobile Data Terminal (MDT)] searches on license plates to determine if a vehicle was reported stolen or to verify the status of the registered owner's driver's license. However, the Court also held that it was not permissible for police officers to obtain the registered owner's personal information contained in the New Jersey Department of Motor Vehicles ("DMV") database without "reason to suspect wrongdoing" (*State v. Donis* (1998), p. 40). Following this case, the New Jersey Supreme Court required the redesign of all MDTs used in the state to incorporate a two-step process for the protection of individuals' privacy (*State v. Donis* (1998), p. 40).

The two-step process allowed police to check a license plate in order to apprehend stolen vehicles (the first step) but prevented an officer from viewing personal DMV data without initiating a separate process (the second step) (*State v. Donis* (1998), p. 40). In order to initiate the second step of the process, the officer was required to have a particularized and articulable suspicion of wrongdoing; this suspicion could later be challenged in court through a motion to suppress. Like the MDT searches that concerned the New Jersey Supreme Court, steps two and three on the LPR continuum involve the examination of personal data by the police and might be restricted by future court decisions if some individualized suspicion of wrongdoing is absent.

Moreover, steps four and five on the LPR continuum of uses may raise additional issues. Even if all of the uses discussed above are constitutionally permissible, this acceptance may not extend to the collection and storage of a large quantity of data about citizens (many of whom have committed no crime). It is the momentum toward data storage that makes LPR unique in comparison with previous police activities. Significantly, data storage may also implicate the most significant risks to the community through unauthorized disclosure (IACP, 2009, p. 17). Likewise, the decision to save LPR data may involve some particularly nuanced privacy issues because data storage could eventually make it possible for police to recreate the daily activities of individuals through LPR data. It also becomes even more difficult to extend the "automation" argument (or the idea that LPR merely automates processes already being conducted by police) to these steps on the continuum. Police do not currently store large quantities of data about citizens' activities.

No court has examined the issue of data storage at this time and, therefore, previous case law does not resolve this issue. However, it is reasonable to assume that courts may be concerned about individual privacy in the face of large-scale or long-term data storage. Courts may also be concerned that no checks would exist on the power of police with respect to their use of the saved data. Citizens may fear that data storage would result in large increases in the surveillance powers of law enforcement (Reiman, 1995).

As mentioned above, others have argued that the saving of LPR data can greatly impact entirely innocent individuals, not merely those suspected of crimes (Hubbard, 2008; Reiman, 1995).

". . . [T]he collection and recordation functions related to the Automatic License Plate Recognition systems act to track innocent people in the event that they may commit, or be involved in, a crime in the future . . . . The asserted justification is that if in the future the police are looking for a suspect, or even victim, who owns a specific car, then they could check the database and see where the suspect has been in the last few weeks, or last few moments, to help them begin their search." (Hubbard, 2008, p. 28).

While this is an important justification for law enforcement, the saving of data may expose innocent members of the community to harm or embarrassment (Reiman, 1995, p. 35). When LPR data is saved, innocent and guilty individuals may be treated the same. In addition, the potential for large scale surveillance and tracking may be viewed as quite distinct from other technologies by the courts.

Though no court has examined whether or under what circumstances the data storage or potential surveillance functions of LPR may violate the privacy of individuals, a few courts (including the U.S. Supreme Court) have discussed the constitutionality of police surveillance carried out through other means, such as tracking devices placed on vehicles by police (*U.S. v. Knotts*, 1983, p. 276; *U.S. v. Moran*, 2005, p. 467). In these instances, the courts were called upon to adjudicate whether or not police placement of tracking devices onto the vehicles of suspects without probable cause violated these individuals' privacy (Hubbard, 2008, pp. 28-31). Despite the fact that the officers did not possess probable cause, the courts have been unwilling to find a violation of privacy when the police could have obtained the same information by following the suspect's movements on public roads (*U.S. v. Knotts*, 1983, p. 276; *U.S. v. Moran*, 2005, p. 467). The use of tracking devices to do the same work did not create privacy violations. These precedents may suggest that the surveillance powers inherent in LPR data storage will not pose a constitutional issue. However, the courts may also view LPR data storage as allowing the

police to accomplish surveillance tasks that were previously unthinkable—not merely as a technological tool for increasing efficiency in the manner of a mobile tracking device (Hubbard, 2008, p. 33).

Indeed, there are also some Supreme Court cases that might lend credence to this view. As indicated above, in several recent decisions, the Court has seemed to express dissatisfaction with the increasingly invasive character of technology (*Kyllo v. U.S.*, 2001; *Dow Chemical Co. v. U.S.*, 1986). This has lead some authors to come to the conclusion that these opinions might provide support for a finding that the most advanced technologies violate privacy if they allow police to access information that they normally would not be able to access (Hubbard, 2008, p. 38). According to Hubbard (2008, p. 32, citing *U.S. v. Ellison*, 2006, p. 562), LPR may be considered technology not available to the public and, by virtue of the capacity to (1) connect license plates to other records and (2) to engage in wholesale data collection, a court may see this as information that normally could not be collected "without 'intrusion into a constitutionally-protected area.'" If LPR allows the police to gain access to the intimate details of individuals' daily lives, this power may be viewed as a true departure from previous police authority. Indeed, Hubbard (2008, p. 40, citing Donohue, 2006) cites research suggesting that the movements of the average citizen are recorded approximately 300 times a day in London where LPR is routinely in use. Notions such as these may be shocking to the courts reviewing the issues related to LPR, and they may be shocking to the community.

Moreover, Reiman (1995, p. 29) makes the argument that "by accumulating a lot of disparate pieces of public information, you can construct a fairly detailed picture of a person's private life." For example, LPR data may allow police to determine who an individual associates with, which doctors or religious services she visits, which protests she participates in, and even which political party she belongs to. "A piece of information here or there about an individual is not very telling; but when combined, these bits and pieces of data begin to form a portrait of a person" (IACP, 2009, p. 16 citing *U.S. Department of Justice v. Reporters Committee for Freedom of the Press*, 1989, p. 507). Normally, these activities are "dispersed over space and time," so police officers can't see them all at once (Reiman, 1995, p. 29). However, the collection and storage of data may bring many of these bits of information together on one system or connected systems. This is a strong argument for considering the spaces to the right of the continuum as—at the very least—conceptually distinct from those on the left of the continuum. In addition to the potential concerns related to privacy, the IACP report cautions that inaccurate data or even data taken out of context, may yield an erroneous picture to law enforcement, an occurrence that may actually hinder investigations (IACP, pp. 12, 14; Solove, 2006, p. 522). Misleading data may also be very difficult for individuals to refute, since people normally do not keep detailed records of their activities and may not remember their locations once time has passed.

Additionally, courts are likely to be concerned that LPR could impact the exercise of other rights and that individual behavior may eventually change as members of the community realize that their daily activities could be recorded and preserved (IACP, p. 16). It is the hope that LPR may help to suppress an individual's commission of illegal acts, but widespread use of the technology may also lead individuals to suppress unpopular, unconventional, or embarrassing actions that are not illegal (Reiman, 1995, p. 35). Specifically, courts may be concerned that it is difficult to exercise First Amendment rights, such as through participation in a rally or demonstration, without traveling to do so (IACP, 2009, p. 14). The fear is that citizens may alter their behaviors when they know that the locations they visit could be preserved and later used against them as evidence. In other contexts, the U.S. Supreme Court has at times protected individuals against being forced to identify themselves during their exercise of certain rights, for example, free press (IACP, 2009, p. 14, citing *McIntyre v. Ohio Elections Comm'n*, 1995), in their political associations (IACP, 2009, p. 14, citing *Brown v. Socialist Workers' 74 Campaign Comm.*, 1982) and in their involvement with religious groups (IACP, 2009, p. 14, citing *NAACP v. Alabama ex rel. Patterson*, 1958).

Yet, the IACP argues in its report that potential changes to individual behavior resulting from LPR may be minimized by law enforcement policies:

"[T]he development and implementation of policies regulating the collection, uses, sharing, and retention of LPR data can operate to reduce these effects. Deployment of LPR cameras based upon crime analysis that takes into account crime patterns and the types of crime targeted by LPR systems can also reduce the perception that LPRs are simply a tool for public surveillance. Developing retention periods are another way to address the potential chilling effects of LPR systems." (IACP, 2009, pp. 13-14)

The IACP also recommends that agencies develop policies "concerning the collection of license plate numbers by mobile LPR cameras in areas known to reflect an individual's political, religious, or social views, associations, or activities (e.g., churches, abortion clinics, etc.) and limit such collection to instances directly related to criminal conduct or activity." (IACP, 2009, p. 15) We concur on the logic of this statement. Such policing may aid courts in considering how to balance the legitimate interests of law enforcement with individual privacy rights. Such policies may also reduce negative perceptions in the community, although that also remains to be tested. The survey-experiment discussed below begins the process of rigorous testing in this and other areas.

## LPR and Police Legitimacy: The Community Survey-Experiment

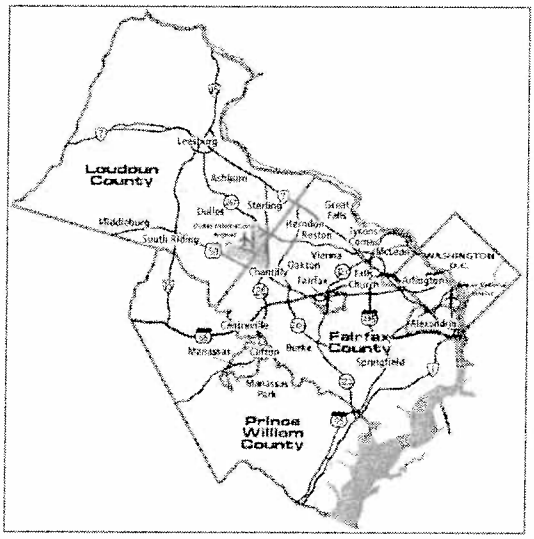
The LPR continuum of uses and the subsequent legal review reflect and emphasize two important themes in democratic policing. The first theme, as already discussed, stresses the importance of legal protections of the individual in light of crime prevention goals. The second theme is the legitimacy and authority afforded to the police by its community or

jurisdiction. The use of LPR may have important implications for police legitimacy and community-police relations, two factors that may further affect an agency's ability to prevent and deter crime (see Tyler, 1990). To explore this, we implemented a community survey-experiment. Though it is not possible for one survey-experiment to address all of the potential issues related to LPR, many of the issues detailed above have been incorporated into the research design, and this survey-experiment serves as the first to test the concerns reflected at each stage of the LPR continuum of uses.

## SURVEY LOCATION AND SAMPLE

We chose to conduct this community survey-experiment in Fairfax County, Virginia, one of the two locations in which we carried out the experimental evaluation described in Chapter 3. Fairfax County is one of the large Northern Virginia suburban counties outside of Washington, D.C., where many individuals who work in the metropolitan D.C. area reside. According to the U.S. Census, it has a population of approximately 969,600 persons; approximately 71% are Caucasian, 10% are African American, 15% are Hispanic, and 17% are Asian. The County spans almost 400 square miles, with a population density of about 2,450 persons per square mile. The police department consists of approximately 1,370 sworn officers serving a well-educated community (over 50% of residents have a college education) with high home ownership rate (70%).

To carry out this survey-experiment, we randomly sampled 2000 Fairfax households, from all residential units/households in Fairfax County. To select only residential properties, we first used a zoning polygon file in ARCGIS, which represented all of the different land use zoning districts within Fairfax County[29] (3,962 zones of a possible 7,496 zones). Then, using a building point file, we selected only the addresses that fell within areas that were zoned as residential. The result was 237,444 residential addresses from which we could randomly draw our sample of 2000 possible respondents.




Once the initial 2000 residences were selected, each was checked individually against the County's public real estate records[30] to ensure that the residence was occupied, that we had the proper mailing address, and that there were no duplicate addresses. If the online

[29] All of the shape files used in this study were accessed through the George Mason University Department of Geography Intranet server. George Mason University obtained these files directly from the Fairfax County Government.

[30] See http://icare.fairfaxcounty.gov/Main/Home.aspx

database indicated that an address didn't exist or referenced a non-residence (such as a church, school, etc.), the address was removed from dataset and replaced with another randomly sampled residence. In total, we replaced 106 cases.

