



# **Body Worn Video: Considering the Evidence**

**Final Report of the Edmonton Police Service  
Body Worn Video Pilot Project**

**June 2015**

## **Acknowledgements**

The EPS Body Worn Video (BWV) Pilot Project has involved input and support from many EPS and external stakeholders as well as other policing agencies. The EPS BWV team gratefully acknowledges all contributions. A very special thank you is due to the sworn EPS members participating in the pilot by wearing the BWV devices during their policing duties. Each participating member also took part in an in-depth interview providing rich and vital data for the overall assessment of this technology.

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## Table of Contents

<b>EXECUTIVE SUMMARY .....</b>	<b>5</b>
<b>1. OPERATIONAL FINDINGS .....</b>	<b>12</b>
1.1. Introduction .....	12
1.2. The BWV Devices .....	14
1.3. Systematic and Secure Data Management.....	24
1.4. BWV Audio-Video Quality .....	27
1.5. Using BWV: EPS Pilot Members' Experiences .....	34
1.6. Using BWV: Opinions of Non-User EPS Members .....	51
1.7. BWV and Complaints to EPS.....	54
1.8. Use of Force at EPS .....	61
<b>2. THE IMPACT OF BWV ON THE PUBLIC .....</b>	<b>67</b>
2.1. Aggression and Rudeness .....	67
2.2. Citizen Compliance with Police .....	70
2.3. Talking to Police.....	71
2.4. Public Objections to BWV Recording.....	72
<b>3. BWV: LEGAL CONSIDERATIONS, THE COURTS AND CROWN PROSECUTORS .....</b>	<b>74</b>
3.1. BWV and the Courts: Members' Experiences .....	77
3.2. Potential Disclosure Issues .....	79
3.3. Unanswered Questions about the BWV and the Court Process .....	80
<b>4. POLICY AND PROCEDURES FOR USING BWV .....</b>	<b>81</b>
4.1. Development of Policy and Procedure for the EPS Pilot.....	81
4.2. Procedural Issues and Questions from Operational Practice .....	82
<b>5. BWV TRAINING: PLANNING AND RESOURCING.....</b>	<b>85</b>
5.1 Training and Development Issues.....	86
5.2. Scope and Content of BWV Training .....	87
<b>6. COSTS AND RESOURCES .....</b>	<b>91</b>
<b>7. REFERENCES .....</b>	<b>94</b>

<b>APPENDIX A: LITERATURE REVIEW</b>	<b>98</b>
A1. Introduction	100
A2. Sources and Review Approach	100
A3. BWV – The Way of The Future? BWV	101
A4. Information or Evidence? Examining The Sources	102
A5. The BWV Promise for Policing: Manufacturer’s Claims	104
A5.1 Technical Specifications	104
A5.2 Operational Value	104
A6. BWV The Inevitability for Policing: Media Excitement	99
A7: BWV and Policing: Testing and Operational Evidence	101
A7.1 Australia	102
A7.2 Canada	104
A7.3 United Kingdom	118
A7.4 United States	126
A8. Legal Considerations	135
A9. Policy and Procedure Guidelines	137
A10. Summary of Analytical Conclusions	139
A11. Bibliography of References and Additional Sources	143
<b>APPENDIX B: EPS BWV PRIVACY IMPACT ASSESSMENT</b>	<b>156</b>
<b>APPENDIX C: EPS LEGAL OPINION ON BWV</b>	<b>166</b>
<b>APPENDIX D: BWV DETAILED METHODOLOGY</b>	<b>168</b>
EPS Body Worn Video Pilot Project: Background	169
Assessment and Evaluation Approach	169
In Conclusion	180
<b>APPENDIX E: TECHNICAL REVIEW</b>	<b>182</b>
Introduction	183
Selection of BWV Technology for Testing	183
Device Functionality	189
Video Quality	191
Data Management Software	192

Security Considerations ..... 199  
Device Management: Hardware (RS3-SX) ..... 201  
Data Management: Storage ..... 204  
Service and Maintenance ..... 207  
Power: Commercial, Emergency, Uninterrupted Power Supply (UPS) ..... 209  
Resources ..... 209  
Conclusions and Recommendations ..... 210

**APPENDIX F: REPORT ON THE (CBRNE) EMERGENCY PREPAREDNESS  
EXERCISE 2012 ..... 214**  
**APPENDIX G: EPS BWV PILOT PROCEDURES ..... 220**  
**APPENDIX H: EPS BWV PILOT PUBLIC SURVEY SUMMARY ..... 229**  
**APPENDIX I: GLOSSARY OF ABBREVIATIONS ..... 232**

## EXECUTIVE SUMMARY

### Introduction

The Edmonton Police Service Body Worn Video (BWV) Pilot began in fall 2011 and finished in fall 2014. With funding support from the Centre for Security Science (Defence Research and Development Canada), the project's purpose was to create a foundation of objective evidence to assist with future decisions about BWV.

The pilot used a professionally designed series of quantitative and qualitative measures to assess BWV for technical performance, legal considerations and practical value to everyday policing.

There were three main goals for the project:

1. Assess BWV for: operational effectiveness; evidentiary value; potential for reducing complaints and use of force; impact on the public; possible training benefits; and costs.
  2. Establish a BWV data management system that securely stores and retrieves data to preserve evidence and minimize human error.
  3. Develop policy and operational procedures as a foundation for best practices for BWV.
- Taken on balance, the findings from the EPS pilot suggest that **BWV has the potential for positive outcomes for police and prosecutors**. But this potential must be weighed against a number of other factors that give strong reason for pause.
  - These factors are detailed below in Key Findings and Recommendations, and more so in the main report, but the major ones are:
    - **the need for improved hardware and data management to meet policing needs**
    - **questions about the evidentiary value and use of BWV footage**
    - **the universal lack of clear policy about when police should record** and how safety issues and privacy rights affect this decision
    - **the absence of cost-benefit analyses** from any jurisdictions to prove value for the enormous investment required to fully implement BWV.

#### Our principal recommendations:

- **The EPS should wait before investing further in BWV**, and monitor ongoing Canadian initiatives by the RCMP, and the Calgary, Amherstburg, Ont., and Toronto police services.
- **With caution, EPS management should consider the viability of a BWV program** for specific EPS units where potential benefits might merit the financial investment.

