An evaluation of CCTV at the Scott Road Skytrain Station:

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BACKGROUND

In August, 2009 a Closed Circuit Television (CCTV) pilot project commenced at the Park and Ride facility associated with the Scott Road Skytrain Station in Surrey, British Columbia (BC). The primary purpose of employing the use of CCTV at this location was to reduce crime and improve public safety in line with the recommendations set out in the City of Surrey's Crime Reduction Strategy (CRS). In addition to the design and implementation, funding was made available for evaluation of the pilot project so that the City could determine how best to use CCTV technology as a crime reduction tool as well as establish best practices that could be shared with other municipalities. The pilot project was scheduled for a one year time span and completed 15 August 2010.

The purpose of this report is to provide background information on CCTV, the theoretical reasons for why CCTV is expected to work, evaluation methods, a literature review on CCTV, the design and implementation of the pilot project, the general impact of vehicle crime at the pilot project site, and the extent of auto-related crime in the City of Surrey.

WHY WOULD CCTV WORK? THE IMPORTANCE OF RATIONAL CHOICES

Rational choice theory (Clarke & Cornish, 1985; Cornish & Clarke, 1986) evolved out of the original "choice" model that helped to establish the situational crime prevention approach (Clarke, 1977; Clarke, 1980). Based primarily on the concepts of choice theory in economics, rational choice theory states that crime is a purposeful act used to satisfy the needs and wants of offenders. In other words, offenders effectively engage in a cost-benefit analysis whereby they make choices and decisions about engaging in criminal behaviour. While the statement that criminals are "rational" is sometimes a contentions one, particularly in the context of violent crimes, the model proposed by Cornish and Clarke (1986) defines the "limited rationality" of offenders that fundamentally informs the situational crime prevention approach.

Cornish and Clarke (1986) argue that criminal offending behaviour involves decisions and choices that are constrained by limits of time, ability and available information. The importance of decision-making processes has been well documented in empirical literature. For several crime types including burglary (Bennett & Wright, 1984; Cromwell, Olson, & Avary, 1991; Decker, Wright, & Logie, 1993; Maguire, 1982; Nee & Taylor, 1988; Nee & Meenaghan, 2006; Walsh, 1980; Wright, Logie, & Decker, 1995), shoplifting (Carroll & Weaver, 1986; Walsh, 1978; Weaver & Carroll, 1985), theft of auto (Copes, 2003; Light, Nee, & Ingham, 1993), and robbery (Gabor et al., 1987), specific decision-making processes have been associated with various methods and motives related to criminal events. This body of research supports the assertions in rational choice theory that are inseparably linked to crime prevention. At a fundamental level, offenders ask themselves questions about targets, guardianship, accessibility, etcetera, when making choices about specific opportunities. By implementing preventative

measures that make crimes more difficult or risky, offenders may weigh the relative costs and benefits and ultimately decide against participation in criminal events.

With respect to CCTV, potential offenders may decide to not act on a criminal opportunity after considering the increased risk because the camera is monitoring their actions. In the context of preventing auto-related crimes, the technique appears to fit well within these theoretical principles by providing technology-assisted guardianship that may make targets less suitable, a location more risky, or the methods required by offenders to compromise the mechanism more difficult. It is the process of evaluation, however, which informs us about the utility of the approach.

EVALUATION

Evaluation is a vital component in the process of crime prevention. In general, the purpose of an evaluation is to assess the causal connection between an intervention and an outcome. Through this process, evaluations can provide information about the effectiveness of a specific crime prevention measure, but more importantly, they can inform theory and effect policy decisions about future interventions. The primary concern is whether or not the crime prevention initiative is worth the resources it consumes.

In general, there are four elements that necessitate consideration in evaluations: 1) interventions; 2) outcomes; 3) cases; and 4) settings (Shadish, Cook, and Campbell, 2002). Together, the four elements constitute the most important features of an evaluation and each should be given careful attention when judging effectiveness and making generalizations.

Interventions are the measures that are assessed through the evaluation process. Eck (2005) notes that these are best thought of as packages since all interventions involve a variety of actions. In the current study, for example, CCTV is the focus of the evaluation but all of the decisions and processes that go into the design and implementation of the measure are broadly categorized as the intervention.

Outcomes refer to the changes in crime. It is important to note that changes are vulnerable to the method by which the outcomes are measured. Therefore, it is important to consider whether a change in the type of crime measurement would result in a change in the outcomes. Ultimately, the researcher would like to draw conclusions from one type of crime to other, similar types of crime. As discussed below, in order to mediate this potential concern, multiple sources of data are used in the evaluation below.

Cases, on the other hand, are the people or places that an intervention is geared towards. Cases vary considerably in different types of crime prevention studies. For example, in studies of a crime prevention technique that targets individual offenders, the offenders are the cases. In contrast, for a crime prevention strategy that targets a series of neighbourhoods, the neighbourhoods would be the cases. An evaluation that only considers one case (e.g., an evaluation of a CCTV system in a single parking facility) is called a case study.

Settings are the specific environments that interventions are applied within. Each setting has its own context that has an intimate connection with the intervention. Similar to the goals described for outcomes and cases, researchers are often interested in generalizing outcomes to other similar, or sometimes, different settings. However, it is difficult to gauge the connection between the setting and intervention. To understand this, however, other evaluations focusing on the same crime prevention technique in different contexts may support the notion that the context is versatile. Conversely, if other evaluations reveal inconsistent outcomes for a single strategy in multiple settings, the context may be less versatile.

One of the main goals of evaluative research is to be able to generalize about the effect of an intervention. This means that general statements can be made about the effectiveness of a crime prevention technique based on specific examples. Since specific examples are often not representative of the broader context that is of interest, theory and evidence play a vital role. The process by which researchers are able to claim effectiveness for a crime prevention measure is based on the ability of theory and evidence to satisfy five criteria: 1) mechanism; 2) association; 3) temporal order; 4) rival causes; and 5) generalizing.

Mechanism is the process whereby an outcome is the result of an intervention. In order to satisfy this criterion, the specific process by which an intervention results in an outcome must be

made clear. This is also referred to as “construct validity” (Shadish, et al., 2002). In evaluative research, mechanism serves several important purposes. First, it allows the intervention to be a plausible measure worth evaluating. In other words, if the intervention is grounded in good theory then it ought to be evaluated. Mechanism also allows for the interpretation of results in relation to the theory and for the extension of conclusions about the intervention. If the evaluation produces results consistent with the grounding theory then broader conclusions may be made.

Association, also known as “statistical construct validity”, refers to whether there is sufficient evidence for the occurrence of the intervention and a reduction in crime (Shadish, et al., 2002). Generally, researchers should provide evidence that manipulations of the intervention are not attributable to random changes in crime. As alluded to in its alternative name, this criterion is typically satisfied through the use of statistics. Researchers must also be mindful of the ways in which a claim of association or a claim of no association could be in error. Inadequate measures of crime and poor implementation of the crime prevention technique are two examples that could result in the violation of this criterion. Multiple data sources and care in the implementation of a crime prevention initiative facilitate proper association.

In order to satisfy the condition of temporal order, the intervention must precede the outcome. This criterion is generally satisfied in evaluations that include measures before and after the intervention. Including both measures allows the researcher to compare the relative changes between groups. Accurate record-keeping is essential for understanding the timing of actions involved in the crime prevention strategy and is helpful for establishing temporal order (Tilley, 2009). It is also important to include measures in the period leading up to the intervention. By considering the trends in crime before the crime prevention technique is put into

place, one can be more certain that the outcome is truly the result of the intervention and not that of a general downward trend in the study area.

Rival causes are perhaps the most difficult obstacles to overcome when judging the effectiveness of an intervention. This criterion requires the researcher to demonstrate that no other plausible explanations could have caused the reduction in crime. Those rival causes that cannot be eliminated as plausible explanations for the outcome reduce the "internal validity" of the evaluation or, in other words, the certainty that the crime prevention measure caused the outcome change (Sadish et al., 2002). For decades now, researchers have identified rival explanations so that evaluators may be aware of them. For detailed lists of rival hypothesis classifications see Campbell and Stanley (1963) and Sadish et al. (2002).

Generalizing, or "external validity", is the final criterion that must be satisfied (Sadish et al., 2002). An evaluation is said to have high external validity if the results could be reliably replicated when applied to similar cases, settings, and outcomes. In order to achieve high external validity, the researcher must ensure that the cases, settings and outcomes involved in the evaluation are not uncharacteristic of those that the results would be generalized to. This is often very difficult to do but there are some telltale signs that cases, settings and outcomes are not typical. For example, an evaluation that is markedly intrusive, where people involved are aware of its existence, could call into question whether the outcomes would be the same in a context where people were not aware of the evaluation. Finally, Eck (2005) makes an important point about satisfying this criterion in evaluation research. Since external validity is based on induction, there is little rationale for generalizing. Instead, external validity should be used to understand when it is inappropriate to generalize (Eck, 2005).

There are a variety of evaluation design types, each with its own strengths and weaknesses. The selection of an evaluation design, however, is not usually an unbound choice for the researcher. The evaluation type is often determined by several factors including the level of intrusion by both those implementing the evaluation and those affected by it, and how and when the evaluation process originates. Randomized experiments, quasi-experiments, non-experiments, and process evaluations are four general types of evaluations that may be conducted.

Randomized experiments are often considered the gold standard for evaluation design because they have the potential to eliminate virtually all rival causes. In these types of experiments, two or more treatments are used to demonstrate their effect on the cases. One of the treatments is always a control, used to show what will happen if no intervention is offered. Further, when compared to the control, the impact of the other treatments can offer relative magnitudes of treatment effects. In these experiments, cases are randomly assigned to each of the treatments. Random assignment ensures that there are no differences between the groups so that any variations found in the outcomes must be attributable to the treatments.

There are certain conditions that must be met when randomized experiments are carried out. First, cases must be independent from each other. In other words, anytime the treatment of a case influences other cases in the evaluation, this condition is violated. In evaluations of crime prevention measures, the presence of displacement or diffusion of benefits are known to violate this condition so it is essential to ensure that cases are not affected by these phenomena. Randomized experiments also require that the implementation of the evaluation be carried out with precision. While this consequently elevates the level of intrusion, it is necessary to ensure that everything but the treatment is identical for the groups.

Generally, the only rival explanation that may be offered against the findings of a randomized experiment is that not all cases in each group received the same, equal treatment. This explanation is known as “attrition” (Eck, 2005). If this rival cause is eliminated the evaluation has very high internal validity. While this elevated internal validity is a significant strength because it provides more evidence for the specific effect of the intervention, it consequently reduces the external validity of the evaluation. The intensive managerial controls that are necessary to ensure that attrition does not occur create artificial conditions that are unlikely to be the same if the treatment was applied elsewhere. Such an evaluation is rare in the social sciences and more common in the medical sciences when evaluating the effectiveness of a new drug, for example.