## THE SURVEY-EXPERIMENTAL INSTRUMENT

As this was an experimental survey, four different versions were generated.. One version of the survey instrument, as it was mailed, is included as Appendix F along with the consent document/introductory letter.[31] The specific questions comprising the survey represented a mix of demographic questions, general questions about crime and police legitimacy, and questions focused on the continuum of LPR uses presented in Figure 4.1. Participants were asked separate questions about the primary use of LPR (recovering stolen vehicles) and also about uses of LPR not directly related to vehicle enforcement, such as those linking LPR data with tertiary (non-vehicular) databases. Additionally, respondents were asked whether or not they would support a decision by their local police to begin saving LPR data for future use. They were also asked explicitly whether or not LPR data should be considered private information. Finally, questions were framed to gauge the impact of LPR use on individuals' daily activities, for example, whether or not they would be less likely to commit a crime or engage in other types of activities if they knew that their locations could be recorded by LPR readers.

In addition to examining these issues, two experiments were incorporated within the survey. In all cases, individuals were assigned randomly to either the treatment or the control group within each experiment. Since the sample was divided twice (once for each experiment), we produced four discrete versions of the survey. Each version contained either slight variations in the text of the survey or in question ordering, as discussed below. However, respondents were not aware of these variations, and each respondent received only one version of the survey.

The first experiment involved alterations to the ordering of questions on the survey and served two purposes. First, in order to guard against question order bias, we randomly varied the order of the two sections of the survey that contained substantive questions. Thus, half of the respondents received surveys where the first section contained general questions related to crime and legitimacy, and the other half of the respondents received surveys where the first section contained LPR-related questions. In addition to reducing question order bias, this division of the sample also allowed us to conduct a substantive experiment. The section of the survey containing general questions also included questions about police legitimacy, job approval, and respect for civil liberties. Since the "control" group received these questions at the beginning of the survey, this allowed for the establishment of a baseline or assessment of existing opinion with respect to these items.

[31] All four versions are available upon request.

The "treatment" group, however, answered these questions following the section related to LPR. When compared with the answers given by group 1, the responses of group 2 will allow us to gauge the impact of the LPR-related survey questions upon the answers of the respondents with respect to police legitimacy. This experiment allows us to begin evaluating the impact that *knowledge and discussion* of LPR might have in the community. These results may also be compared with a number of survey questions regarding police approval that were asked at critical moments *during* the section of the survey related to LPR. This procedure yields two distinct ways of evaluating the impact of LPR on police legitimacy and job approval.

The second experiment is simpler but was designed to evaluate the impact of a particular argument used in support of LPR adoption. Supporters of LPR use have frequently underscored the potential of the technology to reduce crime. We anticipated that this argument might be a powerful incentive for the public to support expanding the use of LPR. Yet, to ask this question on the survey may influence the results of all questions following it. To combat this, we slightly varied the wording of a question that asked respondents if they would support a police decision to save LPR data. The only variation to this question was the addition of the phrase, "if it can help in solving crimes." Each respondent was presented with only one of these scenarios in order to avoid the potential for bias resulting from seeing the questions in sequence. The results of both experiments are discussed in detail in the section below.

**RESPONSE RATE**

We sent out the first round of the survey to a sample of 2000 households in May 2010, once the experimental impact evaluation of LPR had been completed in Fairfax County. The survey could be answered by business-return envelope or online. The addressee was "CURRENT RESIDENT," and the consent document explicitly stated the respondent had to be 18 years or older. Approximately every subsequent two weeks, we mailed further reminders about the survey to those addresses from which we had not received a response. We did this until we ended data collection for this report in mid-July 2010. The survey materials noted that the survey-experiment was being administered jointly by George Mason University's Center for Evidence-Based Crime Policy and by the Fairfax Police Department (see Appendix F).

At the conclusion of the data collection period, 457 residents had completed the survey, yielding a response rate of 22.9%. In terms of gender, the response pool was fairly representative of the wider community, with 48.9% female and 51.1% male respondents. With respect to race, the respondents indicated that they were 85.8% Caucasian, 3.7% African-American, 3.4% Latino, and 7.1% Asian/Pacific Islander, which indicated an overrepresentation of White respondents compared to the racial makeup of the county per the U.S. Census. The divisions reported with respect to political party identification were 33% Democrat, 30% Republican, and 37% Independent.

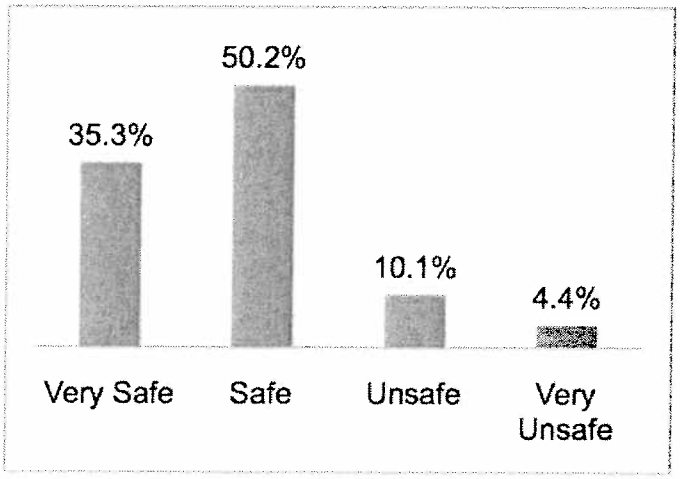
We conducted comparisons between block-group Census estimations of where respondents and non-respondents lived. Specifically, we used GIS software to link Census block-group information to addresses in our sample, and then compared respondents and non-respondents on their block-group estimate means. We compared block-group levels of poverty, unemployment, median family income, home ownership, linguistic isolation, and racial neighborhood composition. T-tests of means did not indicate that those who responded to the survey were significantly different (with regard to social, economic, and demographic factors) than those who did not respond.

## Community Survey Results

### COMMUNITY VIEWS ABOUT CRIME

An examination of the results of our community survey-experiment demonstrates that the respondents generally regard their community as safe and react positively to police performance in Fairfax County. For example, Figure 4.2 demonstrates that a large majority (85.6%) of respondents feel safe walking alone in the community at night, with totals of 35.3% selecting "very safe" and 50.2% selecting "safe" in response to this question.

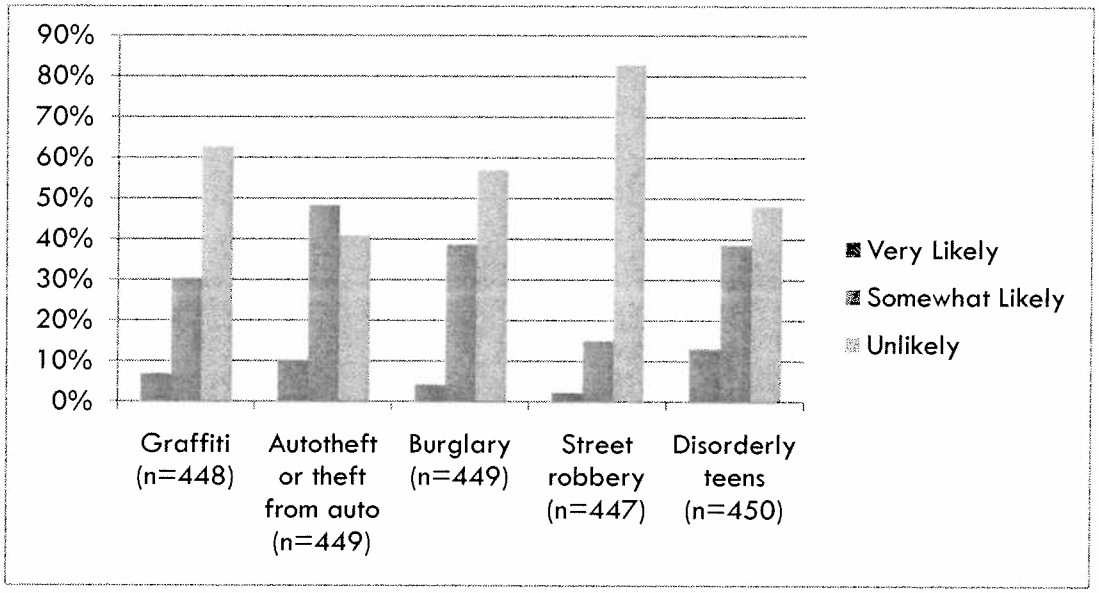
**Figure 4.2. How Safe Would You Feel Walking Alone at Night? (n=436)**




Similarly, when asked about the incidence of specific crimes, respondents indicated by substantial margins that they felt that street robberies (87.8 %), residential burglaries (57.0 %), and even graffiti (62.7 %) are unlikely to happen in their community (Figure 4.3). Residents believe that auto-related crimes (theft and theft from auto) and incidences of disorderly teenagers on the street are slightly more common, though, with only 41% of residents believing autotheft was unlikely to occur and only 48.2 percent believing

incidences of disorderly teenagers were unlikely to occur in their neighborhood. "Disorderly teens" was the most frequently cited as "very likely to occur," although still at a very low rate (13.1%).

**Figure 4.3. How Likely are the Following Crimes to Happen in Your Neighborhood?**




Finally, despite being located in close proximity to Washington, D.C., 55.2% of residents indicated that they are "not very concerned" or "not at all concerned" that their community might fall victim to a terrorist attack.

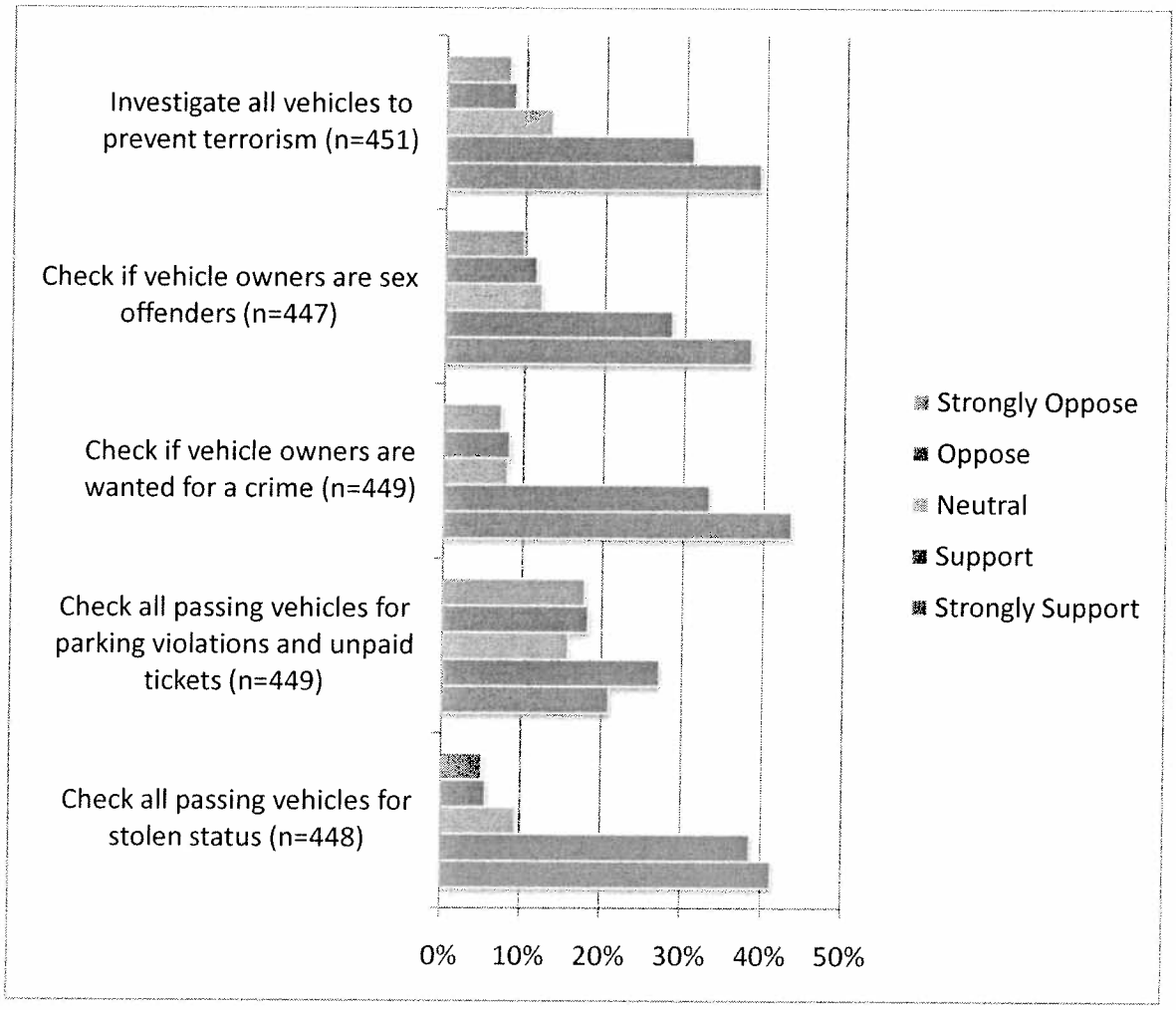
## FAMILIARITY WITH LICENSE PLATE RECOGNITION

Our survey finds that members of the community have heard of license plate recognition, but that residents don't know much about the technology. In fact, 62.8% of respondents self-report that they have heard of the technology. However, almost 90% of respondents are willing to admit that they don't know if their local police currently use LPR. When asked a factual question such as this, survey researchers have often found a tendency on the part of respondents to "guess" at the answer rather than admit a lack of knowledge. The fact that nearly 90% of respondents selected "I don't know" rather than guessing about the answer may underscore the degree to which residents are not yet familiar with LPR. These respondents seem to have felt little social stigma attached to a lack of knowledge. These results are not entirely surprising, but they emphasize the fact that public discourse on this issue has been nearly nonexistent to this point. This impression is also confirmed by examining the results of this survey as a whole, because there are a number of questions where significant percentages of respondents expressed no opinion regarding various LPR issues.