**The Decision on BWV**  
**[Conclusions of Police Executive Research Forum, 2014]**

*The decision to implement body-worn cameras should not be entered into lightly. Once an agency goes down the road of deploying body-worn cameras – and once the public comes to expect the availability of video records – it will become increasingly difficult to have second thoughts or to scale back a body-worn camera program. [p. v]*

*Although body-worn cameras can offer many benefits, they also raise questions about how technology is changing the relationship between police and the community. Body-worn cameras not only create concerns about the public's privacy rights but can also affect how officers relate to people in the community, the community's perception of the police, and expectations about how police agencies should share information. [vii]*

## **Key Findings and Recommendations**

### **Devices and Data Management**

#### **Findings**

- **The collective findings of the EPS pilot and our comprehensive literature review show BWV to be a rapidly evolving, “bleeding edge” technology.** While at the forefront, and the focus of great interest, it is yet unproven.
- **The project team evaluated 16 BWV products to start and selected two for comprehensive testing – none proved to meet the full operational needs of the EPS.**
- **The data management software available at project start could not meet EPS requirements for securely and efficiently managing video.**
  - Storing police video data on the Cloud (managed by a third party) presents security, technical and legal concerns.
  - A reliable, secure, robust and automated data management system is critical to successful BWV deployment.
  - Purchasing and deploying BWV will require a major investment of time, technical know-how and staff resources to manage data storage, access and retrieval. This will incur on-going capital and operational costs.

#### **Recommendations**

- **Any BWV devices deployed by EPS should meet the following criteria:**
  - a one-piece design that is durable and lightweight
  - a mounting system that is flexible and secure

- an easy-to-reach on-off switch that can be manipulated in all weather
- video capture with a wide field of view
- a pre-event recording function that is easy to operate
- a durable rechargeable battery that is reliable in severe (cold or hot) temperatures
- a battery that will support four hours of recording and 11 to 12 hours of pre-event buffering
- secure, locally-controlled data management software to protect recorded data, with scalable storage space, back-up and recovery resources, and ongoing technical support.

## Operations

### Findings

- **Police decisions about when to record are complex;** no simple rule applies for all scenarios. Decisions can be affected by technical issues, priorities during sudden dynamic events, concern for the protection of sources, and dealing with sensitive situations.
- **Police work time would notably increase if video review became a daily part of the reporting routine.**
  - The added time members spent reviewing video may be partially offset by information gained and higher quality reports. However the overall result would remain a notable increase in police work time.
  - Pilot participants were selective about how often they reviewed video for reporting purposes during the pilot, partly because footage often wasn't available on a same-day basis.
- **The EPS members who participated in the project had mixed perceptions of how BWV impacted their work approach.**
  - Increased “professionalism” may be offset by hesitation and fear of judgement.
  - Members may be more careful and patient, but also more “robotic” and less effective in creating rapport.
  - Non-users and other first responders were at times hesitant to support BWV users, but at other times welcomed the presence of BWV.
- **Concerns expressed by non-user respondents** were similar to those identified by the BWV pilot participants.
- **For BWV to succeed, the impact on frontline policing must be thoroughly understood and clearly addressed.**

### Recommendations

- **Review current reporting practices and develop policy for how BWV should be incorporated into reporting.**



- **Provide dedicated viewing areas for police to review BWV footage**, with quality equipment and adjustable lighting.

## **Complaints**

### **Findings**

- **The pilot found no quantitative evidence that BWV had an impact on complaints.**
- **Professional Standards Branch observed that BWV makes a useful contribution** to a complaint investigation. Although the legislated complaints process allows citizens to appeal EPS decisions, in some cases BWV may help with earlier resolution.

### **Recommendation**

- **Continue with current EPS complaint reduction strategies**, which have produced positive results in recent years.

## **Use of Force**

### **Findings**

- **There is no statistically significant evidence that the presence of BWV reduced use of force.**
- **Members' experiences were that the presence of BWV could cause them to hesitate** to use appropriate levels of force.
- **BWV can contribute to use- of-force reviews and training.**

## **Impact on the Public**

### **Findings**

- **The effect of BWV on citizens varies with the situation and is highly nuanced.** It is as likely to be negative as positive.
- **The general public in Edmonton are mostly positive** about, and interested in, the concept of BWV. They have high expectations for this technology, which may not be realistic.

## Legal Considerations, the Courts and the Crown

### Findings

- **The pilot produced no evidence that BWV has significant prosecutorial value.**
  - No significant trials using BWV evidence took place during the pilot period.
  - To the best of our knowledge, BWV evidence has yet to be used during any court proceeding in Canada.
- **There was no formal feedback from Crown prosecutors about BWV evidence** or its use in the courtroom.
- **Current legislation in Canada** doesn't specifically address BWV.
- **Criteria-based evaluations of pilot video footage found the majority of it to be usable,** with potential evidentiary value.
- **Perceptions about audio-video quality are highly subjective** because of individual differences in sight, hearing, prior expectations and knowledge. This contrasts with widely held assumptions that video footage is “factual” and indisputable.
- **Many courtrooms are not equipped to view BWV evidence, and many questions remain unanswered about how the courts will handle issues** such as:
  - managing the volume of footage
  - disclosure, redaction and transcription
  - testimony by video technology experts
  - individual perceptions of video evidence
  - and the time and cost of viewing and presenting BWV as evidence.

## Policy and Procedure

### Findings

- **The pilot identified several procedural issues needing clarification.** These have emerged as international discussion points, with no clear consensus for resolution:
  - notifying subjects they are being recorded
  - the degree of discretion allowed for when to activate recording
  - timing of BWV review for reporting
  - use of BWV for performance management.

### Recommendations

- **BWV policy and procedure must be clear, detailed and well communicated** (with comprehensive training) to address the complexity and variety of police work performed by EPS members:

- **Members should be involved in developing policy and procedures**, particularly those pertaining to issues such as when to activate recording.
- **The EPS pilot policy and procedures are a solid foundation** for BWV practice, and can serve as a baseline for future deployment.

## **Training**

### **Findings**

- **Training must be a major component in any successful BWV program**, requiring substantial investment of resources for planning and delivery.
- **Pilot training failed to ensure consistent and uniform BWV practice by participants**, even though it was comprehensive and well-conceived.
- The project team identified several key training issues for BWV.
  - **There is a need for specific tactics training** to develop muscle memory and integrate the use of the devices with other equipment.
  - **Participants tended not to read and absorb the full scope** of the operating procedures.
  - **Significant influence (positive or negative) was exerted by supervisors and informal leaders** on BWV use.
  - **Training must address organizational culture to create buy-in from members.**
- **BWV has its own training value as a self-evaluation tool for members, and has organizational value as an analytical tool for reviewing training.**

### **Recommendations**

- **A successful training plan must include:**
  - communication about program goals and benefits
  - involvement from intended users and support personnel.
  - tactical training on physical operation of the cameras
  - learning modules for the operational procedures
  - training of police leaders to promote buy-in in the field
  - ongoing “refresher” training reviews.
- If the right technology can be found, **deploy BWV in a small, clearly defined role for review and training purposes.**

## Costs

### Findings

- **Implementing and managing a service-wide BWV program will require a major financial investment in the \$multimillions** for an agency the size of EPS, and costs will extend beyond EPS to involve prosecutorial services and the courts.
- **Such an investment demands reliable technology and hard evidence of outcome benefits.** Currently, we have no data proving the evidentiary value of BWV footage for prosecutions, and the available technology doesn't address all EPS operational requirements.
- Among the police services that use BWV, **there have been no comprehensive cost-benefit analyses done to prove it delivers financial or time savings.**

### Recommendation

- **Consult with EPS management about the viability of a BWV program** for specific EPS units where potential benefits might merit the financial investment.