Quasi-experiments are similar to randomized experiments in that they may also involve the use of multiple treatments. Unlike randomized experiments, however, quasi-experiments do not require the random assignment of treatments. While this reduces the internal validity of the evaluation because there is no assurance that the intervention group is statistically equivalent to the control group, it also provides considerably more leeway for research on interventions where random assignment is simply impractical or impossible. This is a more common form of evaluation in the social sciences.

Quasi-experiments vary with respect to the number of groups and treatments offered, type and intensity of measurement, degree of intrusiveness, and consequently the levels of internal and external validity. Experiments with the highest internal validity are those that use control groups that are similar to each other and include a series of measurements both before and after the interventions are introduced. These designs have higher internal validity because there is less room for rival explanations. Experiments with the lowest internal validity are those

that do not use control groups and only have a single point of measurement before, and a single point after, the intervention. Between these two extremes lies a variety of other quasi-experiment types with varying levels of internal and external validity.

Non-experiments are markedly different from both randomized experiments and quasi-experiments. In these evaluations there is no control group and no involvement with the application of an intervention. Consequently, these are often considered the weakest forms of evaluation. Data for cases that had an intervention applied are compared to data for cases where no intervention was applied, or perhaps a pre- post-type of analysis at a single site. These evaluations are useful for studies where the levels of intrusion inherent in quasi-experiments are not feasible or when it is not possible to analyze a similar control group. Statistical techniques are able to provide evidence for significant differences between the outcomes of groups in these types of evaluations, however, there is no certainty that the variations are due to differences between the cases or settings being compared. As a result, there are more rival explanations and therefore, non-experiment evaluations generally have low internal validity. However, with enough data, particularly data over time, one can be quite certain that the changes in crime are the result of the crime prevention intervention.

Finally, process evaluations serve the role of supporting the other experiment types. These evaluations offer a description about the implementation and functionality of an intervention rather than directly claiming effectiveness or non-effectiveness. Process evaluations are generally used to help build internal validity by explaining the mechanism involved in the intervention process.

While each of the evaluation types discussed above are options for crime prevention research, randomized experiments are rarely used because it is difficult to randomly assign cases

to treatment groups in real world settings. As a result, quasi-experiments are by far the most commonly used design. There has, however, been a recent argument to move away from the quasi-experimental tradition. Some argue, the quasi-experimental approach is ineffective in answering the all important question "what really works?". Scientific realism takes a fresh approach to answering that question by changing the focus of the evaluation process. "Realism, as a philosophy of science, insists that the outcomes unearthed in empirical investigation are intelligible only if we understand the underlying *mechanisms* which give rise to them and the *contexts* which sustain them" (emphasis in the original) (Pawson and Tilley, 1994). In other words, evaluators of crime prevention measures should first consider why and how interventions affect potential cases before assessing whether they work.

The scientific realist approach has been met with some resistance in the realm of criminal justice research (see for example Pawson and Tilley, 1994; Bennett, 1996; Pawson and Tilley, 1997; and Tilley, 2000). It is, however, still being published in methods resources for interdisciplinary social science evaluation (see for example Vaessen and Leeuw, 2010). Although there has yet to be a paradigm shift in that direction, the scientific realist approach ought to be considered when designing an evaluation. The quasi-experimentation approach still remains the dominant study design in the field of crime prevention. This is also true of CCTV evaluations which have been largely dominated by quasi-experimental evaluation designs.

PREVIOUS EVALUATIONS OF CCTV

CCTV has been used in many countries around the world in attempts to prevent and reduce crime in a variety of contexts. Since the 1980s, the use of CCTV has greatly expanded both in private and public spaces and continues to do so today. Despite its widespread application, there is a severe lack of reliable research that informs policy and practice with respect to its use in crime prevention and reduction programs. Part of the reason for the scarcity of research is that many evaluations do not meet acceptable standards for producing informative research on the effectiveness of CCTV initiatives. For example, in a recent meta-analysis of CCTV evaluations Welsh and Farrington (2009) set out basic inclusion criteria that required studies to: 1) have evaluated CCTV as the main intervention, 2) include an outcome measure of crime, 3) include before and after measures in experimental and comparable control areas, and 4) include at least 20 crimes in each area before the intervention was brought in. Out of the 93 studies that were obtained, only 44 met the inclusion criteria.

Another hurdle for informative research on the effectiveness of CCTV as a crime prevention measure is that programs and their evaluations vary considerably making it difficult to compare results and draw conclusions. For example, the size and scope of such strategies can be quite different. Some target very specific areas and have 100% surveillance of the locations while others may focus on broader areas with less comprehensive coverage. The research that is currently available, however, is a useful starting point that begins to shed light on the overall effectiveness of CCTV as well as the specific effects it can have in a variety of contexts with different mechanisms used.

In the context of car parks (parking lots), CCTV systems are usually installed in large parking facilities with the primary purpose being to reduce auto-related crime. Of the programs

evaluated, nearly all took place in the UK and involved cameras that were actively monitored by either security or police personnel.

While evaluations of CCTV systems used in other contexts reveal modest crime prevention and reduction benefits, those used in the context of car parks are far more encouraging. In Welsh and Farrington's (2009) meta-analysis, a total of 6 studies met the evaluation criteria for inclusion. An overall odds ratio of 2.03 meant that crime decreased by 51% in experimental areas compared with control areas. This was marked by 5 of the 6 studies revealing a significant reduction in crime.

Several of the evaluations in car parks revealed interesting effects of CCTV. In Poyner's (1992) evaluation of a CCTV system installed in the parking location at the University of Surrey, Guildford (UK), for example, a single camera was used to monitor 3 parking lots. Monitored by security personnel, the camera had nearly 100% coverage of the adjacent parking lots and was equipped with loudspeakers and infrared sensing capabilities. Analysis of three years of campus-wide crime data, including nine months following installation of the CCTV system, revealed an overall increase leading up to the intervention and an overall decrease after the intervention was put in place. A closer look at specific crime types showed that theft from automobiles was the most frequent type of auto-related crime and experienced the greatest reduction. More instructive, however, were the results found when comparing two parking lots with enough incidents to look at monthly trends. While only one of the lots was monitored by the camera, both experienced similar reduction trends. This pointed to a diffusion of benefits rather than any displacement effects, which Poyner (1992) attributed to the active response by security personnel for incidents detected through the CCTV system. Furthermore, the monthly trend analysis

revealed that the lighting upgrade and landscape alterations brought in around the same time did not have a meaningful impact by themselves.

There is also further evidence to suggest that CCTV systems have a preventative effect independent of active monitoring and enforcement. In the Hawkeye (UK) case study a variety of implementation and operation difficulties precluded the deployment of police, yet a noticeable reduction in crime was experienced (Gill, Little, Spriggs, Allen, Argomaniz, and Waples, 2005). This finding is also consistent with the Bradford (UK) scheme evaluated by Tilley (1993). This evaluation revealed a 68% reduction in theft from cars and 48% reduction in theft of cars in the 12 months following the introduction of the CCTV intervention. Since there were no deployments or arrests made during this time, the apprehension of offenders could not be the mechanism driving the reductions.

Although it may be possible to achieve reductions in crime without active monitoring and enforcement, it is unclear whether these reductions can be maintained over long periods of time. Since the longest follow-up period was 24 months, it is unclear if the effects in the 5 schemes that witnessed reductions were upheld beyond the evaluation windows. The trends revealed in some studies indicated that this may not be the case. In the evaluation of Hartlepool (UK), for example, the reductions in car crime were short term and followed by an increase

Finally, the effect of CCTV on fear of crime was not included in most studies of car parks. This was probably because most car park CCTV systems were specifically designed to reduce auto crime and not fear of crime among users of the space. Those studies that did mention the effects of CCTV on public fear of crime noted that changes were likely very minimal due to the less personal nature of crime in the target areas.

The number of reliable evaluations of public CCTV systems should be considered deficient relative to the extensive use of this crime prevention and reduction measure. There is considerable difficulty in drawing conclusions about the effectiveness of public CCTV but it is hoped that this discussion has drawn attention to some of the most important discoveries to date.

Evaluations of public CCTV systems have largely been contained to four general settings: city and town centres, public housing, public transport, and car parks. In meta-analytic reviews the latter has been the only one to experience sizable and significant overall reductions in crime. This may be due to the design and implementation of such schemes which are often highly focused on specific types of crimes in highly contained areas. In fact, while the other settings may not have experienced significant overall reductions in crime, they each showed reductions in some specific crime categories. It is clear that further research is needed to identify the most suitable types of crime that public CCTV should target.

Evaluations have also yielded a debate about the importance that monitoring and responding to crime has on the effectiveness of CCTV. While the results of some studies indicated that reductions in crime could be achieved without monitoring or taking action towards criminal incidents, others revealed that monitoring cameras and deploying personnel to respond to incidents may have been contributing factors to maintaining reductions in crime.

Further, there are still many unanswered questions about the effect of CCTV on displacement of crime, diffusion of benefits, and fear of crime. While most evaluations revealed no indications of displacement, diffusion of benefits or fear of crime, some did, which may indicate that these phenomena are dependent on the design and implementation of the intervention or other contextual factors.

DESIGN AND IMPLEMENTATION OF THE CURRENT EVALUATION

The City of Surrey has the second largest population (approximately 447,000) in the province of BC and is continuing to grow rapidly (BCStats, 2010). In recent years it has transformed from a primarily residential suburb of Vancouver into an independent urban centre that is expected to surpass Vancouver's population within the next ten years (City of Surrey, n.d.). The City is divided into six Town Centres (Communities) with most of its commercial development centred on two shopping malls – Guildford Town Centre and Central City Shopping Centre. For most growing urban centres, rapid development brings about increases in crime. The City of Surrey is no exception in this facet. Between 1999 and 2003 the crime rate in Surrey rose steadily from 121 criminal code offences per 1,000 population to 128 criminal code offences per 1,000 population. Although this follows the general trend of the province during this time, Surrey's crime rate remained higher than the provincial average which rose from 115 criminal code offences per 1,000 population to 122 criminal code offences per 1,000 population during the same period (Police Services, n.d.).