## PRIMARY AND IMMEDIATE USES OF LPR

Figure 4.4 demonstrates that respondents are supportive of both the primary use of LPR (detecting stolen autos) and what we have termed the other "immediate" uses of LPR (those uses not requiring prolonged data storage). Specifically, when discussing the retrieval of stolen vehicles (or the first space on the continuum of LPR uses), 79.9% of respondents indicated that they would "strongly support" or "support" a decision by their local police to use LPR in this manner. To a certain extent, this result suggests that the views of U.S. courts with respect to license plate checks (that they are largely unobtrusive to the driver) are supported by the community's responses to this survey (*U.S. v. Diaz-Castaneda*, 2007, p. 1151; *U.S. v. Walraven*, 1989, p. 974).

**Figure 4.4 Community Responses to Primary and Immediate Uses of LPR**



This figure represents a very high level of support, even greater than for those uses of LPR in Figure 4.4 that deal with terrorists or sex offenders. Only 10.7% of respondents indicated that they would oppose or strongly oppose a decision by the police to use LPR to detect stolen vehicles. Further, only 9.4% of individuals indicated that they were neutral on this question. This does not leave a large "undecided" percentage of the community (as is the case with some of the other questions) and may also suggest that respondents have an easier time understanding the issues related to LPR use for stolen vehicle apprehension than for other uses. For agencies considering LPR adoption for stolen vehicle apprehension, these results may suggest that the community will be able to easily comprehend the potential benefits of LPR adoption for "primary use" as discussed on the continuum.

Many of the remaining categories of immediate LPR use described in Figure 4.5 are also supported by the majority of the community. These survey items reflect what we have termed "immediate uses" of LPR, or uses that don't require the storage of LPR data for prolonged periods. Rather, at these points on the continuum, LPR is used to detect crime at the moment that the data is collected. For example, 76.6% of respondents either "strongly support" or "support" the use of LPR to check passing vehicles to see if registered owners are wanted for crimes. Similar to the primary use of LPR, it is not surprising that support for checking outstanding warrants is high, as it is likely that many respondents focused on the potential crime control benefits of these uses. To the extent that respondents thought about privacy concerns related to LPR use, then, it is likely that they ultimately dismissed these concerns, since the question referenced individuals with outstanding warrants (rather than average citizens or law-abiding members of the community).

Indeed, this point also explains the community response to the item that asked about checking all passing vehicles for unpaid tickets and parking violations. Though related directly to traffic regulation and conceptually the closest to the primary use of LPR, this item represents the only use of LPR found in Table 4.4 that is supported by less than a majority of respondents in Fairfax (48.1%). Though a sizable percentage of the community supports this use, the fact that support is significantly lower among members of the community raises an interesting point for agencies considering adoption of LPR. It is clear that the use of LPR on parking violations and unpaid tickets is much less popular in the community than the other uses tested in this survey.

One explanation for this might be that respondents were easily able to recognize and relate to a tangible and personal cost that might result from more efficient enforcement in this area (that of being forced to pay more fines). In thinking about this item, community members may focus only on their own costs and may not be able to associate the payment of parking tickets with a tangible benefit. Potentially, individuals concerned about privacy also may not think enforcement of parking tickets to be an important enough issue to require the use of LPR. These issues may merit careful consideration by agencies in formulating LPR policy.

Community support for the other immediate uses of LPR is also generally high, though not as high as for those uses previously discussed. The remaining scenarios detailed in Figure 4.4 reflect more tertiary uses on the LPR continuum. Specifically, 66.7% of respondents either "strongly support" or "support" the use of LPR to check if the registered owners of passing vehicles are sex offenders. Similarly, 70.1% of respondents either "strongly support" or "support" utilizing LPR to investigate all vehicles passing or parking near important places or buildings for the purposes of terrorism prevention. Despite the fact that suspected terrorists and child molesters are among some of the most despised categories of individuals, support for these uses is somewhat lower than support for the use of LPR to retrieve stolen vehicles. This may result from the fact that neither of these uses are directly related to vehicle enforcement; it is possible that members of community—while still very supportive of these uses—view them as farther removed from the primary use of LPR.

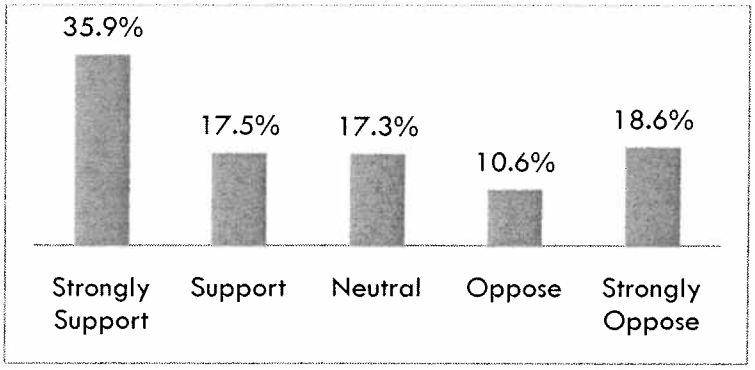
## COMMUNITY REACTIONS TO THE STORAGE OF LPR DATA

Figures 4.5 and 4.6 present the results of the survey relating to LPR data storage. To begin, we asked respondents to specify whether they considered the four elements of LPR data (date of observation, time of observation, license plate number, and the location of observation) to be public or private information (Figure 4.5). To avoid confusion, the survey question again specified the four pieces of information considered a part of the LPR data. The question of whether or not the community considers LPR data to be public or private information is an important one because several of the court cases referenced earlier in this chapter have held that individuals do not have a privacy interest in their license plates while driving (*U.S. v. Diaz-Castaneda*, 2007; *U.S. v. Ellison*, 2006; *U.S. v. Walraven*, 1989; *U.S. v. Matthews*, 1980). As we have seen, however, the resolution of this issue may involve larger questions than the constitutional protection afforded to a single license plate check. While the courts may not view individual license plate checks as a violation of privacy, the storage of LPR data may be seen as distinct because an individual's daily activities, preferences, and opinions might eventually be capable of being recreated through saved LPR data.

Regardless of the courts' ultimate opinions about the level of privacy properly afforded saved LPR data, the public will likely form its own opinion on this topic, which is what often occurs with respect to other police practices (see Lum, 2009). Further, given the rapid diffusion of LPR, the public is liable to form this impression prior to any definitive court ruling about the constitutionality of the technology. Once the public has made its judgment about the privacy of LPR data, this reaction might also play an important role in how the technology itself is perceived—as either a useful law enforcement tool or an example of police intrusion into the private lives of citizens. Both of these judgments are also liable to influence overall police legitimacy and job approval. At minimum, these considerations

should influence the level of security that the police accord saved LPR data and perhaps even how frequently it is used.

**Figure 4.5. Do You Believe That This Information Should Be Considered Private? (n=451)**




Interestingly enough, despite the fact that those in the sample appear very supportive of LPR use, the majority of respondents (53.4%) consider LPR data to be private information. This represents a large number of respondents, particularly given the lack of public debate about LPR up until this point. Currently, most community members have not heard any arguments made by privacy advocates with respect to LPR. Of course, supporters of LPR use have also not had the chance to fully communicate their views either, nor has the public seen potential LPR benefits.[32]

In designing the survey, we purposefully placed this question prior to any questions regarding specific uses of saved data. This was done in order to guard against possible bias that could be introduced through concern over specific uses of saved data. In addition to the majority that responded that LPR data should be considered private, 17.3% of the respondents expressed neutrality with respect to this question. Like some of the other survey items, this reflects a fairly large percentage of undecided individuals. Once the community becomes more familiar with LPR and experiences its use within the community firsthand, the opinions of these individuals may be altered.

In comparison, the results are about evenly split with respect to the question of how long LPR data should be saved (Table 4.1). As a response to this question, the participants were permitted to select one of four options: (1) that the data should be not be saved, (2) that it should be saved for about 1 week, (3) for about 6 months, (4) or for as long as the police wish to save it. In the end, 30% of respondents opted for the 6-month retention

[32] Indeed, though a majority of respondents indicated that LPR data should be considered private, members of the community seem to be much less troubled by data sharing with other government entities. In fact, 74.3% of respondents to our survey felt that the police should be able to share information with other government agencies.

period, while approximately 23% of respondents opted for each of the remaining categories. This result could reflect a small preference for a data storage period of approximately 6 months, but the fact that the responses are so evenly split across all options more likely reflects a lack of developed opinion on this issue. Further, it seems logical that this lack of opinion would stem from the complexity of this question combined with the shortage of public debate and experience with LPR.

**Table 4.1. An Experiment: Community Reaction to Data Storage With and Without "Solving Crime" Clause**

| | Yes, the data should be saved until the police want to erase it. | Yes, the data should be saved for about six months. | Yes, but only for a short period of time (for example, one month) | No, the data should not be saved |
|---|---|---|---|---|
| **Do you think that your local police should save the LPR data? (n=226)** | 53 (23.5%) | 69 (30.5%) | 52 (23.0%) | 52 (23.0%) |
| **If it can help in solving crimes, do you think that your local police should save LPR data? (n=213)** | 77 (36.2%) | 65 (30.5%) | 35 (16.4%) | 36 (16.9%) |