# 1. OPERATIONAL FINDINGS

## 1.1. Introduction

The Edmonton Police Service Body Worn Video (BWV) Pilot began in fall 2011 and finished in fall 2014. With funding support from the Centre for Security Science (Defence Research and Development Canada), the project's purpose was to create a foundation of objective evidence to assist with future decisions about BWV.

The pilot used a professionally designed series of quantitative and qualitative measures to assess BWV for technical performance, legal considerations and practical value to everyday policing. It was the first in Canada to receive federal funding for this kind of study and has generated considerable interest from police agencies across Canada and internationally.<sup>1</sup>

The pilot assessed body worn video<sup>2</sup> for technical performance, legal considerations and practical value to everyday policing. The project covered an entire system of video management (not merely the camera device) for the EPS context. To our knowledge, EPS stands alone with this project in both purpose and approach:

- a) The purpose was to create a base of objective evidence for future equipment decisions. There was no intention or commitment to deploy body worn video beyond the pilot project.
- b) The EPS hired a project coordinator with professional research skills as a non-sworn member, specifically to design the evaluation methodology and coordinate the pilot. This was to add the value of an outside research perspective integrated with inside knowledge of the daily operations of a major police organization ([see Appendix D for background and methodology](#)).

### Project goals

1. Assess the value of body worn video (BWV) for:
  - Aiding investigations (including making them more efficient and timely)
  - Providing evidence to support prosecutions
  - Recording operational events (including pursuit and use of force)
  - Reducing complaints
  - Reducing hostility
  - Providing real life training examples

Cost considerations for equipment and related operations were an additional outcome.

2. Establish a BWV data management system that securely transfers, validates, stores and retrieves data in an automated process, to preserve evidentiary integrity, minimize human error, and reduce the overall resources required.
3. Develop baseline operational standards, protocols, and evaluations that can be used to set best practices for body worn video.

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<sup>1</sup> To date, one or more requests for information have come from 64 policing and oversight agencies.

<sup>2</sup> The team preferred the term "body worn video" over the more common North American term "body worn camera" because it represents an entire system of video management, rather than just a camera.

## Choosing devices and getting started

Once the project coordinator had designed the pilot methodology, the project team began selecting and purchasing devices (cameras and supporting equipment) for the pilot.

- Starting in fall 2011 we identified 12 companies that offered 16 types of BWV devices advertised as suitable for policing.<sup>3</sup> The team assessed these products in three stages:
  1. We evaluated the 16 available BWV products against 22 criteria desirable in the EPS context.<sup>4</sup>
  2. We short-listed five products through a 32-question “Technology Evaluation Form” sent to the manufacturers.
  3. We reviewed questionnaire responses and tested the short-listed devices, choosing two cameras for the operational phase of the pilot–
    - the just-released **Taser Axon Flex** camera (optional head and body mounted system)
    - the chest-mounted **Reveal Media RS3 SX** camera.<sup>5</sup>
- To start the operational phase the project team tested both cameras in the laboratory, and in controlled training situations. We concluded that only one was suitable for ongoing field testing with EPS members during regular duties. We rejected the Taser Axon Flex for field testing mainly because of data management issues; specifically, that Taser offered no locally-controlled and -secured data storage option (see [Appendix E](#)).
- We ran the field test using the Reveal RS3 camera, covering all the essential components of any police agency decision to adopt BWV as a permanent operational tool. For more detail on technical issues – from selecting cameras through managing the devices and the video data they produced (see [Appendix E](#)).
- During the course of the pilot, we also conducted a comprehensive literature review, using all available news media articles, police media articles, organizational reports, guidelines and standard operating procedures; and as many BWV evaluation reports that we could identify and access (see [Appendix A](#)).

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<sup>3</sup> At that time, the Panasonic WV-TW310 Wearable Camera was only at the prototype stage and was not available for consideration in the EPS pilot.

<sup>4</sup> Selection process details and criteria are discussed in the EPS BWV Pilot Interim Report (Clissold, Stratton & Tuson, 2013).

<sup>5</sup> Taser introduced a body mounted one-piece option during the operational phase of the EPS pilot and Reveal Media have released new versions of their BWV products.

## 1.2. The BWV Devices

### Key Findings and Conclusions: BWV Devices

1. **The project team evaluated 16 BWV products to start and selected two for comprehensive testing – none proved to meet the full operational needs of the EPS.**
  - The Reveal RS3 SX met enough evaluation criteria to serve in the field testing stage of the pilot. It had limitations for long term deployment, mainly because of problems with the battery.
2. **To serve EPS needs, BWV devices must meet these criteria:**
  - a one-piece design that is durable and lightweight
  - a mounting system that is flexible and secure
  - an easy-to-reach on-off switch that can be manipulated in all weather
  - video capture with a wide field of view
  - a pre-event recording function that is easy to operate
  - a durable rechargeable battery that is reliable in severe (cold or hot) temperatures
  - a battery that will support four hours of recording and 11 to 12 hours of pre-event buffering
  - secure, locally controlled data management software to protect recorded data in case of loss or tampering.
3. **Selecting and purchasing BWV equipment is demanding and resource intensive.** Rapidly evolving technology will only increase this reality, and will demand accurate specifications and a thorough procurement process. A supplier must be able to meet ongoing demand and offer a strong warranty and repair program.
4. **Managing and monitoring BWV devices** will be an ongoing task requiring specific processes and personnel.

### 1.2.1. Device Description: Taser Axon Flex

The Axon Flex consists of a camera and battery pack connected by a wire. The camera mounts at the side of the head on glasses or a head band, but also has body mount options. The battery pack mounts on the body.



The camera is 80 x 20 x 20 mm (H-W-D) and weighs 15 grams. The battery pack, with mounting clip attached, is 90 x 70 x 20 mm and weighs 93 grams. Our laboratory tests confirmed that in moderate temperatures the battery provides continuous recording for about four hours. It will also support an automatic pre-record (buffering) mode of about 12 hours.

The camera's horizontal field of view is 75 degrees. It operates at 30 frames per second with a resolution of 640 x 480. The camera will store four to eight gigabytes (depending on settings) of solid-state, internal non-removable media. Standby and recording functions run by pressing a button on the front of the battery pack; varying the number of button presses chooses the specific function. A Bluetooth link with an MP3 player or compatible cell phone provides real time viewing and instant playback.<sup>6</sup>

The Axon Flex camera was tested only in the lab and a controlled training context for two reasons:

1. The EPS Tactics Training Unit expressed strong safety concerns because the pressure of the camera against the member's temple could cause injury in a dynamic interaction; and, the breakaway wire could be used as a weapon against the member.
2. The camera lacked locally-controlled and -secured data management software ([Appendix E](#)).