In response to the rapid growth of the city, Surrey's CRS was adopted as a new approach to combat crime. The CRS is based on similar strategies implemented in the United Kingdom (UK) which have been recognized for significant reductions in crime. As its primary objectives, the strategy aims to:

1) reduce crime and increase community safety
2) increase public involvement in reducing crime
3) increase integration between all stakeholders involved in crime reduction
4) improve public awareness around the reality and perception of crime

(City of Surrey, 2007, 9)

In order to tackle these objectives a series of actions are to be implemented along four major strands:

1) prevent and deter crime
2) apprehend and prosecute offenders
3) rehabilitate and reintegrate offenders
4) reality and perceptions of crime

(City of Surrey, 2007, 9)

During the development of the CRS four Sub-Committees of the Mayor's Task Force created more than 100 recommendations under these categories. Along the "prevent and deter crime" strand are two recommendations of greatest relevance to this report. As one of its priorities, the Sub-Committee identified the development of a strategy for the application of CCTV in the City. Specifically, it was recommended that the City work with private sector partners and the Privacy Commissioner to develop a strategy for the introduction of CCTV pilot projects in areas identified as crime hotspots (City of Surrey, 2007). The Sub-Committee also recommended enhanced safety and security at Skytrain stations. In particular this would involve the City working closely with local police and transportation authorities to develop strategies to ensure that stations and adjacent parking lots were safe and secure for users (City of Surrey, 2007). Since its inception in 2007, a number of recommendations identified in the CRS have been implemented by the City. With respect to the two recommendations highlighted above, the City has employed the use of CCTV in a pilot project at the Scott Road Skytrain Park and Ride facility. The primary purpose of the CCTV pilot project is to address vehicle crime– one of the priority crimes listed in the CRS.

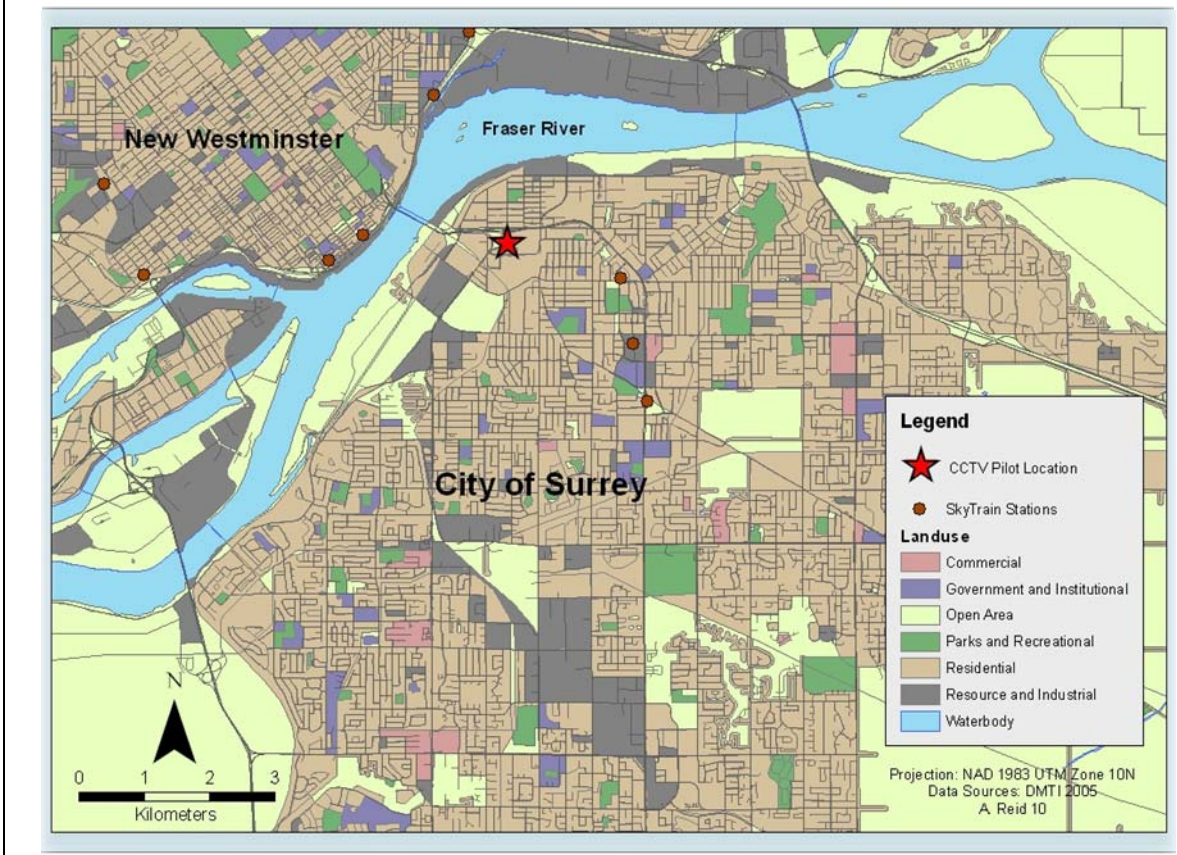
The Scott Road Skytrain Station parking lot was selected as the location for the current CCTV pilot project as Surrey RCMP crime data established it to have a high incidence of theft from and theft of vehicle. Through anecdotal information from those frequenting the area, the parking lot was also recognized as having an elevated risk for vehicle crime due to the lack of rush hour pedestrian traffic and the physical isolation of the location itself. Consequences of vehicle crime at this location have been noted to include damage to property, theft of property, increased fear of crime for transit users, and hesitation by the public to use public transit for fear of victimization (Kerr & Bottril, 2009).

These problems are not new to this park and ride location. In fact, newspapers dating back to 1994 have reported on the high incidence of crimes at the Scott Road Park and Ride facility (Zyartuk, 1994). Other crime prevention strategies have also been attempted at this location. In 1995 a bicycle patrol was implemented at the Park and Ride lot as part of a single month pilot project. A preliminary evaluation found a reduction in vehicle crimes during and after the month long mobile patrol intervention (Spinks, Pittman, Singh, Barclay, and Jahn, 1995). A subsequent study indicated that although there had been partial displacement, the displacement of crime did not impact nearby neighbourhoods or the next nearest crime generator location (Barclay, Buckley, Brantingham, Brantingham, and Whin-Yates, 1997). Although the Barclay et al., 1997 study noted that the results of the initial bicycle patrol evaluation had led to the expansion of the service at the location, it had been discontinued sometime prior to the commencement of the current CCTV pilot project.

The Scott Road Skytrain Station parking lot is located in the North-West corner of the City adjacent to the Scott Road Skytrain Station (see Figure 1). This station is a convenient departure point for commuters travelling between Surrey and much of the lower mainland as it is

the last point in Surrey before the rapid transit line crosses the Fraser River into New Westminster, Burnaby, and Vancouver. The lot is primarily used by commuters travelling out of Surrey to other municipalities in the lower mainland for work or school. This results in pedestrian and vehicle traffic peaking before and after the regular business hours of approximately 9:00am and 5:00pm, Monday to Friday. The lot itself has more than 1500 parking spaces contained within a small number of distinct sections around the elevated platform of the Skytrain station (See Figure 2). All of the spaces are at ground level, uncovered, and within an area measuring approximately 350 metres by 250 metres.

Figure 1. Map showing location of CCTV pilot location



Twelve CCTV cameras have been installed at the Scott Road Skytrain Station parking lot to provide comprehensive coverage of the immediate area. Eleven fixed cameras and one adjustable via remote control record activity throughout the parking lot from a variety of angles. Recordings from the cameras are stored for a period of time and are available upon request to authorized agencies investigating criminal activity. A lighting upgrade competed just prior to the start of the pilot project allows the cameras to capture improved quality images outside daylight conditions. Seventeen signs informing the public about the use of CCTV in the area have also been posted around the parking lot in locations with high visibility. The system became operational on 15 August 2009.

Figure 2. Arial Photograph of Scott Road Skytrain Station and Adjacent Parking Lots,

Photo Courtesy of Bing Maps Platform, Microsoft

THE IMPACT OF AUTO-RELATED CRIME

Auto-related crimes including theft of motor vehicle and theft from a motor vehicle have been widely recognized as serious problems around the world. Results of the 2000 International Crime Victimization Survey reveal that car vandalism and theft from car were the two most prevalent crimes. For the 13 countries that participated in the survey, an average of 7% of the population was a victim of vandalism while an average of 5% was a victim of theft from vehicle (Besserer, 2002). While car and motorcycle theft were less prevalent than these other auto crimes, they were considered more serious by respondents. In fact, car theft was viewed as the most serious crime with an average of 84% of victims from the 13 countries stating that their most recent incident over the past five years was very or fairly serious (Besserer, 2002).

Motor vehicles are attractive targets to offenders who recognize the opportunity for monetary gain through the theft of personal property, parts or the vehicle itself. Others find vehicles attractive for “joyriding” or fulfilling their transportation needs. In Canada specifically, auto crime is a major concern because of its impact on insurance costs. With respect to auto theft alone, the monetary cost to Canadian insurers is quite significant. The Insurance Bureau of Canada reported that in 2005 the cost of motor vehicle theft to insured Canadians was $540 million (Insurance Bureau of Canada, 2004). The cost to Canadians is even greater when considering this figure along with additional costs including non-insured vehicle theft, health care, court, and policing. The overall cost of motor vehicle theft exceeds $1 billion annually when considering the combined expense of these factors (Standard and Poor’s DRI, 2000).

In addition to higher insurance premiums, auto-related crime impacts Canadians on other levels. Motor vehicle theft contributes to incidents of death and injury through motor vehicle theft collisions. Although it is difficult to capture precise figures about the human cost of motor

vehicle theft due to the lack of a comprehensive reporting system in Canada, the National Committee to Reduce Auto Theft provides a glimpse into the problem. In a review of newspaper articles published between 1999 and 2001, 81 persons were killed and 127 people injured as a result of auto theft (National Committee to Reduce Auto Theft, 2002).

Auto crime may also contribute to the generation of fear in Canadians. Those who have been victimized or believe crime in their community to be greater relative to other areas may alter their travel patterns and driving habits for fear of victimization. There is also some evidence to suggest that offenders who engage in auto crime early in their criminal career may continue on a prolonged offending career path. For example, a study based on longitudinal data from a registry of convicted criminals in Sweden revealed that vehicle theft best predicted an extended criminal career path when it was an offender's first criminal offence (Svensson, 2002).

THE EXTENT OF AUTO-RELATED CRIME

The extent of auto crime in Canada is great. In fact, motor vehicle theft is one of the most frequently police-reported crimes across the country (Dauvergne, 2008) and the motor vehicle theft rate in 2004 was 498 per 100,000 population– 26% greater than the United States (Gannon, 2006). There is, however, considerable variation among provinces in Canada. In 2004, BC's motor vehicle theft rate was overrepresented with 818 per 100,000 population – second only to Manitoba (Gannon, 2006). It has, however, been on a steep decline for several years now. Incidents of vehicle theft reported to the Insurance Corporation of British Columbia (ICBC) have fallen by 55% in just the past six years (ICBC, 2010). This is similar to the rate of incidents of theft from vehicles that has declined by 52% in the past six years (ICBC, 2010).