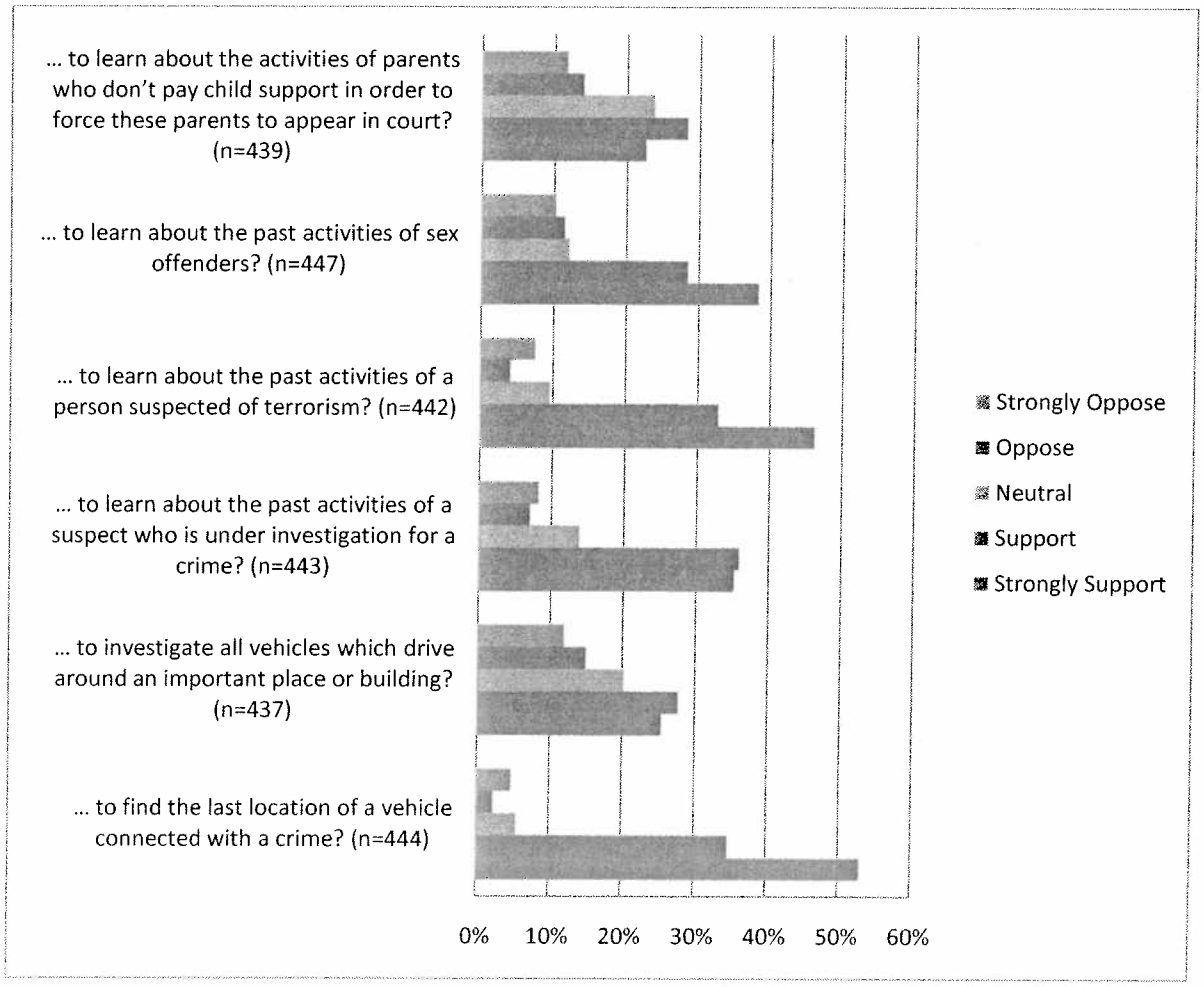
However, an interesting finding results from the experiment that was conducted using a slight variation to this survey item. Law enforcement agencies have made the argument that saving LPR data could help in future crime solving, since an LPR database would allow the police to "look back" at an area or time period surrounding a crime or at the activities of a prime suspect. We wanted to test the persuasiveness of this argument and the impact that it might have upon the willingness of community members to allow LPR data to be saved. For this reason, we split our sample of respondents into two groups and added the clause, "if it can help in solving crime" to the existing question about LPR data storage. Each group of respondents received only one of the two questions listed in Figure 4.6.

The findings presented in the second row of Figure 4.6 demonstrate that this argument seems highly influential to responses regarding the proper length of time to store LPR data. The addition of just a few words about crime resulted in a full 36.2% of respondents indicating that they would allow the police to save their data for as long as the police thought appropriate (as compared to only 23.5% of respondents in the group without this added clause). Further, as can be seen in Figure 4.6, respondents seem to migrate across categories to longer data storage periods once the potential crime control benefits of LPR data storage are mentioned. In fact, even the percentage of respondents

who indicated that data should not be saved for any length of time decreased by approximately six percentage points. Even those who are skeptical about the propriety of saving LPR data appear potentially open to moderation of their positions when reminded of the potential crime control benefits.

The results of the survey with respect to saved data become even more nuanced when we examine the findings targeted to later steps on the LPR continuum. Much like the uses of LPR located on the left side of the continuum, the public generally supports the uses of saved LPR data mentioned on the survey. As Figure 4.6 illustrates, the percentages of respondents replying that they "strongly support" or "support" these uses of saved LPR data remain high, ranging from 50.8% to 87.6% of the community. This is quite a large percentage of the public to support any public policy and—particularly with respect to the very highest percentages of support—may signify that the public has not had much of an occasion to consider the full implications of long-term LPR data storage by police.

**Figure 4.6: "The Police Should Be Able to Use *Saved* LPR Data..."**



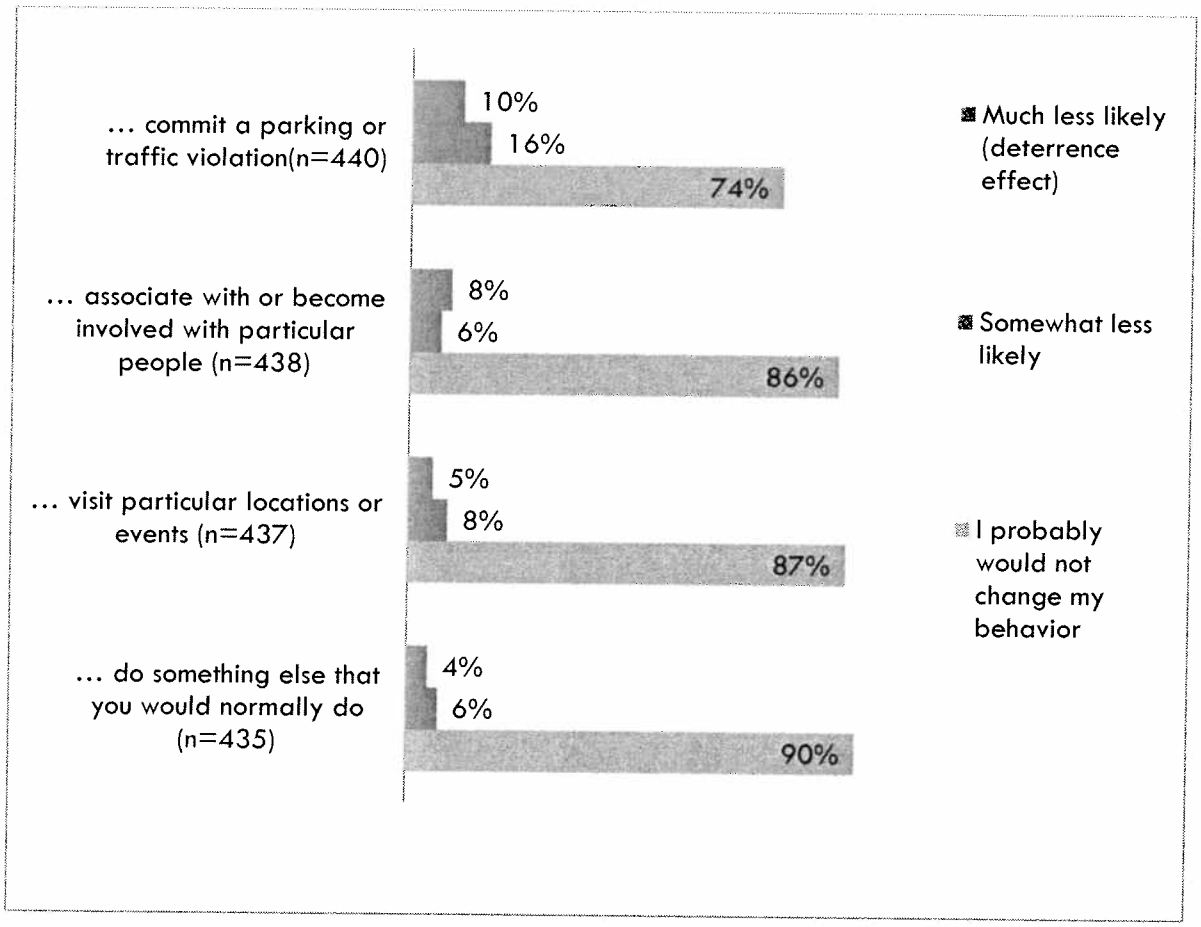
Additionally, it seems that support was again predicated on whether or not respondents felt that a particular use of saved LPR data might impact "average" or "innocent" members of the community. The uses of saved LPR data that would clearly impact "average" members of the community (as opposed to "criminals" or "terrorists") were the least popular. For example, though the use of saved LPR data to learn about the past activities of individuals suspected of a crime (71.1%), vehicles suspected of a crime (87.6%), sex offenders (66.7%), or suspected terrorists (79.0%) each yielded high levels of support, proposals to utilize the same data to investigate "all vehicles which drive around an important place or building" only prompted about 53.1% of respondents to mark "strongly support" or "support."

To be sure, this percentage still represents a majority of respondents. Yet the fact that comparatively few respondents supported the uses of both LPRs and of saved LPR data that might impact "average" members of the community underscores this consideration as potentially very important. This result may also suggest that one argument of privacy advocates—that LPR use and data storage is to be considered seriously because it will impact wholly "innocent" individuals—might have some traction with the public. The argument here is that "innocent" individuals in the community will have their data stored along with the "criminals"; therefore, average community members would be subject to the same potential privacy violations or harm from misused data without any individualized suspicion of wrongdoing.

## LPR IMPACT

Since our project was focused on the deterrent effects of LPR on crime generally and auto-related crimes more specifically, Figure 4.7 displays results regarding the impact of LPR on individual behavior. For this question, we opted to select the six month data storage period discussed above and included a statement hypothesizing that the local police department in Fairfax made a decision to store LPR data for this period.

**Figure 4.7. "If You knew That the LPR System's Data Was Being Saved for 6 Months by the Police in Your Community, Would You Be Less Likely to..."**




In response to this question, 26% of participants indicated that they would be "much less likely" or "somewhat less likely" to commit a parking or traffic violation. This number is substantial because these responses may be based chiefly on the information about LPR contained within our short survey. The impact of LPR upon the commission of parking or traffic violations may increase as the community experiences the efficiency of the technology. Future evaluation studies should follow up on this point and investigate the actual impact of LPR on the commission of these violations, as opposed to the prospective impact investigated by this survey.

Yet, we also possessed a second interest in researching the impact of LPR on the behavior of community members. Since LPR use and computer storage capabilities might eventually progress to the point where it is possible to recreate a person's daily activities from saved LPR data, privacy advocates have been concerned that this capability may influence individuals' non-criminal activities. Individuals who hold political or personal views outside of the mainstream, or who fear criticism for some other choice, may choose to constrain

their activities in order to avoid police knowledge of them (Reiman, 1995, p. 35). As a result, LPR use could also have a chilling effect on the exercise of other rights, such as First Amendment rights (IACP, 2009, p. 14).

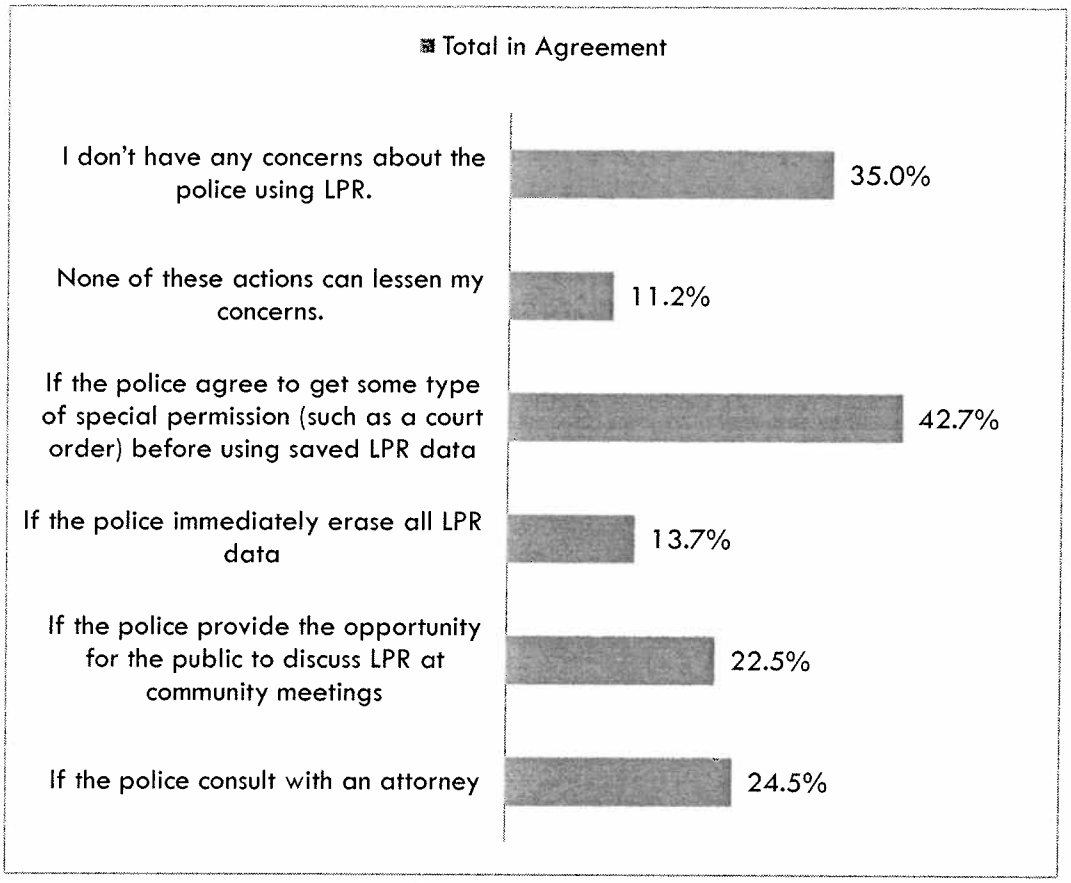
However, when asked if LPR data storage would stop them from "associating with or becoming involved with particular people," a minority (14.4%) of the community said that they would be "much less likely" or "somewhat less likely" to do so. Similarly, when asked if LPR data storage by the police would impact the likelihood that they would "visit particular locations or events," 12.6% said that they would be "much less likely" or "somewhat less likely" to make this choice. Finally, 10.4% indicated that they would be "much less likely" or "somewhat less likely" to "do something else that [they] normally would do." Though not majorities, these percentages represent a substantial portion of the total community, especially when it is considered that the reason why particular actions or opinions might be subject to community criticism is that they are not part of most community members' routines.