### **1.2.2. Device Description: Reveal Media RS3-SX**

The body-mounted RS3-SX is a one-piece unit without external wires, an important feature. The unit measures 120 x 60 x 35 mm and weighs 140 grams.<sup>7</sup> The internal removable battery provides about 90 minutes of recording in moderate temperatures.<sup>8</sup> The optional pre-recording mode reduces even this short time, so the battery isn't a viable option for regular duty use.

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<sup>6</sup> Full specifications for the tested devices are available from the manufacturers' websites.

<sup>7</sup> These measurements include the camera head in the length of the device and the clip mount in depth.

<sup>8</sup> The manufacturer's specifications suggest up to 2.5 hours of recording. However, laboratory testing repeatedly found about 90 minutes of continuous recording, which deteriorated over time and especially in temperatures below freezing. The camera can be wired to an additional battery pack.



The camera's horizontal field of view is 120 degrees, with a manually adjustable head. It operates at 30 or 60 frames per second with three resolution options; the team chose a setting of 848 x 480/ 60 FPS. The camera will store eight gigabytes (upgradable) of data on a removable SD Card, which raises a security concern. (see [Section 1.3](#), Data Management).

The unit screen provides a real-time view of action being recorded and instant playback, operated by buttons located under the screen. Participants thought this feature potentially useful.<sup>9</sup>

The RS3 SX also has a car mount with two options. Detached from the officer and mounted on the car-dash, the camera can be faced either toward the road or into the vehicle.<sup>10</sup>



### 1.2.3. Mounting the Devices

The analytical literature review ([Appendix A](#)) showed that comfort and stability were recurrent issues when it came to mounting BWV cameras. At the first assessment stage, the BWV Team realized that currently available hardware might not meet the challenges posed by operational conditions and safety concerns:

- **The safety of members is a paramount consideration.** Currently, EPS uniform standards permit only concealed body armour for uniformed members; most available body mounts were designed to attach to external body armour;

<sup>9</sup> See Sections [1.4.1](#), [1.5.4](#), and [1.7.4](#) for related findings.

<sup>10</sup> See [Section 1.2.6](#), for related findings.

- **Operational conditions are demanding**, with a significant impact on EPS equipment requirements. Patrols and beat teams (on indoor and outdoor foot patrol) interact intensively with the community using patrol cars, wagons, bicycles and Segways.<sup>11</sup>
- **Edmonton's climate requires multiple uniform layers.** Extreme temperature changes from summer (+30 Celsius) to winter (-30), and even within a 12-hour shift regardless of season, demand layered uniforms and a variety of hats. Any BWV camera must attach and detach easily from each uniform item and fit with each type of hat.
- **Equipment overload.** EPS members currently wear concealed body armour and equipment belts that weigh approximately 30 lbs. They also carry a chest-mounted radio with battery pack and their uniform pockets are filled with equipment. Other extras, such as a carbine, often add to the load. They have little or no space to add more equipment.

#### 1.2.4. Mounting the Axon Flex

Members mounted this camera on the side of the head, with sunglasses or the product headband:

- Members considered the mount fairly comfortable, but none wore it for a complete shift, nor did they test it while wearing a hat.
- The wire connecting camera to battery pack tended to get caught in other equipment, including the patrol car seatbelt. This problem could be reduced by placing the wire inside the uniform shirt.<sup>12</sup>
- In use of force situations the camera almost always became partially or fully dislodged. At a minimum, the focus on the action was disrupted. On several occasions the camera flew off and was 'lost' without the wearer realizing it. It was retrievable in the training context, but in operational use this would be difficult.
- On several occasions, members accidentally mounted the camera upside down, resulting in upside down video.<sup>13</sup>

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<sup>11</sup> Motorcycles and canines should also be considered, but none were included in this pilot.

<sup>12</sup> Discussions with other agencies suggest that most Axon Flex users position the wire inside uniform items. Axon has also worked with other agencies to improve the camera/battery connection so it is less likely to disconnect.

<sup>13</sup> The project coordinator believes this depends on which side of the head the member wore the camera (depending on a right- or left-handed user) and that camera settings can be changed accordingly. However, settings must be changed through the Evidence.com software, which EPS could not use.

## 1.2.5. Mounting the Reveal RS3 SX

### Members' Feedback: Body-Mounting the RS3 SX

[excerpts from in-person interviews with all BWV participants]

*It becomes heavy after extended wear on the radio strap and after a week strains the neck muscles. It is better mounted on the jacket with the popper clip.*

*On the radio strap, when I turned my head to shoulder check it hit my chin or face. Running up stairs (for example) I always knew it was going to hit me, so I really didn't like it. I would put it over my shoulder to get it out of the way.*

*I only used the back clip. I adapted it to fit my uniform – relocated my pens and used that pocket on my shirt. The clip worked [through the loop] on the bike shirts too and the beat jackets. It was a tight fit, but it didn't come out. It stayed put even in a tussle.*

*The back clip did not fit with uniform. Clip had to be filed down to fit pocket....using it meant not having pens and other items in that pocket. It wasn't comfortable as flapped from side to side.*

*The worst was using guns. As soon as I put up my arms it pushes the camera up and out. Even putting on the seat belt in the car pushes the camera up and out. The winter jacket also pushes the camera out of position.*

*You get used to it, like any other equipment.*

The RS3 has a leather case the team purchased as an accessory to protect it from the weather and casual damage (see photos, [RS3 SX description](#)). The special fastening on the back of the case allowed mounting on a radio strap or directly by popper clip to a loop on the uniform. Because of differences in uniform design, each of these options didn't work with some clothing items.

Members were offered additional mounting loops on their uniform pieces, but this tended to interfere with other items such as name tags, pens and notebooks. They could also choose to remove the camera from the case and use the back clip mount, in an attempt to improve mount stability. [Table 1](#) provides the pilot participants' median ratings for each mount. The participants considered the mounts reasonably easy to use, but rated them poorly on comfort, fit and especially stability.

Participants were innovative in trying to make the best of the available mounts. About half tried two or more options, settling for the one they found most manageable or alternating between mounts depending on the uniform item they were wearing. Some shaved down the back clip so it fit fully into their uniform pocket. The back clip was potentially easier to attach and detach, but also less secure. Although special fastening on the protective case secured the camera firmly to the mount, the camera fell off for several members who used the back clip. One camera was lost when it caught in a seatbelt and fell outside the vehicle.

**Table 1: Pilot Users Ratings of RS3 SX Mounting Options**

RS3 Mounting	Used N	Mean score (1 = not at all; 6 = Completely)				
		Ease of use	Comfort to wear	Stability	Fit with uniform	Fit with equipment
Radio Strap	44	4.93	3.00	2.10	3.49	3.65
Popper Clip	24	4.76	4.48	3.44	3.84	4.08
Back clip	26	4.38	3.75	2.92	3.12	3.60

The lack of a comfortable, stable mount was a major irritant for the participants. It was also a safety hazard, as the camera would flop and bounce in a foot chase or use of force situation.