There is also considerable variation among Canadian cities. In 2002 Surrey was declared the car theft capital of North America (CTV News Staff, 2002). Since then, it has followed the general trend of the province with a 52% reduction in incidents of vehicle theft and a 44% decline in incidents of theft from vehicles (ICBC, 2010). There is still, however, room for much improvement. In 2007, Surrey was ranked 6th in Canada for cities with the highest vehicle theft rates (Maclean's news) and in 2009 had 85% more incidents of vehicle thefts than the City of Vancouver (ICBC, 2010).

DATA

The evaluation of the CCTV system implemented at the Park and Ride location adjacent to Scott Road Skytrain Station incorporated data from a variety of sources. The results of two victimization surveys (one pre-intervention and one post-intervention) are used to assess changes in levels of auto-related crimes during the one year pilot project. In addition to reported victimization, the surveys included questions about participants' opinions with respect to the use of public CCTV and also asked for responses to questions regarding personal feelings of safety at the pilot site. Themes from these elements of the victimization surveys are considered in the evaluation. Police crime data and insurance claim data are also employed for the purposes of assessing statistically significant changes in the local trends of two categories of auto-related criminal offences: theft from a motor vehicle and theft of a motor vehicle are considered. These data are also used to assess statistically significant changes in the neighbourhood, community, city-wide, and area-wide trends to investigate possible displacement and diffusion of benefit effects.

Victimization Survey Data

Community engagement is increasingly becoming recognized as one of the key ingredients for successful crime reduction models (City of Surrey Crime Reduction Strategy, 2007; Given, 2008; Forrest, Myhill & Tilley, 2005). The importance of citizens' perceptions of crime has been gaining momentum in recent years and increasing public involvement is, in fact, one of the stated objectives of Surrey's Crime Reduction Strategy (City of Surrey Crime Reduction Strategy, 2007, P. 9). This sentiment was echoed in a segment of the recent CBC special series "Neighbourhood 911" by Alan Given, Chief Executive of the Crime and Drugs Partnership in

Nottingham City (UK). Given (2008) notes the importance of being responsive to community concerns which begins, he claims, by citizens articulating their concerns (Given, 2008). This is of further concern given that "complete information about citizens' perceptions of crime and their feelings of safety in the community is not available at this time in a statistically valid form" (City of Surrey Crime Reduction Strategy, 2007, P. 32).

Since the most recent Criminal Victimization Surveys in 2004 and 2009, little has been done to document the experiences of the public with respect to crime. There has been only one published study that has actively sought Surrey citizens' perceptions and satisfaction with criminal justice agencies in recent years. "Assessing the Performance and Policing Priorities of the Surrey RCMP: A Resident's Survey" was conducted by Kwantlen University College and the RCMP in 2007. This study focused on residents' satisfaction with the RCMP and the fear of crime in Surrey communities (Welsh, 2007). The study used a mail-out survey with 38 questions to measure residents' perceptions and obtain basic demographic information (Welsh, 2007).

The purpose for including victimization surveys in the current evaluation is not to collect general information on residents' perceptions of crime or their satisfaction with criminal justice agencies. Instead, victimization surveys are conducted to assess the impact of CCTV on the number of victimizations at the pilot site. The victimization surveys are also completed to collect the views and opinions of parking lot users with respect to the use of public CCTV, and to allow for an assessment of the impact of CCTV on fear of crime for users of the Park and Ride facility. The surveys posed questions to participants about the frequency and reason for using the parking lot, their feelings of safety with respect to their person and property, personal incidents of victimization, attitudes towards the use of CCTV, as well as basic demographic information.

The first survey was conducted approximately four months prior to the date when the CCTV system became operational at the pilot site. The follow-up survey was conducted immediately following the one year intervention interval in August 2010. Participants for the two surveys were recruited by a small team of research assistants who approached users of the Park and Ride on weekday mornings as they parked their vehicles. Both male and female research assistants conducted the surveys with parking lot users. In both the pre-intervention and post-intervention collection, all surveys were completed within a two week interval.

Police Data

Crime incident data from the Police Records Information Management Environment for British Columbia (PRIME-BC) was provided by the Surrey RCMP detachment for the City of Surrey and covered the time period April 2007 through August 2010—these data were supplemented by data provided by the Transit Police. Records for incidents of theft from a motor vehicle under $5000, theft from a motor vehicle over $5000, theft of a motor vehicle under $5000, and theft of a motor vehicle over $5000 were included in the data retrieval. For the purposes of the current study, these crime types were collapsed into two general categories: 1) theft from a motor vehicle and 2) theft of a motor vehicle.

PRIME-BC is a new police information system in British Columbia that serves all RCMP detachments and municipal police agencies in the province. The three main components that PRIME-BC integrates into one information system are Computer Assisted Dispatch (CAD) entries, the Records Management System (RMS), and the Mobile Work Station (MWS) (RCMP, 2007). The PRIME-BC system is seen by many as a major improvement in the management of police information and records. It alleviates the impact of several problems that previous police

information systems were unable to overcome including lengthy lag time between the time a crime occurs and when it is entered into the information system, and the duplication of logged events (Sherman, Garten, and Buerger, 1989).

Official crime measures can be used to understand criminal incidence reported to police, however, it is well known that there are major shortfalls in the ability of official measures to capture all crime that occurs (Sellin, 1931, 1957; Tibbits, 1932; Pittman & Handy, 1962; Boggs, 1965; Maltz, 1977; Skogan, 1975, 1977). According to the 2004 General Social Survey (GSS), about one third (34%) of criminal victimizations are reported to police (Statistics Canada, Juristat, 2006). As a result, any analyses that use police crime data should acknowledge this limitation. This is even true for the simple task of producing the crime rate for an area of interest. Bernie Magnan (2008), Assistant Managing Director and Chief Economist with the Vancouver Board of Trade claims that two thirds of all crime goes unreported to police and is therefore not included in crime rate calculations (Magnan, 2008). Allan Castle (2008), Officer in Charge of Criminal Analysis for the RCMP Pacific Region recognizes the limitations of police crime statistics and agrees with Magnan that an annual survey of criminal victimization should be adopted to produce more accurate measurements (Castle, 2008). Statistics Canada has also recognized the need for more information and is currently in the process of assessing the effectiveness of carrying out an annual survey (Vancouver Board of Trade, 2008).

ICBC Data

In order to compliment the police data, insurance claim data from the Insurance Corporation of British Columbia (ICBC) were also analyzed. Because all claims must be reported to the police, these data represent a subset of the police data discussed above. The advantage of using these

additional data is to investigate any changes in trends for those automotive crimes deemed important enough to report to insurance, by the victims. ICBC insurance claim data from January 2006 through August 2010 were obtained for the City of Surrey and the Corporation of Delta. All insurance claims for incidents of theft from a motor vehicle under $5000, theft from a motor vehicle over $5000, theft of a motor vehicle under $5000, and theft of a motor vehicle over $5000 in the City of Surrey and the Corporation of Delta were included in the data retrieval. Once again, these crime types were collapsed into the two general categories of theft from a motor vehicle and theft of a motor vehicle. Only the region of North Delta is analyzed here because of its proximity to the Scott Road Skytrain Station Park and Ride.

Although insurance claim data is a reasonable source for information about criminal occurrences related to automobiles, the data does have some considerable limitations. First, not all auto-related crimes are necessarily reported to insurance companies. For example, if an insured motor vehicle owner was victimized and the claim was thought to be less costly than the deductable that would have to be paid to the insurance company, the insured owner may decide against proceeding with a claim. In this type of case, the insured motor vehicle owner may decide to pay for the loss without processing a claim with the insurance company because it would be the cheaper option. Alternatively, a claimant may report a claim and sometime during the claims process the adjuster will discuss the remediation costs versus the deductible cost. If the claimant decides not to proceed with the claim because the deductible is more than the remediation costs then the claim is closed without payment. These cases are in the data we provided.

METHODS

Geocoding Procedures

Both the PRIME-BC and ICBC datasets were geocoded to the Surrey and Delta road networks in preparation for spatial data analysis. Geocoding of spatial data introduces a potential source of error in spatial data analysis techniques so particular attention must be given when carrying out the procedure. Ratcliffe (2001) warned that, in addition to the inaccuracy of geocoding algorithms, there is the potential that not all street addresses or street intersections will be located. These geocoding errors could result in spatial bias. In order to proceed with confidence in spatial data analysis, Ratcliffe (2004) identified a minimum standard of 85 percent for geocoding success rates.