For example, only a small portion of a community might hold minority religious or political beliefs. When viewed in this light, the fact that 10–15% of residents might alter their actions seems substantial. Further, these results need to be understood in the context of the Fairfax, Virginia, community—a relatively large, fairly heterogeneous suburban community with a well-educated and mobile population. In another community (such as one that is smaller or more homogeneous), any chilling effect might be magnified.

Finally, the survey asked how the police might lessen any concerns the respondents might have about LPR use. Respondents were given the option of checking up to two items on a list of six. The list also included the option of checking a statement indicating that the individual did not have any concerns about LPR use. Likewise, another option allowed respondents to indicate that no action by the police could alleviate their concerns. The results of this question (Figure 4.8) are interesting. Since community support for the use of LPR is relatively high, it is not surprising that 35% of respondents indicated that they have no concerns about the use of LPR. In comparison, 11.2% responded that the police could take no action that would lessen their LPR-related concerns, and an additional 13.7% of participants asserted that their concerns would only be lessened by the immediate erasure of LPR data.

Taken together, the last two groups mentioned represent about one quarter of the population, which is not insubstantial. Since we allowed participants to check more than one option, there may be some overlap between these two groups; however, it seems unlikely that there is much overlap given the results on police legitimacy and support that are presented in the next section of this chapter. Indeed, we will find that similar percentages (23% of respondents) indicated that they would hold a more negative view of their local police if the decision were made to save LPR data.

**Figure 4.8. Respondents' Suggestions for Alleviating Concerns About LPR (n=457)**




A similar percentage (24.5%) would like to see the police department consult an attorney about legal issues prior to using LPR. This is actually a slightly greater number of respondents than those who would like to see police allow the public an opportunity to comment on the use of LPR (22.5%). However, by far the largest percentage of respondents (42.7%) indicated that they would like to see police be required to obtain some special permission (such as a court order) before using saved LPR data. The argument that police should not have unfettered access to this information appears to have some traction in the community. For example, a policy that states that police will only look at LPR with some level of cause to suspect criminal wrongdoing might help to lessen the concerns of the community.

## POLICE LEGITIMACY AND PERFORMANCE

The community survey-experiment incorporated several distinct measures related to police legitimacy, performance, and job approval. As mentioned in the methodology section above, we chose to ask questions regarding approval of police at several strategic points throughout the survey. Additionally, we incorporated an experiment that involved altering

the order in which various sections of the survey were presented to respondents. This allowed us to obtain a "baseline" reading with respect to legitimacy issues prior to asking any questions about LPR and to obtain a second reading from another groups of respondents to see if discussion of these issues would impact answers to the police legitimacy items. The experimental design allows for comparison of the average answers given by members of the community without fear of biased results that might occur if these questions were asked in sequence.

**Table 4.2: Community Response to Police Legitimacy and Job Approval Questions**

| **Responses given before discussion of LPR** | **Strongly Agree** | **Agree** | **Neutral** | **Disagree** | **Strongly Disagree** | **Total** |
|---|---|---|---|---|---|---|
| The police can be trusted to do what is right | 54 (23.58%) | 131 (57.21%) | 28 (12.23%) | 12 (5.24%) | 4 (1.75%) | 229 |
| Most police officers in my community do their job well | 80 (34.93%) | 116 (50.66%) | 28 (12.23%) | 5 (2.18%) | 0 (0.00%) | 229 |
| The police in my community treat citizens with respect | 66 (28.82%) | 117 (51.09%) | 34 (14.85%) | 10 (4.37%) | 2 (0.87%) | 229 |
| The police in my community respect citizens' rights | 67 (29.52%) | 109 (48.02%) | 38 (16.74%) | 9 (3.96%) | 4 (1.76%) | 227 |
| **Responses given after discussion of LPR** | **Strongly Agree** | **Agree** | **Neutral** | **Disagree** | **Strongly Disagree** | **Total** |
| The police can be trusted to do what is right | 28 (12.84%) | 120 (55.05%) | 48 (22.02%) | 13 (5.96% ) | 9 (4.13%) | 218 |
| Most police officers in my community do their job well | 67 (30.59%) | 128 (58.45% ) | 22 (10.05%) | 2 (0.91%) | 0 (0.00%) | 219 |
| The police in my community treat citizens with respect | 56 (25.69%) | 117 (53.67% ) | 38 (17.43%) | 7 (3.21%) | 0 (0.00%) | 218 |
| The police in my community respect citizens' rights | 49 (22.58%) | 118 (54.38% ) | 42 (19.35% ) | 6 (2.76% ) | 2 (0.92%) | 217 |

The "baseline" readings mentioned above are presented in the top half of Table 4.2. Generally, the top half of Table 4.2 indicates that residents hold positive feelings toward

their local police. The first five rows include only the responses from one-half of the sample—those respondents who answered these questions prior to any discussion of LPR on the survey. 80.79% of respondents expressed "strong agreement" or "agreement" that the local police department could be trusted to do what is right for the community. Similar percentages of the sample also either "strongly agree" or "agree" that the local police do their job well (85.59%), treat citizens with respect (79.91%), and respect citizens' rights (77.54%). In this manner, community sentiment toward the police in Fairfax, Virginia, seems to be very high. This high degree of esteem with which the Fairfax police are viewed by members of community may also influence the degree to which citizens are willing to trust their police to use LPR and store the data.

The experimental design allows us to compare the percentages discussed in the above paragraph with those from the "treatment" group, or the half of respondents who were asked about their feelings toward the police department after answering questions about LPR. Table 4.2 also presents these results in the last five rows. In comparison to the 80.79% of respondents who expressed "strong agreement" or "agreement" in the first sample, only 67.89% answered similarly that the local police department could be trusted to do what is right following discussion of LPR. Though still a sizable majority of respondents, there is also a substantial decline when compared with the responses of the first group. Indeed, this is the case after these citizens grappled with LPR issues for only a short period of time (during the survey). In comparison, we detected decreases in the percentages of respondents who would "strongly agree" with the remaining items, but not in overall support. In fact, Table 4.2 shows that strong agreement with each of the four items (trust in police, job approval, beliefs that police treat citizens with respect, and respect for rights) drops by between 2.51 and 10.74 percentage points following discussion of LPR. Additionally, these results appear even starker when it is considered that group number 2 coincidentally included close to an additional 12 percentage points of individuals identifying as Republicans and political conservatives[33], groups that previous public opinion studies have suggested trust the police at higher rates than others in the community. The changes that occurred in how the respondents answered these questions suggest that with prolonged discussion of LPR in public debate, police departments may reasonably be concerned about the impact of LPR on police legitimacy and community approval.

Our survey design allows for confirmation and replication of these findings and, perhaps, allows us to pinpoint why these changes have occurred. Specifically, we asked respondents to indicate whether they would feel more positively, neutral, or more negatively about the police at critical points during the survey. These results are compared in Table 4.3. The first "checkpoint" occurred after discussion of only the primary use of LPR (stolen vehicle retrieval). At this time, 79.85% of respondents indicated that they would

[33] These groups were measured in two separate survey questions (one related to political parties and one related to political ideology). However, both questions yielded nearly identical results with respect to group 2.

"strongly support" or "support" a decision by the police to use LPR. This finding corresponds with space one on the continuum of LPR uses. Following discussion of the LPR uses located at spaces two and three on the continuum, 35.97% of respondents indicated that they would feel "much more positively" or "more positively" about their police department, while 49.77% remained neutral and 14.25% of respondents indicated that they would feel "more negatively" or "much more negatively" about their local police. Substantial numbers of respondents indicated preferences on both the negative and positive sides of the scale. However, the results seem to suggest that the adoption of LPR uses at spaces one through three on the continuum may, at this time, engender more positive feelings of police than negative.

**Table 4.3: Alterations in Community Support for Police as a Result of LPR Use**

| Question asked after discussion of primary and immediate uses of LPR only . . . | Much More Positively | More Positively | Neutral | More Negatively | Much More Negatively | Total |
|---|---|---|---|---|---|---|
| If the police in your community decided to use LPR, would this cause you to feel more positively or more negatively about your local police? | 16 (14.48%) | 95 (21.49%) | 220 (40.77%) | 31 (7.01%) | 32 (7.24%) | 451 |
| **Question asked after discussion of LPR data storage . . .** | **Much More Positively** | **More Positively** | **Neutral** | **More Negatively** | **Much More Negatively** | **Total** |
| If the police in your community decided to save LPR data for six months, would this cause you to feel more positively or more negatively about your local police? | 57 (12.75%) | 60 (13.42%) | 231 (51.68%) | 50 (11.19%) | 49 (10.96%) | 447 |

Yet, there is also an important point of caution associated with this finding. The majority of respondents also reported that they would be neutral to the decision to utilizing LPR at continuum points one, two, and three. This finding may result from the fact that LPR does not influence views of police for these individuals, or the finding may again result from the fact that there has been so little public discussion of LPR to this point. Agencies considering adopting LPR must also judge how events or a more robust public dialogue may influence these opinions.

Finally, we may also compare responses provided to the same question but this time asked directly following discussion of the possibility that the police department might save LPR data for a 6-month time period. This "checkpoint" corresponds with spaces four and five on the continuum of LPR uses presented earlier in this chapter. Following discussion of the uses of LPR that rely on saved data, only 26.17% of respondents indicated that they would feel "much more positively" or "more positively" about their police department (down from 35.97 above). Additionally, while approximately one half of respondents remained neutral, the number that indicated they would feel "more negatively" or "much more negatively" about their local police rose (from 14.25 to 22.15). This finding suggests that the decreases found in the four items discussed at the beginning of this section (trust in police, job approval, beliefs that police treat citizens with respect, and respect for rights) are likely attributable to concerns over the storage of LPR data.

## Conclusions

It is clear from the preceding results that the community of Fairfax, Virginia, feels quite positively about its local police department. At the start of this community survey-experiment, then, our results seemed to indicate that the police department was operating with a good deal of legitimacy in the eyes of the public. In turn, this high level of legitimacy and reserve of goodwill between the police and the community may also have affected the degree to which the community indicated a willingness to trust the police to utilize LPR technology. Indeed, across the board, there are high levels of support within the community for most of the uses of LPR mentioned within the survey. For the purposes of aiding future testing and policy development, this chapter presented a continuum of LPR uses and a survey-experiment specifically targeted to locations on that continuum.