- During interviews, 47 (85%) of the participants commented – without being prompted – that the camera flopped about during rapid movement.
- Twenty-nine of those 47 (62%) added that the camera hit them on the chin or face. This problem occurred mainly with the camera mounted to the radio strap, but also at times with the popper clip mounted on a shirt or jacket loop that held the camera just under the chin.

Because this was a pilot project, major uniform adjustments to accommodate the cameras weren't feasible. If BWV were to be adopted permanently, uniform changes would be necessary. Even then, the need to move the device quickly from one uniform item to another would remain challenging.

### **1.2.6. Using the Reveal RS3 on the car mount**

The car mount for the RS3 was easy to attach to a vehicle windscreen. The same fastener that holds the camera in its leather case also connects it securely to the car mount. The research team rated the video produced by this system as excellent. However, the devices were quite difficult to remove and remount as they had to be twisted upside down in the process.

To use the camera in the car, it had to be detached from the uniform and fixed in the car mount. Upon arrival at a call, the camera then had to be taken from the car mount and reattached to the uniform. Obviously, this wouldn't take precedence for members when responding to a priority call, and so proved a limitation.<sup>14</sup> Hence, during the pilot roll out the project coordinator advised members to use the car mount only when with a partner, thus assuring one member still had a camera when exiting the vehicle.

<sup>14</sup> The Reveal RS3 SX worked very well when in the car mount. A potential solution if this device were to be adopted would be to equip cars as well as members with cameras.

### 1.2.7. Activating the Axon Flex

The two-part Axon Flex device is activated by buttons located on the battery pack/controller. During controlled context testing two issues arose:

1. The coloured indicating lights for operating the camera were counter-intuitive: instead of “go,” a green light meant “buffering;” instead of “stand by” (or buffering), an amber light meant “disconnected wire;” instead of “problem,” flashing red meant “successful recording” and solid red indicated booting up. The various battery light options added to the confusion. The result was a frequent failure to record.<sup>15</sup>
2. The on-off button situated on the battery pack was a potential safety hazard. The battery was either located in a pocket or clipped to the front or back of the equipment belt. Hence, the member would have to look down, or remove the pack from pocket or belt to activate the camera or check if it was on. This could distract the member in threatening situation.

Extended use and practice might help overcome these problems, but they are significant safety considerations for members and citizens. Units with multiple, connected components, or that require multiple steps to activate, increase the potential for distraction. These issues are exacerbated in cold weather, when members must remove gloves or dig under uniform layers to operate cameras.

### 1.2.8. Activating the Reveal RS3 SX

The one-piece RS3 is easily turned on and off – a major strength. A large red sliding button located on the right side of the camera starts and stops the record function, and this can be activated while wearing winter gloves. Participants gave the camera an almost perfect score for ease of activation, with a mean of 5.58 out of six.

Two members mentioned that in temperatures below -30 Celsius for an extended period, they experienced the button becoming stiff and hard to activate, but that it still worked. Another finding was that left-handed members had more difficulty operating the button.

A beeping alert indicates that the camera is recording; this frees members from having to visually check. However, in a noise-sensitive situation (such as responding to a weapons call, potential suicide, or mental health situation) the sound can be a safety hazard. The latest firmware for the camera includes a “stealth mode” for quiet operating, but this must be pre-selected and can’t be turned on in the field.

Although the RS3 is easy to activate, members need familiarity and muscle memory to turn it on quickly in a sudden, dynamic situation. See Sections [1.2.10 \(battery life\)](#) and [1.5.2 \(deciding when to record\)](#) for more on this issue.

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<sup>15</sup> Interestingly, the confusion about operating lights was touched on in an episode of the Toronto-based, Global TV drama *Rookie Blue* (“Moving Day”, July 24, 2014). The episode featured the newer Axon Body Camera (with the battery pack part of the Flex adapted to include the actual camera component).

### 1.2.9. Battery life for the Axon Flex

Most pilot tests of BWV cameras to date note the lack of sufficient battery life for recording throughout the average 10- to 12-hour shift. The Axon Flex appears to be an exception. It showed excellent battery life in a laboratory setting, with approximately 12 hours on pre-record buffering and over four hours of continuous recording.

Likewise, no battery problems were encountered during controlled context training. However, we did not test it in extreme cold and to our knowledge it hasn't been tested anywhere in conditions below -10 Celsius.<sup>16</sup> The EPS pilot only tested the Flex on a handful of days, so battery life over time is unknown. The battery isn't replaceable, so long term performance would be an important cost factor.

### 1.2.10. Battery life for the RS3 SX

#### **Members' Feedback: Operational Use with the RS3 SX Battery**

*[excerpts from in-person interviews with all BWV participants]*

*Battery life is not adequate. Ninety minutes recording time is not enough for a busy day, where four serious calls would be expected.... We only had one spare charged to carry – so not necessarily enough.*

*It was adequate as I used it. If I'd used it as per policy for every interaction, it would have been completely inadequate. But mostly it is adequate when used with discretion.*

*The battery life was variable. Some days it is OK, but others it doesn't last long. At -20C or below it seemed to get about 30 minutes. It was only 20 minutes one day when it was -35C. And I was with a canine and the beeping set off the dog and the handler said "turn it off!"*

*At a priority event we do not have time to change the battery. The beeping on low battery is loud and distracting and could negatively influence a fragile, delicate situation.*

*Battery life was not sufficient...one example is when I was holding point on a gun call and was outside for over 90 minutes. Something could have happened at 91 minutes and there is no battery left. I did take a spare battery a couple of times, but it is not always possible to change in the middle of a call.*

The BWV Team concluded that RS3 battery life could not meet every day EPS policing needs for the following reasons:

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<sup>16</sup> The evaluation in Mesa Arizona noted some battery degradation in extreme heat (Rankin, 2013).