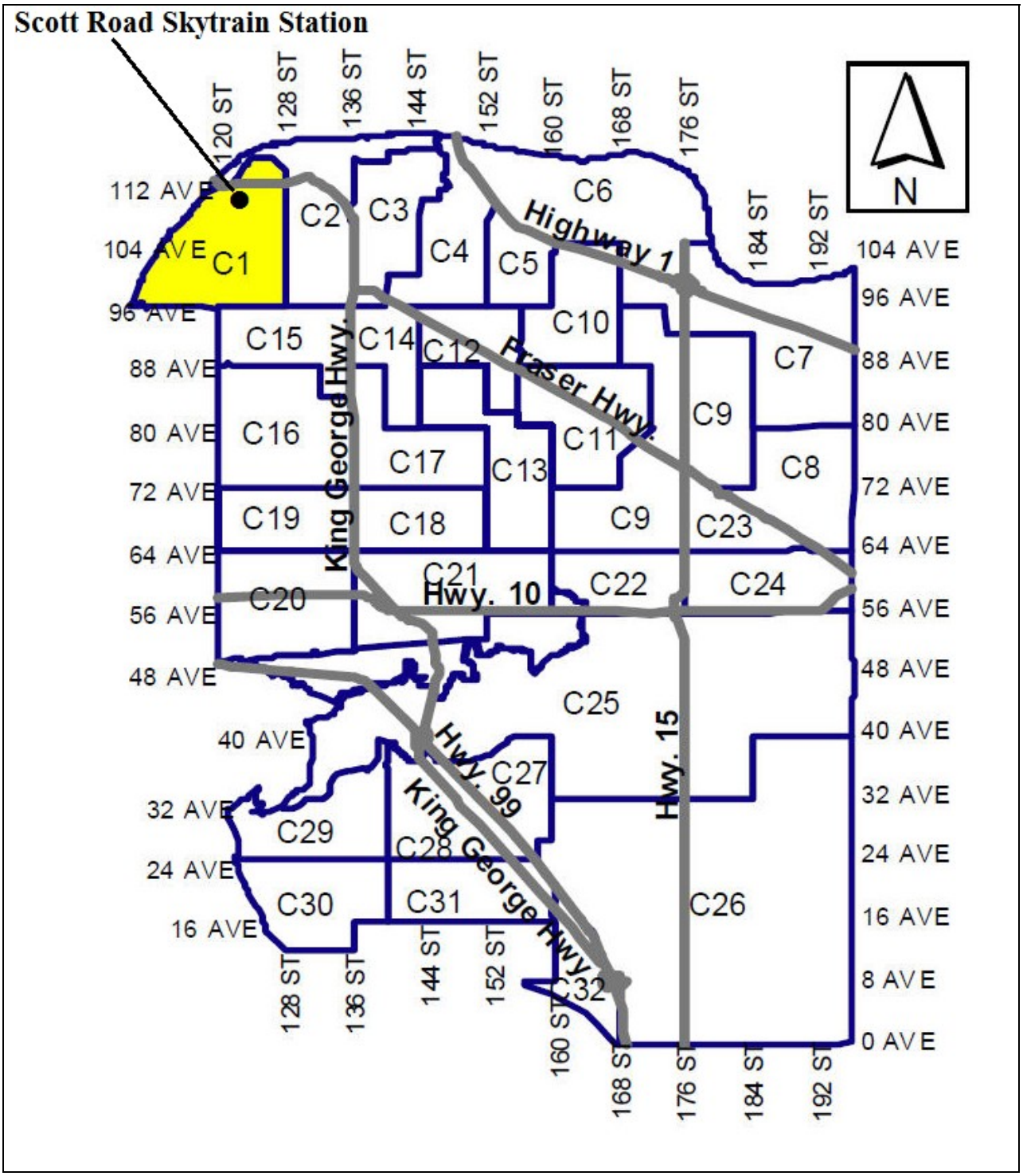
The requirement for a successfully geocoded event in the current evaluation was for the event to be matched to the exact address. The PRIME-BC and ICBC datasets were each geocoded with a success rate of 97 percent. Upon further inspection of the incidents that were not geocoded successfully, it appeared that the locations could not be matched interactively (manually) because the locations simply did not have specific street addresses. For example, a number of incidents had addresses that were documented as “King George Highway Off-ramp”. The address locator used in this analysis was unable to recognize an off-ramp as a valid address and therefore, the incident was not geocoded to the street network. Since each of the 97 percent success rates exceeded the minimum standard identified by Ratcliffe (2004), and addresses and intersections that were not located by the geocoding procedure did not appear to have any distinct spatial pattern, there was little concern for spatial bias when proceeding with the current analyses.

There are, however, a number of other potential problems in geocoding procedures that could impact the accuracy of spatial analyses: long streets can be arbitrarily broken into street segments despite there being no intersections to substantiate a new end and beginning to a road; events are assigned to the street network using an interpolation process that could result in events being assigned to the wrong place on street segments; geocoding matches can be made on aerial units and subsequently misplaced on street segments; and variation in street segment length can skew analyses. Because the scope of the current evaluation did not require the consideration of spatial crime patterns at the street segment level of analysis, these issues did not present any concern.

Spatial Units of Analysis

All events that were successfully geocoded to the street network were subsequently aggregated to a variety of spatial units of analyses. The spatial units of analysis considered in this evaluation include thirty-two areas (these areas are subset of the larger Surrey communities), five communities (Whalley, Guildford, Fleetwood, Newton, Cloverdale, and South Surrey), North Delta, and the entire City of Surrey. A map of the Areas is shown in Figure 3 that highlights the location of the Scott Road Skytrain Station in Area 1. By including various spatial units of analysis, potential displacement and diffusion of benefit effects are able to be considered in addition to the local trends of auto-related crimes at the pilot site.

Figure 3. Surrey Areas



Test for Structural Break in Trends

In the current evaluation, a structural break test was used to assess the impact of the CCTV intervention on incidents of theft from a motor vehicle and theft of a motor vehicle at the Scott Road Skytrain Station Park and Ride. Structural break tests are commonly used with time-series data in economics and statistics to test for changes in trends over time. Structural break tests may, however, be applied in a variety of fields to address different research questions about time-series data.

In program evaluation, structural break tests may be used to test whether the independent variables have had different impacts on subgroups of the population. For example, Piehl, Cooper, Braga and Kennedy (2003) demonstrate the value of a structural break test in their evaluation of a youth homicide reduction program in Boston, MA (USA). In this evaluation, the researchers were faced with some difficult challenges. Specifically, there was no control (or comparison) group and the precise date that the intervention was implemented was unknown. By using a structural break test, the authors were able to identify a statistically significant reduction of youth homicide shortly after the estimated intervention date. By controlling for a variety of important variables, the authors were able to claim, with reasonable confidence, that the reduction was due to a program effect rather than an unrelated change in the outcome measure.

In the current evaluation, several structural break tests are employed via linear regression models. The models consider the association between three trends and the number of auto-related crime incidents in a variety of spatial units. Specifically, three independent variables are introduced that represent: the overall trend during the pre and post intervention periods (Trend), the impact at the intervention date (CCTV), and the trend during the one year intervention pilot project (CCTV Trend), respectively. By considering these three trends, it is possible to identify

the immediate impact of the intervention and the on-going impact of the intervention throughout the pilot project while also accounting for the effect of the general crime trend during the entire time-span of the data. The expectation is that CCTV will have a negative estimated parameter because of the increased risk due to the installation of the CCTV system. There is no *a priori* expectation for the CCTV Trend variable. If it is negative, and statistically significant, this implies that the continued presence of the CCTV system continues to decrease automotive crime after the initial impact, captured by the CCTV variable. However, it is also possible for CCTV Trend to be positive as offenders return to their previous levels of criminal activity at the site. Such a result would occur if they deem, over time, that they overestimated the increase in risk from the CCTV system installation. This result would not be a surprise given the CCTV system is not monitored. And, lastly, the CCTV Trend variable may be statistically insignificant, indicating that there is no change in the trend of automotive theft after the CCTV system installation.

RESULTS

Victimization Surveys

This section presents results from the victimization surveys conducted at the Scott Road Park and Ride location—the pre- and post-intervention surveys are included in an appendix at the end of this report. The first paragraph, below, summarizes information about the samples that were obtained for the two victimization surveys. The subsequent paragraphs summarize participants' responses to questions regarding their use of the parking lot, their perceptions of crime at the parking lot and their opinions about the use of public CCTV at the pilot site. Finally, responses to questions about participants' victimization and feelings of safety at the Scott Road Skytrain Station Park and Ride are summarized and discussed.

In total, 312 surveys were completed in the preliminary collection (before the installation of the CCTV cameras) and 302 more were completed during the follow-up collection (one year after the cameras became operational). These samples represented approximately 20 percent of the total spaces available for use in the parking facility although usage of the parking lot varied considerably by day of the week and seasonality. The sex of participants that completed the victimization surveys were roughly split, with females making up slightly more than half of each sample population (55 percent for the preliminary survey and 53 percent for the follow-up survey). Approximately one third of participants were between the ages of 20 and 29 and a vast majority of each sample ranged from 20 to 49 years of age (79 percent of the preliminary survey and 77 percent of the follow-up survey). Please see Table 1 for a detailed summary of survey responses to questions regarding this demographic information.

Most participants who completed a survey at the Scott Road Park and Ride were frequent users of the facility. The majority of parking lot users who were surveyed in both the preliminary

and follow-up collections indicated that they used the parking lot on a daily basis, Monday to Friday (67 percent for the preliminary survey and 62 percent for the follow-up survey), and nearly 90 percent used the facility at least one day per week. The reason for using the parking facility that was most frequently selected by participants was travelling to work. 90 percent of participants who completed the pre-intervention survey and 85 percent of participants who completed the post-intervention survey identified this as the primary reason for parking their vehicle at the lot. Other respondents indicated that they parked at the Park and Ride location for the purpose of attending school (7 percent for the preliminary survey and 8 percent for the follow-up survey) while a very small number of participants indicated other reasons for using the facility.

Participants were also asked several questions about their attitudes, feelings, and opinions with respect to the use of public CCTV at the Scott Road Skytrain Station Park and Ride. When asked to rate the effectiveness of CCTV in reducing crime at the parking lot, respondents were generally more optimistic before the implementation of the CCTV system compared to after the cameras had been in operation for a year. 63 percent of respondents in the preliminary survey ranked the anticipated effectiveness of CCTV at the Park and Ride location as either 4 or 5 on a Likert Scale ranging from 1 to 5 (with 1 being very ineffective and 5 being very effective). In the follow-up survey, however, 33 percent of participants indicated one of these responses. The most frequently selected response in the post-intervention survey was 3 (selected by 49 percent of respondents) indicating no distinguishable feelings about effectiveness or ineffectiveness.

Although opinions about the effectiveness of the CCTV system were quite varied, a vast majority of participants did not indicate any personal concerns about the use of public CCTV at the Park and Ride facility. 94 percent of respondents in the pre-intervention survey and 97

percent of respondents in the post-intervention survey responded “No” when asked if they had any concerns about the use of CCTV to reduce crime. Nearly all of those who did indicate some level of uneasiness about the use of a CCTV system specified personal privacy as their main concern.

The surveys also included questions regarding participants’ perceptions of crime. First, participants were asked to specify which, of three types of auto-related crime, were of most concern to them. Although participant responses did not reveal an overwhelming concern for a specific type of crime, the proportions of participant responses were relatively consistent between the two surveys. 41 percent in the preliminary survey and 40 percent in the follow-up survey identified vandalism as the crime that was of greatest concern. 35 percent and 32 percent selected theft of a motor vehicle, and 24 and 28 percent selected theft from a motor vehicle in the pre-intervention and post-intervention surveys, respectively.

Participants were also asked about their perceptions about the extent of crime at the pilot site over the past year. This meant that for participants in the pre-intervention survey, they were being asked about crime in the year leading up to the start of the CCTV intervention, and for the participants in the post-intervention survey, they were being asked about crime during the one year CCTV pilot study period. In both surveys, a majority of respondents indicated that crime had remained relatively unchanged over the course of the previous year (61 percent in the preliminary survey and 66 percent in the follow-up survey). For those respondents that did identify a perceived change in crime during the previous year, the change in proportions seemed to indicate that more participants believed crime had been getting worse before the implementation of the CCTV system compared to after (19 percent in the pre-intervention survey and 6 percent in the post-intervention survey). Conversely, more participants perceived crime as

getting better after the implementation of the CCTV system than did in the period leading up to the crime prevention strategy (20 percent in the pre-intervention survey and 28 percent in the post-intervention survey).