Yet, despite the high levels of police legitimacy found in this community, the survey-experiment detected slippage in opinions about the police following discussion of LPR. This result occurred even though most members of the community have likely had very little actual experience with LPR. Further, the discussion of LPR on the survey was relatively brief. Even in a community with high levels of public support for the police and where the police department commands substantial legitimacy, mere discussion of LPR on a survey results in some reduction of goodwill. This question of legitimacy is crucially important, as it impacts all operations that the police must conduct. In some ways, this is the "toughest test" of whether or not LPR use might impact legitimacy by virtue of the fact that legitimacy was particularly robust in this community. Not surprisingly, the survey item that reflected the slippage mentioned above to the greatest degree was an item asking respondents to assess whether or not the police respected the rights of citizens. While this survey-experiment yielded interesting results, police agencies would be well served by a future survey project in a community with lower pre-existing police legitimacy and job approval. In a community of this type, the impact of LPR may be even more substantial.

In fact, the slippage of opinion regarding the police that was detected in the survey-experiment may only be temporary, as our current research design can tell us nothing about the persistence of this decline. However, it may be just as logical to assume that decreases in legitimacy might also accelerate with increased citizen interaction with and knowledge of LPR. As mentioned previously, these results do not account for the impacts of prolonged discussions of privacy that may occur once a community begins to think about the full implications of the technology. To the best of our ability, we designed this survey to represent an unbiased source of information and, in doing so, we purposefully did not mention any of the "buzz" words that may result in stark changes of public confidence. Further, our survey does not account for serious legitimacy impacts that might result from publicized instances of hacking or improper disclosure of LPR data.

For these and other reasons, public opinion regarding the use of LPR technology may change. For example, we found evidence of this possibility in several items on the survey for which substantial percentages of respondents fell into the neutral category. Not surprisingly, at times, we also detected a response pattern suggestive of a simple lack of knowledge about LPR at this time. The question that asked about the proper length of time for storage of LPR data provides a good example of this. Our sample selected each response category with nearly equal frequency, likely the result of a lack of any true opinion. This may change rapidly with increased exposure to LPR. As is generally the case with questions related to privacy, respondents also seem to have had a difficult time conceptualizing some of the tradeoffs between LPR and civil liberties, but this may change with more widespread LPR use and more frequent discussion in the community.

Yet, the community survey-experiment also yielded several results that may be helpful to agencies in formulating policy, even at this early point in the development of the evidence base. First, it seems that members of the community are responsive to allowing more police discretion with respect to LPR if the technology can aid in combating crime. The community's substantial response to our second experimental stimulus made this clear. Additionally, law enforcement agencies should note that individuals in this experiment were less supportive of LPR uses that seemed to affect them personally or to affect "innocent" members of the community (such as when LPR is used to give parking tickets). These uses are easier for the community to conceptualize and relate to the possibility of experiencing negative consequences personally. The result was that fewer respondents supported these uses. This may also suggest that individuals could be receptive to some arguments by privacy advocates suggesting that LPR targets "innocent" citizens as much as those guilty of a crime. Finally, the majority of respondents indicated that they considered LPR data to be private information, a finding that should be considered by agencies thinking about how to configure their LPR systems.

Indeed, when asked what the police could do to lessen their fears about LPR, the highest percentage of respondents answered that they would like to see the police be required to

obtain some special permission before examining saved LPR data. This result also coincides with the findings of our legitimacy tests, which suggest that residents have greater concerns about data storage than they do about the uses of LPR located to the left side of the continuum. This also coincides with some of the legal arguments that suggest that the courts may have a more difficult time with the storage of data than with the primary use of LPR.

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# APPENDICES

# APPENDIX A. RANDOM SAMPLE LPR SURVEY

**TO:**
**REGARDING:** Survey on License Plate Recognition Technologies
**SPONSORING AGENCIES:** Department of Defense (DOD/SPAWAR) and Department of Justice (DOJ), Administered through the Center for Evidence-Based Crime Policy (CEBCP), George Mason University http://gemini.gmu.edu/cebcp .

Your agency has been randomly selected from all U.S. law enforcement agencies to participate in a survey gauging the extent of law enforcement use of **license plate reader/recognition (LPR) technology**. Specifically, the LPR systems mentioned in this survey are those systems, either in fixed positions or mounted on vehicles, which have the ability to scan license plates for investigative purposes. *(Please note: We are **NOT** asking about red light cameras or CCTV technologies in this survey.)*

This short survey will take approximately 10 minutes to complete. Please select the following survey that best describes your agency:

1. If your agency **currently uses LPR** systems, please fill out the information below and complete the brief survey as indicated on page 2 of this letter. For your convenience, this survey may also be accessed at: http://sites.google.com/site/surveycebcp/
2. If your agency **DOES NOT use LPR systems**, please fill out the information below and complete the brief survey as indicated on page 2 of this letter. For your convenience, this survey may also be accessed at: http://sites.google.com/site/surveycebcp/survey-for-agencies-without-lpr-technology

All results from this survey will be treated as confidential information and no individual survey or agency information will be disclosed in the reporting of these results. All survey results will also be made fully available to participating agencies upon request. If you have any questions regarding this survey, please feel free to contact Dr. Cynthia Lum, Deputy Director for the Center for Evidence-Based Crime Policy, directly at clum@gmu.edu or 703-993-3421. Thank you very much for your time.

**If you do not have internet access, please fill out the attached survey and return to**:
Dr. Cynthia Lum, George Mason University
Fax to: 703.993.8316
Mail to: CEBCP at George Mason, Administration of Justice, 301 Bull Run Hall (MS4F4),
10900 University Blvd, Manassas, VA 20110

Agency name: _____

Contact name and official title of the person who completed this survey: _____

E-mail address: _____

Phone (Example: 999-999-9999): _____

Full business address: (Example: ABC Police Agency, 123 Main Street, Los Angeles, CA)

## Survey for Agencies that do not use LPR technology

*Please complete ONLY if your agency DOES NOT have LPR technology. If your agency does use LPR, please skip and go to "Survey for Agencies that currently use LPR Technology" on the next page.*

1. Does your agency have plans to acquire LPR technology in the next 12 months?
   - ☐ Yes
   - ☐ No
   - ☐ No, but we are interested in acquiring LPR at some point

2. Why hasn't your agency acquired LPR technology to this point? Please check those factors that your agency has specifically considered. Check all that apply. If you also select "Other" please make sure the box to the left of "Other" is checked.
   - ☐ Agency is focused on other priorities
   - ☐ Data files or downloads are not available to support LPR technology
   - ☐ Cost of technology and ongoing maintenance
   - ☐ Lack of outside funding available to purchase LPR systems
   - ☐ Potential for legal or privacy concerns
   - ☐ Lack of familiarity with LPR systems
   - ☐ Concerns about technological problems with LPR systems
   - ☐ Concerns about misuse of data or hacking of data stored in LPR databases
   - ☐ Not enough information on the benefits or best practices associated with LPR systems
   - ☐ Concerns about driver distraction when using LPR system in police vehicles
   - ☐ Concerns about complaints from citizens or community groups
   - ☐ Other (please Describe): _____

Additionally, if you would like to share any other comments or concerns about your agency's discussion concerning the use of LPR technologies, please describe them below.

## Survey for Agencies that currently use License Plate Recognition (LPR) Technology

*If your agency currently uses LPR technology, please complete the following 10-question survey.*

1. How many LPR devices does your agency regularly use? (Please enter a number) _____

2. Who is the vendor (s) of the LPR devices used by your agency?

_____

_____

3. Where did your agency obtain funding to acquire LPR devices?
(Check all that apply.)
   - ☐ Federal program or federal grant funding
   - ☐ State program or state grant funding
   - ☐ Funding from annual agency budget

- ☐ LPR devices are loaned from another agency
- ☐ Other: _____

4. How are LPR devices used by your agency?
(For each of the following categories, check all that currently apply)

*4a. Operational purpose* (Check all that apply)
- ☐ Devices are used to detect stolen vehicles or stolen tags
- ☐ Devices are used to detect motor vehicle violations (vehicle with expired registration, unpaid tickets, etc.)
- ☐ Devices are used to initiate traffic stops to address other crimes
- ☐ Devices are used to monitor or record vehicles entering high-crime locations
- ☐ Devices are used to monitor security in high-risk locations (government buildings, key infrastructure)
- ☐ Devices are used to connect licenses to a secondary database (sex offender registry, child support, warrants) for further investigation
- ☐ Other: _____

*4b. Frequency of use* (Check all that apply)
- ☐ At least one device is always in operation 24 hours a day, 7 days a week
- ☐ Devices are turned on and off during the day or during a shift for a few hours
- ☐ Devices are used on an ad hoc basis for specific operational purposes
- ☐ Other: _____

4c. *Device Platform* (Check all that apply)
- ☐ Devices are mounted at fixed positions along highways or other traffic areas.
- ☐ Devices are mounted on marked police vehicles
- ☐ Devices are mounted on unmarked vehicles
- ☐ Devices use images gathered by other surveillance systems (i.e. CCTV systems, red-light cameras)
- ☐ Other: _____

4d. *Personnel operating the LPR technology* (Check all that apply)
- ☐ Uniformed police officers in general patrol
- ☐ Officers part of a LPR-dedicated or specialized unit
- ☐ Civilian and non-sworn agency employees
- ☐ Personnel in a command center
- ☐ Other: _____

5. Has your agency conducted a formal or published evaluation of your LPR devices?
- ☐ Yes
- ☐ No

6. What did your agency do to prepare to use the LPR technology? (Check all that apply)
- ☐ Consulted with another police agency regarding the use of LPR or attended an LPR training session hosted by another agency
- ☐ Reviewed research on LPR technology
- ☐ Created standard operating procedures for the use of LPR

- ☐ Researched the legal implications of the technology
- ☐ Consulted with the agency's attorney
- ☐ Attended a demonstration of the technology by the manufacturer or vendor
- ☐ Created or collected the data to be used by the LPR system
- ☐ Consulted with community leaders on the implementation of the technology
- ☐ Announced the use of the technology through press release or other media campaign
- ☐ Upgraded computer or information technology systems to accommodate LPR technological needs
- ☐ Conducted a needs assessment for the use of LPR
- ☐ Other: _____

7. What concerns does your agency have about the use of LPR? (Check all that apply)
   - ☐ Potential for legal or privacy concerns
   - ☐ Cost of the technology or ongoing maintenance
   - ☐ Lack of familiarity with LPR systems
   - ☐ Concerns about technological problems with LPR systems
   - ☐ Concerns about the misuse of data or hacking of data stored in LPR databases
   - ☐ Concerns about complaints from citizens or community groups
   - ☐ Not enough information on the benefits or best practices associated with LPR systems
   - ☐ Concerns about driver distraction when using LPR system in police vehicles
   - ☐ Concerns about vandalism of LPR units
   - ☐ Other: _____

8. Have individuals or community groups voiced concerns about your agency's use of LPR technology?
   - ☐ Yes No

9. If so, what was the nature of those concerns?
(Check all that apply. If you select "Other" please make sure the box to the left of "Other" is checked)
   - ☐ Potential for legal or privacy violations
   - ☐ Cost effectiveness of the technology
   - ☐ LPR system errors in detecting vehicles associated with law violations
   - ☐ Concerns about misuse of data or hacking data stored in LPR databases
   - ☐ Not enough information on the benefits or best practices associated with LPR systems
   - ☐ Concerns about driver distraction when using the LPR system in police vehicles
   - ☐ Concerns that the agency should be focused on other priorities
   - ☐ Other: _____

10. Has your agency faced any legal challenges related to the use of LPR technology?
    - ☐ Yes
    - ☐ No

Additionally, if you would like to share any other comments or concerns about your agency's use of LPR technologies, please describe them below. Specifically, please list other uses of LPR that your agency has considered or concerns with this technology not mentioned above.

# APPENDIX B. OFFICER INSTRUCTION SHEET FOR HOT SPOT PATROL WITH LPR UNITS

**TRAINING FOR IMPLEMENTATION OF EXPERIMENT**
**ALEXANDRIA PD AND FAIRFAX COUNTY PD**

**A. Contact information if there is any concerns or questions before, during or after experiment.**
(Cynthia Lum xxx-xxx-xxxx) (Julie Willis xxx-xxx-xxxx) (Breanne Cave xxx-xxx-xxxx)

**B. Time length of the experiment:**

1. 30 WORKING days, beginning February 8th, 2010, ending when individual officer completes 30 consecutive working days (30 envelops will be given to each unit, thus, 60 total envelops to each supervisor for two officers).
2. Each unit/officer will be assigned five (5) hot spots to patrol for 30 minutes each.
3. The experiment takes on average, about 3 - 4 hours of each officer's shift (thus, officer can be disrupted by arrest, reports, other duties and still complete the experimental assignment).