- The battery only gave around 90 minutes recording time in the best conditions, preventing use of the pre-recording function. (“Pre-recording” means the camera is on a continual “buffering mode” loop but not “saving” unless the “record” function is turned on.<sup>17</sup>)
- A busy shift with more than one major call can easily require four or more hours of actual recording. A simple traffic stop, including waiting for a tow truck, can last 40 to 60 minutes. Complex calls with multiple subjects and related issues can take several hours. Frequently during the pilot, members found they couldn’t rely on the camera to record throughout critical or complex situations.
- Members adjusted their camera use to manage limited battery life, making choices about which interactions to record during a shift (see quotes above). They rated battery life at a mean of 4.4 out of six, although they acknowledged that their discretionary use of the camera affected their rating of the battery. Our researchers’ reviews rated this 4.4 mean to be overly generous.
- Over 25% of pilot users complained about severely depleted battery life in cold weather, especially after repeated exposures.
- Over time, battery strength diminished in general. We replaced all the RS3 batteries after one year, and some several times during the 20 months of operational testing.
- The battery in the RS3 can be changed easily, but if members carried a spare battery with them in the field it added to their equipment load. (We provided them with spares which they could change in the field or return to docking bases to exchange.) Even if they had a spare, changing it in a volatile or sensitive situation was problematic, especially for the intervention patrol group. (Beat members were generally closer to base and could change batteries between calls or beat walks.)
- Members also commented that batteries tended to die when they were most needed during complex, lengthy calls. The battery would start to beep about 15 minutes before it died and continue more loudly and rapidly as it drained. This was distracting and potentially dangerous in a sensitive situation. Turning off the battery alert meant there would be no indication that recording was about to cease.
- An unacceptable problem arose with some batteries when they drained to low or empty; the date would reset to the factory default. Although members’ notes and upload time can support the actual time of an event, this failure could cause an incorrect metadata marking on the video, proving harmful to the evidentiary value of BWV footage.
- The RS3 requires a special reset key to change the camera date and other settings. The date resetting problem was so frequent that the team eventually gave keys to some of the sergeants to reset the dates. We thought the problem could have been automatically resolved had we been able to use the [Reveal DEMS software](#) for data management. However, the U.K. Isle of Wight pilot

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<sup>17</sup>“Pre-recording” would be helpful for sudden events and when a casual interaction becomes a police incident. However, this function can also capture inappropriate or irrelevant information on a recording that might be used in evidence (see [Legal and Social Considerations](#)).

(Ellis Jenkins & Smith, 2014), reported that only the most recent DEMS upgrade addresses the date resetting issues. The manual date reset also meant we had to reset when we transitioned between daylight and standard time. The manufacturer, Reveal Media, made recent upgrades to address this issue, but we found that the problem continues with the most recent version of the device supplied to us.

### 1.2.11. Device Durability: RS3 SX

The active nature of routine EPS duties, coupled with variable and harsh climate conditions, demands that all components of a BWV device be rugged, weather resistant and durable. Because we couldn't test the Axon Flex operationally, we weren't able to assess the durability of this model (see above, Section [1.2.1](#))

The RS3 SX operated satisfactorily in all weather conditions (excepting the battery issues)<sup>18</sup> but did not prove to be very durable for the reasons listed below. The U.K. Isle of Wight pilot (Ellis Jenkins & Smith, 2014) also reported some of these issues; Reveal Media has made improvements that seem to resolve some of the problems.

- **Plastic rims breaking** on the camera upload/charging sockets – resolved with new metal rims.
- **Fragile camera heads** that broke with the slightest knock – newer models have stronger camera “necks” but the EPS pilot ended before these could be adequately tested.
- **Weak catches** on the battery/SD card housing (only an issue if the protective case wasn't used) – the new catches are stronger but somewhat difficult to use.
- **Review button covers** falling off – no opportunity to evaluate improved version.

There were other issues – such as firmware failure, review screen failure and intermittent self-correcting audio failure – but these were infrequent.<sup>19</sup> Reveal Media replaced malfunctioning parts and units throughout the pilot.

Our experience shows that manufacturer warranty and replacement policies are an important purchasing consideration. Handling equipment failure, returns and replacements is an important resource issue.

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<sup>18</sup> Edmonton's climate is quite dry even during summer heat, so we weren't able to evaluate how the RS3 behaves in high humidity. Fogging sometimes occurred when moving from extreme cold into hot, humid indoor conditions (e.g. a dance bar), but it cleared quite rapidly.

<sup>19</sup> This audio issue was also encountered in Amherstburg, Ont., and reported to Reveal Media (see [Appendix A: Literature Review](#)). There is no explanation as yet. It is infrequent, but during the EPS pilot always seemed to pick important incidents!



### 1.2.12. Monitoring and Managing the Devices

To manage the 56 pilot cameras we needed several processes<sup>20</sup> to monitor daily considerations:

- **Monitoring assignments of cameras to members.** Monitoring transfers of members and their cameras in and out of BWV pilot units was challenging, requiring weekly checks on unit rosters. Personnel movement in a large agency would demand extra resources and a well-conceived and -managed system to monitor assignments of BWV equipment.<sup>21</sup>
- **Device malfunctions.** EPS has a Help Desk that assigns assistance requests to the appropriate personnel. The project team used the existing CCTV help system, routing assistance requests on a BWV malfunction to the project coordinator or a member of the Security Management Branch technical team. They would either fix a minor problem or replace a device (which also required updating the serial number on the device assignment record).
- **Device warranty returns.** Reveal Media extended the device warranties to cover the EPS pilot period of three years. The coordinator tracked cameras that were returned to the manufacturer (or the Canadian agent) for repair or replacement and ensured that replacements were received. This was time consuming to a surprising level. Length of warranty and a repair and replacement system must be a purchasing consideration for any agency adopting BWV.

### 1.3. Systematic and Secure Data Management

One of the goals of the pilot was to establish a data management system for BWV video. This system would need a secure process to upload and retrieve files automatically from cameras to network storage devices. This process would preserve evidentiary integrity, minimize the chance for human error and reduce the overall resources required.

The EPS data network had systems and procedures in place for storing and retrieving CCTV footage from EPS facilities, and from video taken by police helicopters. The goal was to establish a similar system for managing BWV cameras and the data they produce.

The technical security team from Security Management Branch (SMB) invested a great deal of time and technical expertise to evaluate available software and address safety, security, and resource requirements.

At project start-up, we reviewed other BWV pilots and ongoing operations. These relied on manual upload and retrieval of video data from locally situated personal computers.<sup>22</sup>

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<sup>20</sup> See [Appendix E: Technical Review](#) for details.

<sup>21</sup> Some jurisdictions use a “pooling” system for sharing cameras among members. Hampshire Constabulary is evaluating a system for individual assignments on the Isle of Wight while using a pooling approach on the mainland. Insp. Goodier reported at the CPS BWV Symposium that pooling led to worse care of the cameras. We believe that pooling would make it more difficult to track down broken or missing cameras and missing data management information.

<sup>22</sup> [Appendix A: Literature Review](#) details these pilots and data management approaches.

### **Key Findings and Conclusions: Data Management**

- 1. The data management software available at project start could not meet EPS requirements for securely and efficiently managing video.**
- 2. A reliable, secure, robust and automated data management system is critical to successful BWV deployment.** Such a system requires local (versus centralized) design, scalable storage space, back-up and recovery resources, and ongoing technical support.
- 3. Deploying BWV will require a major investment of time, technical know-how and staff resources** to manage data storage, access and retrieval. This will incur on-going capital and operational costs.
- 4. Storing police video data on the Cloud (managed by a third party) presents security, technical and legal concerns.** Lack of a local data management option prevented field testing of the Axon Flex camera, one of the two highest rated devices.
- 5. The BWV pilot team developed an in-house data management system.** Using Automation Anywhere software within the Windows operating system, the team was able to test the Reveal RS3, the remaining top-rated camera.