With respect to fear of crime, participants were asked to rate their feelings of personal safety at the Park and Ride location during daylight hours and also asked about their feelings of safety after daylight hours. In general, most participants indicated feelings of personal safety during the day (81 percent in the preliminary survey and 87 percent in the follow-up survey). In contrast, 4 percent and 3 percent of respondents indicated that they felt either fairly unsafe or very unsafe in the pre-intervention and post-intervention surveys, respectively.

There were fewer responses to questions about personal safety at night because some participants indicated that they were never present at the parking lot during the evening. Not surprisingly, the results of questions asking about night time use were markedly different from those asked in the context of daytime use with many more respondents indicating feelings of insecurity. The differences between the pre-intervention and post-intervention surveys, however, did reveal an improvement both in the proportions of respondents that indicated feelings of insecurity and those that indicated feelings of safety. 41 percent of respondents in the preliminary survey identified as feeling either fairly unsafe or very unsafe during the evening while only 30 percent identified one of these responses in the follow-up survey. Similarly, 29 percent of respondents in the pre-intervention survey and 42 percent in the post-intervention collection identified as feeling either fairly safe or very safe during the evening hours.

Participants' feelings of safety with respect to their property were also asked in the same contexts of day and night-time parking lot use. When asked about the safety of their property during daylight hours, the results were similar to participants' feelings of personal daytime

safety. More participants indicated that they felt either fairly safe or very safe (43 percent in the pre-intervention survey and 69 percent in the post-intervention survey) than did fairly unsafe or very unsafe (18 percent in the pre-intervention survey and 8 percent in the post-intervention survey).

Participants' responses to the question regarding the safety of their property at night revealed similar results to the question about personal safety at night. A large proportion of respondents indicated that they felt their property was either fairly unsafe or very unsafe (67 percent in the preliminary survey and 43 percent in the follow-up survey). Conversely, a much smaller proportion of participants selected fairly safe or very safe when asked about the safety of their property at night (10 percent in the pre-intervention survey and 33 percent in the post-intervention survey).

Perhaps most significantly, there appears to have been a significant drop in victimization since the installation of the CCTV system. In the pre-intervention survey, 20 percent sample, there were 53 thefts from auto and 11 thefts of auto. When adjusted for the whole population of users at the pilot site, there were 260 thefts from auto and 54 thefts of auto. In the post-intervention survey, also a 20 percent sample, there were 25 thefts from auto and 2 thefts of auto. When adjusted for the whole population of users at the pilot site, there were 127 thefts from auto and 10 thefts of auto.

The last response worthy of mention here is the proportion of the users that would be willing to pay $1 more for parking if the CCTV system was monitored. This is an important question because, as stated above, the evaluation research that shows the most promise for CCTV includes those systems that are monitored. As shown in Table 1, only 27 percent of those surveyed would be willing to pay $1 more.

Table 1. Victimization survey results, pre- and post-intervention

Survey question/issue	Response	Pre-intervention percent	Post-intervention percent
Frequency of use	Daily	67	62
	3-4 days per week	14	17
	1-2 days per week	9	9
	Infrequently	11	13
Reason for use	Shopping	0	1
	Work	90	85
	School	7	8
	Recreation	2	1
	Other	1	5
Personal safety (day)	Very Unsafe	2	1
	Fairly Unsafe	2	2
	Neither Safe nor Unsafe	15	9
	Fairly Safe	38	39
	Very Safe	43	48
Personal safety (night)	Very Unsafe	19	11
	Fairly Unsafe	22	19
	Neither Safe nor Unsafe	30	27
	Fairly Safe	20	28
	Very Safe	9	14
Victimization (counts)	Theft from auto	53 (260)	11 (54)
	Theft of auto	25 (127)	2 (10)
Crime of most concern	Theft of auto	35	32
	Theft from auto	24	28
	Vandalism	41	40
CCTV effectiveness	1	5	10
	2	6	9
	3	28	49
	4	32	19
	5	30	14
Concerned about CCTV	No	94	97
Crime trend (past year)	Worse	19	6
	Same	61	66
	Better	20	28
Vehicle safety (day)	Very Unsafe	6	3
	Fairly Unsafe	12	5
	Neither Safe nor Unsafe	40	23
	Fairly Safe	36	55
	Very Safe	7	14
Vehicle safety (night)	Very Unsafe	32	18
	Fairly Unsafe	35	26
	Neither Safe nor Unsafe	23	39
	Fairly Safe	9	14
	Very Safe	1	5
Willing to pay $1 for monitoring	Yes	n/a	27

Police Data

The results of the structural break test using the police data are reported in Tables 2 and 3 (theft of vehicle) and Tables 4 and 5 (theft from vehicle). The results for the City of Surrey, the CCTV site, and Surrey's Communities are presented in Table 2—the community of Whalley contains the CCTV site, but the CCTV site data are excluded from Whalley to investigate changes in the area not attributed to the CCTV site. The City of Surrey as a whole has an overall trend that is insignificantly different from zero over the time period: April 2007 to August 2010. There is no statistically significant change for the City during the evaluation period (15 August 2009 to 14 August 2010), but there is a statistically significant and negative estimated parameter value for CCTV Trend. This indicates that the City of Surrey as a whole experienced a decrease in theft of vehicle during this time period. As such, if the CCTV site experiences a similar change in trend it is not necessarily a result of the CCTV system, but part of a city-wide trend.

The results for the CCTV site, however, are statistically insignificant aside from a low magnitude negative overall trend. Consequently, based on the police data, there is no statistical support for a decrease in theft of vehicle resulting from the CCTV system. Inspection of the parameter values for the Communities of Surrey reveals that there is very little change occurring during the evaluation period. Newton has a statistically significant and negative estimated parameter for CCTV Trend, consistent with the city-wide CCTV Trend. And South Surrey's overall trend is positive (increasing) and statistically significant. However, this increase in trend is at a very modest level.

Table 2. Trend Results, RCMP Data: Surrey, CCTV Site, and Communities, theft of vehicle

	Trend	CCTV	CCTV Trend	R^2
Surrey	0.01	3.93	**-6.88**	0.218
CCTV Site	**-0.09**	0.99	-0.11	0.196
Whalley	-0.28	1.26	-2.63	0.264
Guildford	-0.26	-1.41	0.19	0.112
Fleetwood	0.10	-2.52	-0.74	0.109
Newton	0.13	6.08	**-3.09**	0.157
Cloverdale	0.10	0.29	-0.20	0.009
South Surrey	**0.33**	-1.19	-0.32	0.219

Note. Bold indicates statistical significance at the 10 percent level.

Turning to the 32 Surrey Areas, Table 3, the results are quite similar. Most often, the overall trend is negative. However, these estimated parameters are only statistically significant in 6 cases. Additionally, the magnitude of these parameters is always close to zero. The CCTV variable is always statistically insignificant, and the CCTV Trend variable is almost always negative, but only statistically significant in 2 Areas.

Overall, there is little to report from the analysis of the police data. Though there is no statistical evidence for a decrease in theft of vehicle at the CCTV site, the analysis of the Communities and Areas shows no evidence of this crime shifting to other areas--crime displacement.

The results from the police data for theft from vehicle exhibit much more statistically significant results. The City of Surrey has no statistically significant estimated parameters, pre- or post-CCTV installation. Curiously, the CCTV site has a statistically significant and positive estimated parameter for the CCTV variable. Such a result does not mean that theft from vehicle has increased because of the CCTV system; rather, it is likely due to an increased level of reporting to the police because the users of the Park and Ride know the CCTV system has been installed.

Table 3. Trend Results, RCMP Data: Surrey Areas, theft of vehicle

Community	Area Number	Trend	CCTV	CCTV Trend	R^2
Whalley	1	**-0.20**	2.91	-0.44	0.238
	2	-0.11	6.06	**-1.26**	0.211
	3	-0.10	-3.79	0.32	0.126
	14	0.07	-1.34	-0.33	0.061
	15	0.05	-2.39	-0.85	0.160
Guildford	4	-0.08	1.05	-0.19	0.046
	5	-0.16	-2.51	0.22	0.231
	6	-0.01	-0.71	0.01	0.021
	7	-0.01	0.63	0.12	0.068
Fleetwood	10	0.06	-0.06	-0.22	0.058
	11	-0.04	0.76	-0.03	0.009
	12	0.08	-1.80	-0.22	0.080
	13	0.02	-1.80	-0.26	0.141
Newton	16	-0.11	6.78	**-1.75**	0.268
	17	0.12	0.19	-0.53	0.055
	18	0.05	2.93	-0.43	0.034
	19	0.00	-2.99	-0.12	0.084
	20	-0.04	0.55	-0.15	0.063
	21	**0.14**	-1.86	-0.17	0.086
Cloverdale	8	**0.16**	-2.25	0.03	0.167
	9	-0.04	0.62	-0.00	0.021
	22	0.09	0.19	-0.47	0.074
	23	-0.05	0.36	0.22	0.076
	24	-0.07	0.80	0.05	0.019
South Surrey	25	-0.03	0.69	0.12	0.041
	26	**0.16**	-0.55	-0.21	0.248
	27	0.03	0.39	-0.07	0.043
	28	**0.10**	-1.07	-0.08	0.114
	29	**-0.05**	1.21	-0.13	0.198
	30	0.02	0.67	-0.10	0.023
	31	0.07	-0.68	0.01	0.042
	32	-0.00	-0.44	0.11	0.053

Note. Bold indicates statistical significance at the 10 percent level.

Cloverdale and South Surrey also have statistically significant estimated parameters for the CCTV variable, positive and negative, respectively. Because of the results for the CCTV site itself, there is no obvious interpretation of these results. It is curious, however, that South Surrey

has results that would be expected for the CCTV site (negative CCTV and positive, but low magnitude CCTV Trend) when no crime prevention initiative was implemented in that community that the authors are aware of.

Table 4. Trend Results, RCMP Data: Surrey, CCTV Site, and Communities, theft from vehicle

	Trend	CCTV	CCTV Trend	R^2
Surrey	-0.72	23.46	-5.23	0.067
CCTV Site	**-0.24**	**5.98**	-0.23	0.163
Whalley	-0.70	32.19	-4.55	0.137
Guildford	-0.48	14.79	-0.65	0.094
Fleetwood	**-0.57**	4.03	0.61	0.112
Newton	0.09	-10.71	-1.69	0.197
Cloverdale	-0.26	**20.79**	-0.74	0.164
South Surrey	**1.44**	**-43.62**	**2.01**	0.468

Note. Bold indicates statistical significance at the 10 percent level.