**C. General responsibilities of officer regarding the experiment.**

1. Pick up sealed assignment each consecutive working day from Supervisor or OIC -open.
2. Officer "A" is always Officer "A" (same with "B").
3. In sealed envelope will be daily assignment. In the order they appear and are numbered, (e.g., "1", "2", ...), officer will complete the experiment within his or her shift.
4. NOTE! Officers may be assigned to visit the same hot spot more than once in one day.
5. Immediately upon leaving the hot spot, officer fills out information on the map.
6. After all 5 sheets are completed, officer puts all sheets and final days log back into envelop, seals, signs, and gives to Supervisor.
7. Supervisor holds envelopes for weekly pickup and check in by Project Staff..

**D. Specific instructions for officer while in each hot spot.**

1. ONLY turn on LPR device right before entering the hot spot, and turn off device immediately after leaving hot spot.
2. ONLY stay in the hot spot during the 30 minutes. When finished with the assignment, return to regular patrol or normal duties.
3. At the very least, the following deployment must be implemented: Driving through every street segment within hot spot (parking lots/structures if possible) and scanning.
4. If extra time after scanning, any specific deployment given the officer's judgment and discretion of the area can be used.

**E. If you must leave the hot spot in the middle of the 30 minutes allocated:**

1. If the reason is because of an arrest due to the implementation of the LPR device, continue with arrest, and then once arrest process is finished (and if more than 30 minutes had elapsed), continue to next hot spot sheet, in the order they appear.
2. If someone else is processing the arrest and you are still within the 30 minutes allocated, continue as planned in that same hot spot in those thirty minutes.
3. If drawn away from that hot spot for some other emergency reason, please note on sheet. Only return if within 30 minutes. If not, move to next hot spot.

# APPENDIX C: SAMPLE HOT SPOT ASSIGNMENT SHEET AND MAP

Instructions:

1. Turn on LPR ONLY when in designated hot spot
2. Stay within the boundaries of the hot spot for a total of 30 mins.
3. Complete table below immediately after leaving hot spot

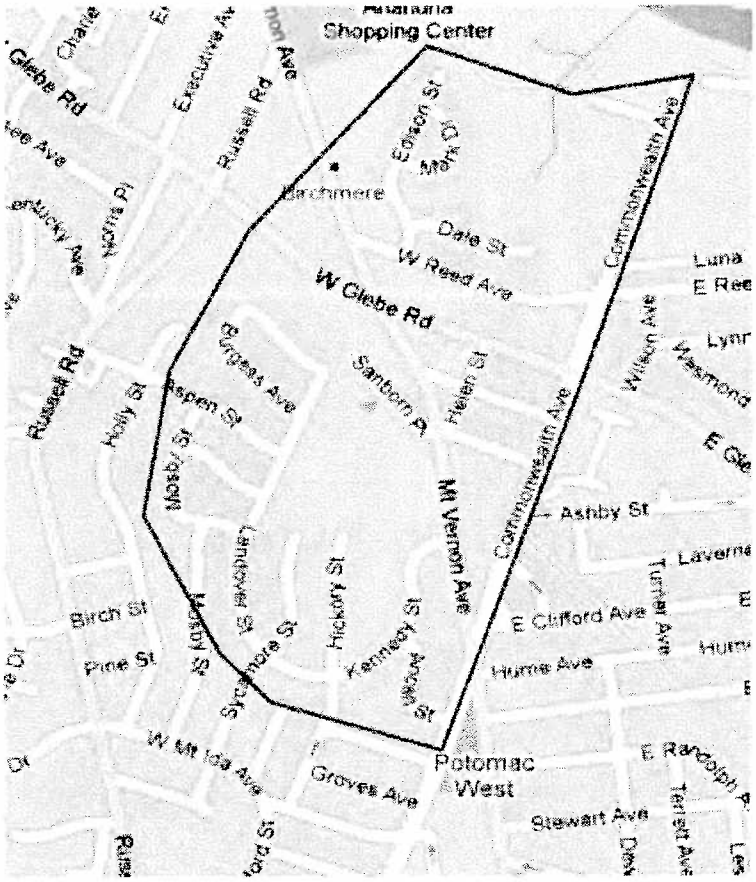
| Log for LPR hotspot patrol | |
|---|---|
| Officer Name | |
| Date of Patrol | |
| Entry time into hot spot | |
| Exit time leaving hot spot | |
| **Activity** | |
| # of plates scanned | |
| # of hits | |
| # of accurate hits | |
| **Outcomes for Hot Spot** | |
| Unoccupied stolen vehicles found | |
| Arrests- stolen vehicle | |
| Arrests -stolen plates | |
| # of arrests (other) | |
| **Notes – please write what you did while in hot spot.** | |
| | |

If during this implementation of this experiment you have any questions, please feel free to contact the project team.

Cynthia Lum xxx-xxx-xxxx
Julie Willis xxx-xxx-xxxx
Breanne Cave xxx-xxx-xxxx

## Hotspot XX

Day_____ Order #_____
OFFICER "B"




N: Edson St/ Commonwealth Ave; E: Commonwealth Ave; W: Mosby St; S: Landover St/ Ancott St

# APPENDIX D: TRAINING MANUAL FOR GMU LPR EXPERIMENT

## SECTION 1: GENERAL RESPONSIBILITIES

Supervisor or OIC:

- Holds 60 envelopes (30 per officer) in secure location for daily pick up.
- Receives sealed envelopes with completed sheets at the end of shift.
- Point of Contact with GMU team member.
- Supervisor and officers will have copy of this training manual.

Officer (2 assigned per jurisdiction)

- Patrols the 5 area assignments as directed; responsible for fidelity.
- Accurately Logs information on each sheet after 30 minute patrols.
- Returns all information back to envelop after each day and seals.

GMU Team (Lum, Willis and Cave)

- Provide any support at any time via cell phone or in person.
- Picks up sealed envelopes once/week at Supervisor's convenience.
- Checks in with officers each week to ensure experimental fidelity.
- Lum will supervise the entire project, and will be responsible for all issues.
- Willis will be assigned to APD specifically to pick up packets
- Cave will be assigned to FCPD specifically to pick up packets.

## SECTION 2: INSTRUCTIONS UPON OPENING ENVELOPES

- Patrol the hot spots according to the order that they appear in the envelope. They will be numbered at the right hand corner by Day and by Order # (1,2,3,4,5). *Do not deviate from that order even if the hot spot numbers themselves seem out of order.*

- *See sample instructions and hot spot map in Appendices B and C.*

- Turn on LPR right before entering each area, and log the time of entry on that area's map sheet.

- Spend ONLY 30 minutes patrolling each hot spot. If you make arrests, stops, or have to deviate from that area, only return if you are still within those 30 minutes. If not, go on to next area.

- 30 minutes begins when you ENTER hot spot, not while in transit.

- Turn off LPR right after exiting each area, and log the time of exit.

- Immediately complete the Log on each map upon leaving each hot spot. Don't forget to write what you did in the blank section on each map – use the back if you need more space.

- Move to next location and repeat # 2-6 upon arrival.

- After completing all five areas and logging efforts, put all materials back into this envelop. Note any special concerns, problems or issues on the back of the instructions sheet. Seal and sign the seal.

- Returned sealed envelope back to supervisor upon completing that day's assignment.

- Each packet contained five hot spot assignments as randomly constituted. Each page for each hot spot appeared as the following: (See Appendix C)

**SECTION 3: DEPLOYMENT ORDERS WHILE IN THE HOT SPOTS**

- First, sweep entire area, covering all streets with LPR.

- Then, after initial sweep, tactics are up to officer discretion. RECORD what you do on your log in the area labeled "Notes – please write what you did while in hot spot." Be as descriptive as possible, use the back of the paper if necessary.

- If you must leave the hot spot in the middle of the 30 minutes allocated: Only return if still within 30 minutes (or if you hadn't been there for too long), or if you cannot return within 30 minutes, continue to the next assigned area.

- If you cannot complete that day's assignment, please note reasons on the back of this sheet.

**SECTION 4: INSTRUCTIONS IF OFFICERS GET A POSITIVE HIT ON A VEHICLE OR LEAVE THE AREA**

*If you receive a positive hit on a vehicle:*

- Proceed as you would in patrol and follow through. Return to the assigned hot spot only if after you are done with your arrest/stop, you are still within the 30 minutes. LOG this special activity on the sheet.

- If outside of 30 minutes, upon return from arrest processing, continue with next assigned area in the envelope.

*If you must leave the area:*

- If less than 15 minutes, return and resume that area's assignment.

- If more than 15 minutes, move to next assignment.

- Don't begin a 30-minute assignment if you know you will be diverted.

*If you are disrupted from the experiment*

- If you haven't started the assignment, consider today a "non-working" day and just resume with this assignment tomorrow.

- If already within assignment and your shift has ended, use the "Notes" page on the back of the instructions page and write reason you were not able to complete the assignment.

- For the next day, continue with the next envelope as planned.

- Always feel free to call any of the three GMU team members if a question arises (cell numbers are on the instruction sheet)

**SECTION 5: ANTICIPATED PROBLEMS**

It is acceptable to:

- Not go immediately to the next hot spot. (you have entire shift to complete five, 30 – minute hot spots patrols)

- Make arrests and stops in the hot spot which may result in spending more than 30 minutes in area. (*)

- See the other LPR unit in the same hot spot. Just continue as planned and ignore the other unit (unless that unit needs backup).

- Return to "business as usual" or other duties *ONLY WHEN FINISHED WITH FULL ENVELOPE ASSIGNMENTS (and envelop is sealed and returned to supervisor)*.

Officers should try to absolutely avoid:

- Spending any more than around 30 minutes in each hot spot unless an action needed to be taken(arrest, stop, back-up).

- Deviating from your assigned hot spot during the 30 minutes.

- Patrolling outside of the five hot spots assigned, until you seal the envelop and finish that day's assignment.

- "Estimating". Dates, times, number of hits, descriptions of problems must be accurate and precise.

- Forgetting to put EVERYTHING back into envelope. If it came from the envelope, it goes back into the envelope, even instructions.

# APPENDIX E. QUESTIONS FOR LPR INTERVIEWS

**Theme 1: The Experiment**
*First, we would like to start by asking about your understanding of the experiment.*

Can you tell us about the LPR project?
- What it was about
- What was the objective/point of the project
- Rules of the experiment

Can you describe your "usual day" while doing the LPR experiment?
- What they did each day to start the experiment
- What did you do each day during the experiment
- What did you do each day to end the experiment

*Now, we want to ask some questions about your experience with carrying out the experiment.*

Can you describe any challenges you faced while carrying out the experiment?
- Problems completing hot spots each day
- Getting called away from hot spot during
- Problems finishing hot spot in 30 min.
- Ran out of things to do in 30 min.
- Was it hard to follow rules of the experiment? If so, why?
- Ever have to break rules of the experiment? If so, why?

**Theme 2: Officer Interaction with LPR Technology**
*Next, we would like to hear about how you ran the LPR units while carrying out the experiment.*

Can you describe how the LPR unit works?
- What the unit does
- How it works
- How does data license plate data get into unit
- What happens when there is a hit
- What happens to stored scan information after you use the LPR?

Can you describe the different ways you used the LPR to scan plates in the designated hot spots?
- Scanned patrol
- Stationary scans
- Any other strategies used?

How easy or difficult was the LPR to run?
- Any problems while driving and running unit?
- Any problems scanning plates?
- Were there any weather issues (i.e., snow)

- Problems patrolling certain geographies (i.e., parking garages, alleyways, etc.)

Did you ever have any problems with the LPR equipment? If so, what were they?
- Software updates
- Problems scanning (i.e., missed hits, reads fences or other objects as plates, etc.)

**Theme 3: Crime Prevention and Detection and LPR**
*Now we would like to hear about how the LPR was used to deal with crime problems.*

Prior to this experiment, how were auto thefts calls/reports typically handled?
- What they did
- Was the LPR used prior to the experiment for these calls/reports? If so, how?
- Were maps used to diagnose problem areas for auto related crimes?
- Were hot spots used to identify areas of auto related crimes?
- Were there any problems of handling calls/reports this way? What were they?

Is LPR useful to law enforcement and crime?
- If so, how?
- If not, why?

Throughout this experiment, what were the different ways you used the LPR?
- Patrol Scans
- Stationary scans
- Any other activities?