#### **1.3.1. Data Management Software**

In Canada, the system for managing BWV data must be secure and preserve the evidentiary trail to provide investigative and prosecutorial value. Data management software is continuously evolving; here are the products we assessed at project outset:

- **Taser Axon Flex: Evidence.com Data Management Software** – this product manages data in a U.S.-based Cloud storage and retrieval system.<sup>23</sup> The Flex camera settings, meta-data time stamps and other features link with the Evidence.com system. For the EPS though, Cloud storage of police information presents security, technical and legal concerns (details in [Appendix E](#)). Along with the [safety concerns](#) detailed in [Section 1.2.1.](#), our inability to find a local data management option for the Flex prevented field testing of this device.

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<sup>23</sup> Taser did offer a downloadable, stand-alone version of the software but it wasn't able to meet EPS function and security requirements.

- **Reveal RS3 SX: DEMS 2 Data Management Software** – this software is designed for stand-alone and network use. When we lab-tested it, the software delivered some, but not all, of EPS’ data management requirements (see [Appendix E](#) for more details); upload time was also very slow. For these reasons, we rejected the software for field testing during the pilot. Reveal Media indicated that DEMS 3 has resolved these issues, but project timelines precluded assessing this version.
- **Panasonic Arbitrator Software** – we tested this new software as a possible resolution to the network problems posed by the Reveal software. Arbitrator offered many potential benefits but had similar problems to the Reveal software with upload and playback delays. As a result, we didn’t use this product for the project.

### An in-house solution

To get the pilot operational within project timelines, the SMB technical team developed an in-house, script-based automated process for uploading, storing, viewing and retrieving BWV data files. The EPS solution used Automation Anywhere software, with Microsoft Windows and Storage Area Network devices (see Appendix E, [Technical Review](#) for details). Although an improvement on BWV manufacturers’ software, it was still subject to malfunction and didn’t have the ability to label or manage data once uploaded.

#### 1.3.2. Data Storage Considerations

Storage space is another important consideration for BWV technology. Video files are large and becoming rapidly more prevalent as digital video technology advances. This is generating unprecedented data storage issues for police agencies across Canada and internationally.

The team knew the volume of data generated by the 56 pilot cameras would need dedicated local storage. So we arranged to upload and store video files on a site-specific basis (local network segment), due to bandwidth and resilience issues. Individual video files could be viewed or retrieved centrally as needed, because this used less bandwidth. To support the pilot, EPS invested significant dollars and technical resources to acquire, configure, install and support six Storage Area Network devices.

Between October 12, 2012, and July 2, 2014, BWV video files took up 2.5 terabytes of storage space; with a total of 8077 video clips (many incidents used multiple clips). One RS3 video clip runs for about 15 minutes and then starts a new clip.<sup>24</sup> [Table 2](#) shows the breakdown of storage and usage across pilot sites.<sup>25</sup>

Decisions about storage also depend on retention and retrieval requirements. In Alberta (and generally across Canada) provincial requirements are moving to a one-year mandatory retention period. When

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<sup>24</sup> In our [video quality](#) rating we noted that the Axon Flex video clips ran for closer to 20 minutes before commencing a new clip.

<sup>25</sup> See [Section 1.5.1](#) for data on participants’ recording of police interactions. This differs from total recording storage, which includes all test and demonstration clips.

video is part of evidence there can be a variety of retention requirements, depending on the type of charge. All pilot video was retained accordingly.

**Table 2: Video Storage**

PILOT UNITS	USER#	MONTHS USED#	STORAGE USED (GB)	FILE#
Downtown patrol/beat	26	17	1360	3291
Impaired driving CU	3	19	154	1337
Whyte beats	20	16	829	2944
WEM beats	6	10	156	505
<b>TOTALS</b>	<b>55</b>		<b>2499</b>	<b>8077</b>

**1.3.3. Access and Transfer**

During the pilot, copies of video files needed for evidence or other legal purposes were burned to DVD, following established EPS procedure for CCTV footage. This required processes, technology and resources (technical staff), an important consideration representing additional on-going capital and operational costs.

**1.4. BWV Audio-Video Quality**

**Key Findings and Conclusions: Audio-Video Quality**

1. **Perceptions about audio-video quality are highly subjective** because of individual differences in sight, hearing, prior expectations and knowledge. This contrasts with widely held assumptions that video footage is “factual” and indisputable. It is an important consideration in assessing the potential evidentiary value of BWV.
2. **Criteria-based evaluations of EPS pilot video found the majority of footage to be usable**, with potential evidentiary value. Overall quality varied and was rated somewhere between “fair” and “good.”
3. **Recording context (conditions such as lighting and noise) will always affect the potential evidentiary value** of BWV footage and the value of technology in general.
4. **Members need a dedicated viewing area**, with quality equipment and adjustable lighting, if they are to use BWV for reporting and to contribute evidence.

- One of the widely promoted promises about BWV is that the technology will provide a clear, indisputable account of an event. It is true that BWV devices can provide high definition recording with high quality footage. Most manufacturers feature impressive examples on their websites.
- But - technical and film experts, and crown prosecutors, challenge these claims. There are several factors at play: how far the camera can see vertically and horizontally; how fast it is filming (frames per second); and variable lighting and sound conditions that must inevitably affect the quality of video. A BWV recording captures only what the camera can see and hear. This may not be the same as what the wearer sees and hears.
- Research refutes the assumption that viewers of a video clip see and hear the same things (Harris, 2010, pp. 15-17).<sup>26</sup> The project team encountered this very issue when analyzing the interviews with pilot participants. Also, the project team members faced their own struggles to evaluate objectively the video clips gathered during the project.

#### 1.4.1. BWV Quality: Pilot Users Perceptions

##### **Members' Feedback: Audio-Video Quality**

[excerpts from in-person interviews with all BWV participants]

*No complaints about the quality of the video especially when I had time to aim the camera. It had the image I wanted and really good sound.*

*On the Avenue there is enough light at night and the BWV performs well. In darker street settings I sometimes have used the flashlight, which works well. In a dark night club there is not enough light, but that's just what it is.*

*Orange street fluorescent is particularly bad for video clarity. Audio is terrible. I thought the audio was the worst feature. I heard myself perfectly but not anyone else. Very difficult when there was a background noise.*

*There is no light inside the wagon and the street light doesn't get in. Once the person is in the wagon they disappear from the video. But we do have the audio and short of a light on the camera, it's not going to be perfect.*

*You can't hear with a lot of ambient noise, like at the Greyhound station, when a person is mumbling.*

*Lot better now we have new computers with better speakers.... The cheap ear buds suck. They cause an echo. But now I make sure to get one of the new computers in the reporting room and the sound on those is much better.*

<sup>26</sup> The concept of "film grammar" (<http://visual-memory.co.uk/daniel/Documents/short/gramtv.html>) proposes that average viewers are socially trained to expect to see certain things when they watch film or video and are not able to properly "see" and process raw video.

The quotes above show the pilot participants held differing opinions about the audio-video quality of the BWV footage they collected.