The results for theft from vehicle in the 32 Surrey Areas provide little insight into changes resulting from the CCTV system installation. The areas within the community of Whalley only show a statistically significant result for CCTV Trend in one of the Areas. Guildford, Cloverdale, and South Surrey each have one Area with a positive and statistically significant estimated parameter for CCTV. The areas in Cloverdale and South Surrey are distant from the CCTV site and are not expected to be places that would experience and crime displacement. The Area in Guildford is a possibility for crime displacement because it contains many targets for theft from vehicle (the parking lot of a large shopping centre) but as stated above, the CCTV site also experienced an increase in theft from vehicle. Consequently, it is unlikely that the increase in Guildford is a result of the CCTV system installation. Lastly, similar to the results shown in Table 4, South Surrey has experienced notable decreases in theft from vehicle at the time the CCTV system was installed, with moderate increases in theft from vehicle thereafter.

Table 5. Trend Results, RCMP Data: Surrey Areas, theft from vehicle

Community	Area Number	Trend	CCTV	CCTV Trend	R^2
Whalley	1	-0.09	1.68	-0.40	0.055
	2	-0.25	12.19	-1.61	0.096
	3	**-0.49**	11.99	-0.36	0.127
	14	0.07	5.74	-0.54	0.135
	15	0.05	-1.26	**-1.36**	0.241
Guildford	4	-0.15	**19.24**	**-1.56**	0.313
	5	-0.19	1.96	0.02	0.069
	6	-0.05	-1.69	0.30	0.029
	7	-0.04	-1.28	0.04	0.136
Fleetwood	10	-0.06	**-8.51**	**1.07**	0.196
	11	0.11	5.45	-0.25	0.278
	12	**-0.28**	0.59	-0.13	0.271
	13	**-0.36**	4.04	0.19	0.212
Newton	16	0.01	4.94	**-1.29**	0.369
	17	0.08	0.22	0.59	0.186
	18	-0.01	1.87	-0.24	0.007
	19	0.04	**-11.85**	0.14	0.238
	20	-0.04	5.45	**-0.81**	0.110
	21	0.01	-1.02	-0.07	0.018
Cloverdale	8	**0.15**	-0.24	**0.42**	0.59
	9	-0.06	1.13	0.02	0.029
	22	-0.04	2.73	-0.16	0.014
	23	-0.02	3.11	-0.32	0.039
	24	**-0.35**	**10.59**	-0.39	0.212
South Surrey	25	-0.05	**7.27**	**-0.55**	0.244
	26	**0.28**	-2.69	0.09	0.436
	27	**0.28**	**-9.21**	**0.83**	0.407
	28	**0.29**	**-6.47**	0.03	0.220
	29	0.11	**-6.67**	**0.56**	0.191
	30	0.14	-3.55	0.24	0.068
	31	**0.30**	**-14.17**	0.41	0.188
	32	**0.14**	**-4.12**	0.12	0.279

Note. Bold indicates statistical significance at the 10 percent level.

ICBC Data

The results using the ICBC data are no more promising for the impact of the CCTV system at the Scott Road Skytrain Station Park and Ride, but do exhibit more consistent findings than the RCMP data. The overall trend for the City of Surrey is negative, statistically significant, but moderate. There is no statistically significant increase in theft of vehicle at the time of the CCTV system installation (CCTV), but the parameter is a large positive magnitude. The trend after the CCTV system installation (CCTV Trend), however, is negative and statistically significant. The CCTV site experiences no statistically significant change in at the time of the CCTV system installation, but does have a statistically significant and positive trend thereafter that is low in magnitude.

Table 6. Trend Results, ICBC Data: Surrey, CCTV Site, and Communities, theft of vehicle

	Trend	CCTV	CCTV Trend	R^2
Surrey	**-0.99**	36.18	**-10.88**	0.425
CCTV Site	0.01	-1.02	**0.16**	0.080
North Delta	**-0.33**	6.47	-0.54	0.317
Whalley	-0.33	**-64.30**	**5.10**	0.543
Guildford	**-0.36**	**40.52**	**-4.40**	0.414
Fleetwood	0.02	**33.28**	**-4.84**	0.219
Newton	-0.19	**-24.29**	-1.54	0.480
Cloverdale	0.12	23.73	-2.61	0.072
South Surrey	**-0.25**	**28.27**	**-2.75**	0.328

Note. Bold indicates statistical significance at the 10 percent level.

With regard to the possibility of crime displacement, the immediate area of North Delta shows no evidence of change for theft of vehicle. The rest of Whalley also exhibits no indication of crime displacement. In fact, Whalley has a larger in magnitude decrease in theft of vehicle than the CCTV site itself that is also statistically significant. Though it is possible that there is a diffusion of benefits present here (offenders believe the entire area has increased enforcement), this is unlikely because the entire Community of Whalley is large. As such, it is more likely that

the entire Community of Whalley (including the CCTV site) is experiencing a change in theft of vehicle that is independent from the CCTV system installation. The Community of Guildford experiences a statistically significant increase at the time of the CCTV system installation indicating the potential of crime displacement, but so does its neighbouring Community of Fleetwood. Therefore, a more obvious mechanism to explain this phenomenon is that there has been a more general shift in theft of vehicle in Surrey that has offenders searching for targets in Fleetwood and Guildford rather than Whalley that does not relate to the CCTV system installation. Lastly, the results for South Surrey indicate a statistically significant and large in magnitude increase in theft of vehicle, with a corresponding decreasing trend thereafter. Because of the distance of South Surrey from the CCTV site this is very likely not an incidence of crime displacement. Rather, this provides further support that there is another (unknown) mechanism at work regarding theft of vehicle in Surrey during the evaluation period.

The results from the ICBC data on theft of vehicle in Surrey Areas corroborate much of the previous discussion and show some variation within the larger communities. A few results are worthy of discussion here. For example, essentially all of Whalley experiences decreases in theft of vehicle in the CCTV and CCTV Trend variables. In fact, the Area that contains the CCTV site (Area 1) experiences a statistically significant decrease in theft of vehicle at the time of the CCTV system installation, or thereafter. This indicates that the diffusion of crime prevention benefits may be occurring here, stated as a possibility above with regard to the results in Table 6.

With regard to the possibility of crime displacement, inspection of the Area results indicates that this is not likely. If crime displacement were to occur in the context of theft of vehicle to the Community of Guildford, that crime displacement would most likely occur in Area

4, the site of the large shopping centre and corresponding large parking lot. This does, in fact, occur. Additionally, Area 5, adjacent to Area 4, does not contain anywhere near the number of potential targets for theft of vehicle and experiences no such increase. However, as with the results in Table 6, the Areas within Fleetwood and South Surrey also experience these increases. Therefore, given that the CCTV site experienced no statistically significant change for theft of vehicle and increases in theft of vehicle occurred in many locations, the presence of any crime displacement from the installation of the CCTV system is unlikely.

Table 7. Trend Results, ICBC Data: Surrey Areas, theft of vehicle

Community	Area Number	Trend	CCTV	CCTV Trend	R^2
Whalley	1	-0.04	**-12.07**	**0.83**	0.365
	2	-0.05	**-20.03**	**2.14**	0.471
	3	**-0.12**	**-6.66**	**0.68**	0.290
	14	-0.04	**-7.02**	0.37	0.290
	15	-0.08	**-18.52**	**1.08**	0.404
Guildford	4	-0.19	**24.04**	**-2.98**	0.239
	5	**-0.13**	4.39	0.09	0.062
	6	-0.01	**10.02**	**-1.32**	0.256
	7	-0.02	2.06	-0.20	0.010
Fleetwood	10	0.04	4.39	-0.66	0.059
	11	-0.05	**17.16**	**-1.68**	0.109
	12	0.01	**4.99**	**-1.09**	0.199
	13	0.02	**6.73**	**-1.41**	0.312
Newton	16	**-0.17**	**-18.30**	0.99	0.451
	17	0.06	-0.17	**-1.05**	0.259
	18	-0.02	5.22	**-1.24**	0.192
	19	-0.01	**-13.57**	**0.69**	0.504
	20	**-0.05**	**-5.36**	0.27	0.412
	21	0.01	**7.89**	**-1.19**	0.202
Cloverdale	8	0.05	3.93	-0.22	0.057
	9	0.04	-0.78	-0.01	0.054
	22	0.04	7.21	-0.84	0.039
	23	-0.02	**5.64**	**-0.55**	0.085
	24	0.01	7.72	-0.99	0.050
South Surrey	25	-0.03	**3.48**	-0.08	0.103
	26	0.02	**5.03**	**-0.49**	0.153
	27	-0.01	**5.95**	**-0.73**	0.285
	28	-0.04	**3.04**	**-0.41**	0.145
	29	**-0.04**	0.42	-0.03	0.252
	30	**-0.05**	-0.58	0.05	0.273
	31	**-0.11**	**10.21**	**-1.06**	0.260
	32	-0.01	0.72	0.00	0.014

Note. Bold indicates statistical significance at the 10 percent level.

Table 8. Trend Results, ICBC Data: Surrey, CCTV Site, and Communities, theft from vehicle

	Trend	CCTV	CCTV Trend	R^2
Surrey	**-1.37**	22.50	-3.16	0.174
CCTV Site	-0.01	-0.98	0.01	0.092
North Delta	**-0.24**	1.09	-0.06	0.179
Whalley	-0.17	**-61.57**	**11.64**	0.279
Guildford	**-0.78**	4.67	0.20	0.225
Fleetwood	-0.02	17.64	**-4.43**	0.209
Newton	-0.25	47.18	-4.84	0.078
Cloverdale	-0.03	**45.02**	**-7.31**	0.346
South Surrey	-0.12	**-29.46**	**4.58**	0.480

Note. Bold indicates statistical significance at the 10 percent level.

Turning to the results for theft from vehicle using the ICBC data, the results are similar to those from the police data, Table 4. The City of Surrey, North Delta, and Guildford all have statistically significant and moderately decreasing overall trends in theft from vehicle. The City of Surrey, the CCTV site, and North Delta have no statistically significant changes resulting from the CCTV system installation—both CCTV and CCTV Trend are statistically insignificant in all cases. The Communities of Whalley and South Surrey have statistically significant and negative estimated parameter values for CCTV, and the Community of Cloverdale has a statistically significant and positive estimated parameter for CCTV. CCTV Trend is positive and statistically significant for the communities of Whalley and South Surrey, but negative and statistically significant for the Communities of Fleetwood and Cloverdale. As such, these results exhibit no evidence for a reduction or the presence of either crime displacement or the diffusion of crime prevention benefits.

Once again, the results for theft from vehicle considering Surrey Areas (Table 9), only reinforce the discussion relating to the City of Surrey and its Communities (Table 8). For example, the negative estimated CCTV parameter for the Community of Whalley is not present

for Area 1, the Area that the CCTV site is contained within. And the most statistically significant results are present for the Areas contained within the Communities of Cloverdale and South Surrey that are distant from the CCTV site.