For each of the strategies you used, can you describe any operational issues (i.e., not being able to enter into parking garages while patrolling, not able to read plates because of way cars were parked, etc?) you had with the LPR unit?
- Problems scanning certain areas
- Parking garages
- Ways cars were parked
- Narrow streets (alleys, etc.)
- Any other problems?

If there were operational problems, how did you handle them?

What did you think WOULD BE the most effective strategy for using the LPR? Please explain why.

What do you think WOULD BE the most ineffective strategy for using the LPR? Please explain why.

Can the effects of police activities on crime vary by how the LPR is used? If yes, please explain.

Overall, what do you think about the hot spots approach to auto thefts and auto related crimes?
- Does it work/Does it not work
- Best uses
- Does it help reduce crime?

- Does it help clear open cases?

In general, should hot spots approaches be used with the LPR technology?
- If yes: Why?
- If no: Why not?

**Legality and Legitimacy Issues and Concerns**
*Now we are going to switch gears a little bit and talk about any legal or legitimacy concerns that arise from the police using LPR.*

What do you think might be some legal concerns with using LPR?

What do you think might be citizen concerns with using LPR?
- Potential for legal or privacy violations
- Cost effectiveness of technology
- LPR system errors in detecting vehicles associated with law violations
- Concerns about misuses of data or hacking
- Not enough information on the benefits or best practices of LPR
- Concerns about driver distractions when using LPR
- Agency should be focused on other priorities

Have legal, ethical, or legitimacy concerns regarding LPR uses ever come to mind?
- Private information about vehicle owners
- Information about time, date, and location of car
- Use of LPR data for other law enforcement activities
- Sharing LPR information with other agencies
- Any others

What do you think might be some legal concerns with using hot spots policing?

What do you think might be citizen concerns with using hot spots policing?

Have legal, ethical, or legitimacy concerns regarding hot spots policing ever come to mind?
- Private information about vehicle owners
- Information about time, date, and location of car
- Use of LPR data for other law enforcement activities
- Sharing LPR information with other agencies
- Any others

Did you observe any response from citizens while using the LPR or during your presence in the hot spot? If so, can you describe?
**The Evaluation Experience**
*For the last set of questions, we want to talk to you about the LPR evaluation overall.*

In your view, what was the purpose of the LPR experiment?

What was your initial reaction and impression of the LPR evaluation study?

- If good: Why was it good? What about the project or the idea of evaluating LPR did you like?
- If not good: What might help improve that initial interaction/approach in the future?
    - Presentation
    - Approach to determining what to evaluate
    - Other suggestions

Was an evaluation of LPR was needed?

- If yes: Why?
- If no: Why not?

Are there any differences between prior conceptions about LPR and now?

Have you worked with evaluation researchers before?

- If yes, what describe prior experience – type of project, feelings/reflections about evaluation

Would you participate in evaluation research again on another type of tactic or technology?

- If yes:
    - Why?
    - Is there a particular tactic or technology you think needs to be evaluated?
- If not: Why not?

Are there incentives that might facilitate further participation from officers in future evaluations?

- If so: What are they?
    - Commendations
    - Compensations
    - Other suggestions for incentives
- If no: Why would incentives not work?

# APPENDIX F. THE COMMUNITY SURVEY[1]

**GEORGE MASON UNIVERSITY &**
**FAIRFAX COUNTY POLICE DEPARTMENT**
**COMMUNITY SURVEY**

*Consent form and information sheet*

**DESCRIPTION OF THIS PROJECT**
This survey, carried out jointly by George Mason University (GMU) and Fairfax County Police Department (FCPD) is intended to gauge the community's feelings about police services, and also the use of a technology to reduce auto theft and crime.

**ANSWERING A SHORT SURVEY**
We would very much appreciate your participation in this short survey. If you agree to participate, you will be asked to answer the attached survey, either in writing, or using our automated internet form located at http://gemini.gmu.edu/cebcp/LPR.html . The survey will take approximately 15 minutes to complete. You must be at least 18 or over to participate in this survey, and the survey is anonymous.

**RISKS/BENEFITS**
There are no foreseeable risks and/or benefits to any individual for participating in this research.

**CONFIDENTIALITY**
Your answers will be kept confidential and anonymous. Please do not write your name on the survey you complete. The number at the right hand corner of the survey is only to identify the survey itself for administrative purposes. We are only interested in aggregate responses of the entire Fairfax County community in this survey, not any one particular response. You may choose either to mail back your completed survey in the provided, stamped envelope, or you can complete it online. Both choices are anonymous choices.

**PARTICIPATION**
Your participation is voluntary, and you may withdraw from the study at any time and for any reason.

**CONTACT**
This research study is being conducted by George Mason's University, Center for Evidence-Based Crime Policy (CEBCP) in partnership with Fairfax County Police Department. The researcher team may be reached at 703-993-3421 or cebcp@gmu.edu for questions or to report a research-related problem. You may also contact the George Mason University Office of Research Subject Protections at 703-993-4121 if you have questions or comments regarding your rights as a participant in the research.

This research has been reviewed according to George Mason University procedures governing your participation in this research. George Mason Human Subjects Review Board has chosen to waive the requirement for a signature on this consent form. However, if you still wish to sign a consent form, please contact the CEBCP at 703-993-3421.

[1] Note that there were four versions of the survey so that an experiment within the survey could be conducted.

**George Mason University and Fairfax County Police Community Survey**

You may complete this survey either on paper and return it using the enclosed stamped envelope, or fill it out online at http://gemini.gmu.edu/cebcp/LPR.html. Both are anonymous. Once you answer a question, please do not go back and change your answer. **SURVEY NUMBER <<Unique ID>>**

**SECTION I: QUESTIONS ABOUT POLICE SERVICES**

Please mark the level of your agreement or disagreement with the following statements:

| | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
|---|---|---|---|---|---|
| The police can be trusted to do what is right. | | | | | |
| Most police officers in my community do their job well. | | | | | |
| The police in my community treat citizens with respect. | | | | | |
| The police in my community respect citizens' rights. | | | | | |

How safe would you feel walking alone at night in your neighborhood? Please circle one:

Very Safe  Safe  Unsafe  Very unsafe

How likely are the following crimes to happen in your neighborhood? Please check **one box for each crime.**

| | Very Likely | Somewhat Likely | Unlikely |
|---|---|---|---|
| Graffiti | | | |
| Car being stolen or broken into | | | |
| House being burglarized | | | |
| Person being robbed on the street | | | |
| Teenagers hanging around and being disorderly | | | |

How concerned are you that you or your neighbors might be a victim of a terrorist attack? Please circle one:

Very Concerned  Somewhat Concerned  Not Very Concerned  Not at all Concerned

Which of the following statements comes closest to your view? Please circle one number along this range.

| In order to lower the risk of terrorism in this country, I am willing to give up some civil liberties. | | Neutral | | We should preserve our freedoms above all even if there remains some risk of terrorism. |
|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) |

## SECTION II: QUESTIONS ABOUT A NEW LAW ENFORCEMENT TECHNOLOGY

**Some law enforcement agencies use license plate recognition systems (LPR) in order to scan license plates and check them against reports of stolen vehicles. The police in these cities can place a LPR system in either a fixed location or on a police vehicle and then use the system to automatically check the license plates of all vehicles which pass by. The next set of questions asks for your opinions about the use of this technology.**

Prior to this survey, have you ever heard, read about, or seen the use of License Plate Recognition (LPR) technology?

CIRCLE ONE: Yes No

To your knowledge, do your local police use LPR?

CIRCLE ONE: Yes No I don't know

If your local police agency decided to use LPR to check all passing vehicles to see if any have been stolen, would you support this decision? CIRCLE ONE:

Strongly Support Support Neutral Oppose Strongly Oppose

License Plate Recognition (LPR) technology may be used in many other ways. Please tell us which other uses of LPR you would support by marking **one box on each line** below:

| ***An officer should be able use LPR technology in order to:*** | Strongly Support | Support | Neutral | Oppose | Strongly Oppose |
|---|---|---|---|---|---|
| … check all passing vehicles for parking violations and unpaid tickets. | | | | | |
| … check if the registered owners of all passing vehicles are wanted for a crime. | | | | | |
| … check if the registered owners of all passing vehicles are sex offenders. | | | | | |
| … investigate all vehicles passing or parking near important places or buildings to try to prevent terrorism. | | | | | |

LPR systems take a photograph of a vehicle's **license plate number**, which can then be linked to the vehicle's registered owner. The system can also be set up to record the **date, time and exact location of a vehicle** at the moment the photograph is taken. Do you believe that this information should be considered private? Please circle one number along this range.

Private Information (1) (2) (3) (4) (5) Not Private Information

If the police in your community decided to use LPR, would this cause you to feel more positively or more negatively about your local police?

Much more positively (1) (2) Neither positively nor negatively (3) (4) Much more (5) negatively

After an LPR system records data, the police may choose either to save the data for future use or to erase the data. Do you think that your local police should save the LPR data? Please circle one number:

| **(1) No**, the data should not be saved | **(2) Yes, but only** for a short period of time (for example, **one month**) | **(3) Yes**, the data should be saved for about **six months.** | **(4) Yes**, the data should be saved until the police want to erase it. |
|---|---|---|---|

If the police decide to save the LPR data (license plate number, date/time, location of the vehicle), the police will be able to look at the saved data in the future. Please tell us which uses of saved LPR data you would support by marking **one box on each line below**.

| ***The police should be able to use saved LPR data in order to:*** | Strongly support | Support | Neutral | Oppose | Strongly Oppose |
|---|---|---|---|---|---|
| … find the last location of a vehicle connected with a crime? | | | | | |
| … investigate all vehicles which drive around an important place or building? | | | | | |
| … learn about the past activities of a suspect who is under investigation for a crime? | | | | | |
| … learn about the past activities of a person suspected of terrorism? | | | | | |
| … learn about the past activities of sex offenders? | | | | | |
| … learn about the activities of parents who don't pay child support in order to force these parents to appear in court? | | | | | |

Should the police department be able to share information collected by the LPR system with other government agencies? Yes No

If you knew that the LPR system's data (license plate number, date, time, exact location of vehicle) was being saved for six (6) months by the police in your community, would you be less likely to . . .

| | Much less likely | Somewhat less likely | I probably would not change |
|---|---|---|---|
| … commit a parking or traffic violation? | | | |
| … associate with or become involved with particular people? | | | |
| … visit particular locations or events (such as certain types of medical facilities, businesses, religious services, or political protests)? | | | |
| … do something else that you normally do? | | | |

If the police in your community decided to save LPR data for six months, would this cause you to feel more positively or more negatively about your local police? Please circle one number along this range:

| Much more positively | | Neither positively nor negatively | | Much more negatively |
|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) |

If you have concerns about the use LPR, how could the police **best lessen these concerns**? Please mark (x) up to TWO answers that are important to you. If you don't have any concerns about LPR, please mark only the last answer.

_____ If the police consult with an attorney about possible legal or privacy issues before using LPR
_____ If the police provide the opportunity for the public to discuss LPR at community meetings
_____ If the police immediately erase all LPR data
_____ If the police agree to get some type of special permission (such as a court order) before using any saved LPR data
_____ None of these actions can lessen my concerns.
_____ I don't have concerns about the police using LPR technology.

***Thank you for your participation. In order to complete the survey, please answer some general questions about yourself.***

What is your gender? Male Female

Generally speaking, do you usually think of yourself as a Republican, a Democrat, or an Independent?

Republican Democrat Independent

Please circle the racial or ethnic group with which you most closely identify yourself.

_____ White/Caucasian
_____ Hispanic/Latino
_____ Asian or Pacific Islander
_____ Black/African American
_____ American Indian or Alaskan Native

In what year were you born? _____

Some people are very interested in politics and political campaigns. Others prefer to spend their time in other activities. Overall, how interested would you say that you are in politics?

Little Interest(1) (2) Medium Interest (3) (4) (5) High Interest

Generally speaking, how would you characterize your political ideology?

| Very Liberal | Liberal | Slightly Liberal | Moderate | Slightly Conservative | Conservative | Very Conservative |
|---|---|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) | (6) | (7) |

What is the highest level of education that you have completed?

_____ Some high school
_____ High School Graduate (or equivalent)
_____ 4-year college graduate
_____ J.D. (law degree)
_____ Ph.D. or equivalent
_____ Other graduate degree

In the last two years, how many times have you been pulled over by a police officer for a traffic-related issue (such as speeding or running a red light)? _____