The last form of analysis using the ICBC data is to investigate whether or not the nature of theft of and from vehicle has changed because of the CCTV system installation. Because of perceived increased risk, potential offenders may feel the need to increase the benefits from their criminal activity in compensation: stealing more goods from vehicles or more expensive vehicles, for example. Investigation of the data, however, reveals that there were no significant changes during the evaluation period compared to the year before.

Table 9. Trend Results, ICBC Data: Surrey Areas, theft from vehicle

Community	Area Number	Trend	CCTV	CCTV Trend	R^2
Whalley	1	0.03	-6.16	1.44	0.056
	2	-0.05	**-20.33**	**3.59**	0.127
	3	-0.11	**-25.34**	**4.57**	0.240
	14	0.02	-5.82	**1.24**	0.070
	15	-0.06	-3.92	0.79	0.007
Guildford	4	**-0.53**	5.38	0.51	0.225
	5	**-0.17**	-2.29	-0.07	0.201
	6	-0.09	-0.52	0.06	0.083
	7	-0.01	2.11	-0.30	0.019
Fleetwood	10	0.07	1.34	-0.60	0.053
	11	0.01	3.99	**-1.35**	0.214
	12	-0.03	3.96	**-1.09**	0.112
	13	-0.06	**8.35**	**-1.39**	0.224
Newton	16	-0.14	11.20	-0.87	0.023
	17	0.02	5.59	-0.35	0.025
	18	-0.04	4.92	-0.46	0.011
	19	-0.01	11.22	-1.42	0.043
	20	-0.07	**8.35**	-0.88	0.058
	21	-0.02	5.89	**-0.88**	0.063
Cloverdale	8	0.04	5.40	-0.96	0.297
	9	-0.01	**7.64**	**-1.03**	0.218
	22	-0.01	**12.69**	**-2.11**	0.191
	23	0.01	1.44	**-0.56**	0.165
	24	-0.07	**17.84**	**-2.65**	0.213
South Surrey	25	0.01	2.40	**-0.67**	0.162
	26	**0.05**	**-3.29**	-0.05	0.271
	27	-0.01	**-2.75**	0.01	0.201
	28	-0.01	**-6.18**	0.39	0.262
	29	-0.04	-2.44	**0.39**	0.115
	30	**-0.07**	**-6.39**	**1.22**	0.315
	31	-0.04	**-8.76**	0.27	0.483
	32	-0.01	**-2.04**	0.01	0.253

Note. Bold indicates statistical significance at the 10 percent level.

DISCUSSION AND CONCLUSIONS

This report has evaluated the installation of a CCTV system at the Scott Road Skytrain Station Park and Ride using data from a victimization survey, police data, and insurance data. The results of the victimization survey indicate a substantial drop in the victimization of theft of vehicle and theft from vehicle. Though the results for theft from vehicle are plausible because reported crime to the police is significantly less than reported in the victimization survey, the results for theft of vehicle are not plausible. The number of thefts of vehicle in the year before the evaluation period is in order (54 in the victimization survey and 42 in the police data) because this difference may be attributed to having a 20 percent sample with the victimization survey; however, the number of thefts of vehicle in the year of the evaluation period (10 in the victimization survey and 36 in the police data) clearly shows that our evaluation period sample is not representative of the population. However, the drops in both theft of vehicle and theft from vehicle are large enough in magnitude to conclude that the CCTV system has been effective in reducing crime. Without further investigation it is difficult to quantify this decrease, however. Perhaps more important, the level of fear for personal and vehicular victimization is notably lower in the evaluation period. Though even more difficult to quantify, the impact on the fear of crime should not be ignored because most research on the costs of crime to society show that the psychological impacts of crime are most often far greater than the monetary losses.

The results for the analysis of the police data do not show much impact from the CCTV system installation. In fact, the police data show very little change at all before and after the CCTV installation, no matter what area of the city is considered. The ICBC data have results similar to those from the RCMP data.

Considering the results from all three analyses, it appears as though the CCTV system installation at the Scott Road Skytrain Station Park and Ride has have an impact: decreased theft of and theft from vehicle crime. This statement is made primarily on the basis of the victimization survey and a lack of contrary evidence from the RCMP and ICBC data. However, because of the nature of the statistical results on the police and insurance data, quantifying that decrease would be irresponsible.

As discussed above, most of the research that is able to show definite decreases in crime resulting from CCTV systems has been those systems that are monitored. As such it is our recommendation that the CCTV system at the Scott Road Skytrain Station Park and Ride be monitored and evaluated again. Such monitoring would of course come with a cost, which is why a question regarding an increase in parking fees was asked of the survey respondents. The respondents were asked if they would be willing to pay an addition $1 per day for parking if the CCTV system had live monitoring. Of those asked, 27 percent said yes.

The value of $1 was used because it was thought to represent a small value to each individual, but when multiplied by all users over the entire year that $1 adds up quickly. Let us assume that each individual that uses the Park and Ride has 8 weeks of holidays throughout the year. This leads to 220 days of parking (46 weeks and 5 days per week). Let us further assume that there are consistently 1000 used parking spaces in the car park each and every day—this is a conservative estimate. This would lead to $220 000 in revenues per year from that $1. Even if the increase was based on the percentage of those willing to pay (27 percent), and increase in parking of $0.25 would lead to $55 000 in revenues per year. Given that the Park and Ride is used primarily in the daytime hours, as indicated by the responses to the surveys, such revenues would very likely cover 12 hours of monitoring 5 days per week. These revenues should be able

to cover live monitoring or, perhaps, have security (on bicycles) on site for the hours and days that are of primary concern: Monday to Friday, 7am to 7pm.

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APPENDIX

Pre-Intervention Survey

Consent Statement (3-4 minutes of your time)

The purpose of this study is to **evaluate the impact of installing CCTV** at Scott Road Skytrain Station's Park and Ride. You will be required to answer a few questions regarding their use of the car park, automotive theft victimization, and fear of victimization. The benefits of this study are to **identify the benefits of a CCTV system** and if these benefits are enough to **justify the costs in order to improve your safety** at this Park and Ride. Your name or any other **identifying information will not be gathered** and you will not be contacted for any future studies. If you would like to obtain research results further information is on this sheet (offer sheet on following page to participants).

Questions

1. How frequently do you use the Park and Ride at Scott Road Skytrain Station?

Daily 3-4 days per week 1-2 days per week Infrequently

2. When/why you use the Park and Ride what are the usual reasons for parking here?

Shopping Working School Recreation Other

3. In general, how safe do **<u>you feel</u>** you are at the Scott Road Station Park and Ride?

During the Day	**At Night**
5. Very Safe	5. Very Safe
4. Fairly Safe	4. Fairly Safe
3. Neither Safe nor unsafe	3. Neither Safe nor unsafe
2. Fairly Unsafe	2. Fairly Unsafe
1. Very unsafe	1. Very unsafe

4. During the last year have you been a victim of crime (i.e. automobile stolen, theft of property from automobile, vandalism etc)

Example:

If theft from auto:

What was stolen: Value of goods:

If theft of auto:

Make: Model: Year:

5. What automotive crime most concerns you? Theft of Theft from Vandalism
6. On a scale of 1 (not effective) to 5 (extremely effective), On the following scale please indicate if you think that Closed Circuit Television (CCTV) is an effective way to reducing crime at the Scott Road Park and Ride.

1 2 3 4 5

7. Do you have any concerns about CCTV being used in this way?

YES NO

8. Do you believe in the last year criminal activity is getting worse, is the same, or better here at Scott Road Park and Ride.

Worse Same Better

9. In general, how safe do you feel **<u>your car or property in your car</u>** is here at the Scott Road Station Park and Ride? (Fear of Crime)

During the Day	**At Night**
5. Very Safe	5. Very Safe
4. Fairly Safe	4. Fairly Safe
3. Neither Safe nor unsafe	3. Neither Safe nor unsafe
2. Fairly Unsafe	2. Fairly Unsafe
1. Very unsafe	1. Very unsafe

10. Sex and age range

MALE FEMALE

10-20	20-30	30-40	40-50	50-60	60-70	70+

Post-Intervention Survey

Consent Statement (3-4 minutes of your time)

The purpose of this study is to **evaluate the impact of installing CCTV** at Scott Road Skytrain Station's Park and Ride. You will be required to answer a few questions regarding their use of the car park, automotive theft victimization, and fear of victimization. The benefits of this study are to **identify the benefits of a CCTV system** and if these benefits are enough to **justify the costs in order to improve your safety** at this Park and Ride. Your name or any other **identifying information will not be gathered** and you will not be contacted for any future studies. If you would like to obtain research results further information is on this sheet (offer sheet on following page to participants).

Questions

1. How frequently do you use the Park and Ride at Scott Road Skytrain Station?

Daily 3-4 days per week 1-2 days per week Infrequently

2. When/why you use the Park and Ride what are the usual reasons for parking here?

Shopping Working School Recreation Other

3. In general, how safe do **<u>you feel</u>** you are at the Scott Road Station Park and Ride with the presence of CTV?

During the Day	**At Night**
5. Very Safe	5. Very Safe
4. Fairly Safe	4. Fairly Safe
3. Neither Safe nor unsafe	3. Neither Safe nor unsafe
2. Fairly Unsafe	2. Fairly Unsafe
1. Very unsafe	1. Very unsafe

4. During the last 12 months have you been a victim of crime (i.e. automobile stolen, theft of property from automobile, vandalism etc)

Example:

If theft from auto:

What was stolen: Value of goods:

If theft of auto:

Make: Model: Year:

5. What automotive crime most concerns you? Theft of Theft from Vandalism

6. On a scale of 1 (not effective) to 5 (extremely effective), On the following scale please indicate if you think that CCTV has been an effective way to reducing crime at the Scott Road Park and Ride.

1 2 3 4 5

7. Do you have any concerns about CCTV being used in this way? YES NO

8. Do you believe in the last 12 months criminal activity is getting worse, is the same, or better here at Scott Road Park and Ride.

Worse Same Better

9. In general, how safe do you feel **<u>your car or property in your car</u>** is here at the Scott Road Station Park and Ride with the presence of CCTV? (Fear of Crime)

During the Day	**At Night**
5. Very Safe	5. Very Safe
4. Fairly Safe	4. Fairly Safe
3. Neither Safe nor unsafe	3. Neither Safe nor unsafe
2. Fairly Unsafe	2. Fairly Unsafe
1. Very unsafe	1. Very unsafe

10. Would you be willing to pay an extra $1 for parking per day to have the CCTV monitored?

Yes No

11. Sex and age range

MALE FEMALE

10-20	20-30	30-40	40-50	50-60	60-70	70+

Map for those victimized