In addition to the interview feedback, the participants sometimes brought specific video clips to the attention of the project coordinator, usually because they felt the quality of the clip rendered it useless.

The coordinator might agree that the recording was poor in quality but seldom that it was useless. Two main factors led to the differing perceptions between the coordinator and the participating members on this issue:

- **The quality of the viewing equipment and environment.** Sometimes members only reviewed the clips on the camera itself. Neither the small camera screen nor its audio playback was of good enough quality for clear perception.<sup>27</sup> The quality of uploaded video when viewed on a desk top computer was much better. Even then, the built-in speakers on desk top computers are poor, and reporting rooms tend to be noisy and brightly lit – not ideal video viewing conditions.

Pilot participants were provided with personal ear buds for listening to videos, but few used them.<sup>28</sup> With quality ear-buds and adjusted room lighting, the project coordinator could usually discern more audio and visual details, even on low-light videos. Viewing equipment and conditions are important for EPS members, and [crown prosecutors and the courts](#).

- **Expectations and understanding of BWV video capabilities.** Interview feedback showed that perceptions about BWV audio-visual quality were related to a general understanding of video capabilities. Members with some understanding of how different lighting and sound conditions can affect video technology tended to be kinder in their opinions of the footage collected. Others participants had expected the footage to live up to promotional claims.

### 1.4.2. Video Analysis Ratings

The project team developed 18 criteria (see below, [Table 3](#)) to assess the quality of a representative sample of video collected during the pilot. Two researchers (a first and second “rater”) agreed on definitions for each criterion and applied them to a set of test clips before starting the actual ratings.<sup>29</sup>

We were thorough in developing and testing criterion definitions, using similar desktop computers and identical ear-buds within the same office. We kept the lighting constant, not turning it down for low-light clips. Even so, we found small differences in quality depending on the computer. Furthermore, we identified differences in hearing ability between the two researchers.

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<sup>27</sup> On the earliest version of the RS3 the audio playback was almost useless. The quality improved on the subsequent two versions, but the device didn't have a headphone connection so was still very limited. Playback for the Axon Flex was through an MP3 player or smart phone, which had clearer sound and also allowed headphones to be connected.

<sup>28</sup> This was mainly because participants had no spare place to carry the ear buds and nowhere in the reporting room to store them. Second, participants said the ear buds were inexpensive and lacked good sound quality. Also, most reporting areas did not allow for reduced lighting, which improves viewing for low-light recordings.

<sup>29</sup> The first rating was done by an EPS volunteer who was also a sociology graduate student at the University of Alberta. The project coordinator did the second rating on 20% of the first-rated sample. The criteria definitions and details of sample selection are available on request.

**Table 3: Video Quality Mean Scores**

VIDEO RATING CRITERIA	MEAN RATING (Total 5: 1. Unusable; 2. Poor; 3. Fair; 4. Good; 5. Excellent)	
	RS3 SX <sup>30</sup> N = 107	FLEX <sup>31</sup> N = 39
Field of view - horizontal	3.17	3.81
Field of view - vertical	3.08	3.76
Clarity of image daylight good light	4.25	N/A
Clarity of image daylight poor light	3.45	N/A
Clarity of image night time good light	3.71	N/A
Clarity of image night time poor light	2.38	N/A
Clarity of image indoors good light	N/A	3.62
Clarity of image indoors poor light	N/A	2.75
Clarity of image outdoors good light	N/A	3.58
Colour definition/accuracy	3.26	3.48
Focus on distant subject/object	3.22	3.62
Focus on close subject/object	3.70	3.64
Stability during movement	3.60	4.08
Clarity of sound quiet setting	4.60	3.72
Clarity of sound noisy setting	3.76	3.25
Clarity of sound close up	4.65	3.96
Clarity of sound at a distance	3.54	2.95
Ability to distinguish multiple speakers/other noises	4.33	3.83
Ability to determine date and time	3.86	N/A
Ability to determine overall context of incident	3.85	N/A
Use of force incident	3.20	3.40
<b>Overall Score (mean of the means)</b>	<b>3.64</b>	<b>3.56</b>

<sup>30</sup> The researchers selected two clips for every pilot participant: the 10<sup>th</sup> from the start of the file and the 10<sup>th</sup> from the end. If there were fewer than 25 clips, a researcher would review the file and select two clips to best represent the content.

<sup>31</sup> Because we only tested the Axon Flex in controlled scenarios the conditions were less variable, there was no night time footage, and we had to adjust the lighting criteria accordingly. We selected every fifth clip for rating, and we didn't rate the scenario contexts because they were limited and repetitive.



The two researchers followed standard protocols for agreeing on ratings within an established range of acceptable difference.<sup>32</sup> Even with the best controls and standardization, the rating exercise emphasized how subjective the viewing of video can be. This is an important finding and a significant consideration for evaluating the evidentiary potential of BWV footage.

[Table 3](#) shows that we rated the video clips from the Axon Flex and RS3 as very close in overall quality. The mean rating fell between “fair” and “good,” although each device had different strengths and weaknesses.

### **Ability to capture context**

One of the potential concerns about the evidentiary value of BWV footage is how well it can capture the context of a situation.

- The video raters asked a crucial question: “Could an average observer with no prior knowledge of the incident and little knowledge of policing practices understand what is happening and why?”
- A key factor was whether the EPS member making the recording voiced an explanation of what was happening during live action. The RS3 clips rated a mean of 3.85 out of six (just short of “good”) on this factor, suggesting room for improvement.
- The ability to determine date and time was another factor. As long as the date and time on the RS3 camera were correct, this was clear. But if the date and time were incorrect (see [Section 1.2.10](#), battery life), the footage would be unusable for evidence unless the member had voiced the date and time during the recording. (We didn’t rate the Axon Flex on date and time because we only tested it in pre-determined, controlled scenarios and the footage, viewed with Windows Media, had no date and time marker.)

### **Field of view and focus**

The field-of-view ratings considered how well the camera captured the horizontal and vertical space around the action. The focus ratings assessed how well the member using the camera captured the details relevant to the incident. We also rated stability as one of the five criteria for focus.

The Axon Flex (head-mounted) outscored the RS3 on all field-of-view and focus criteria, with an overall mean of 3.78. This suggests some possible focus advantages to the head-mounted camera, especially for stability, but we weren’t able to field test the Axon Flex in everyday operation. Further, it didn’t score as well as the RS3 in hands-on, [use of force](#) situations. Also, the 3.78 score only applied when the camera remained connected to the battery pack and was able to record (see [Section 1.2.1](#)).

The overall mean for the RS3 was 3.35. The footage was “fair” for visual quality but far from excellent. The following factors detracted from the RS3’s recording quality:

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<sup>32</sup> The first rater’s assessment was accepted within a variation of one on a criterion. Anything more was reviewed by both raters, who then agreed on a score. After the initial few clips the two raters usually had acceptable agreement in their ratings.



- **The movable camera head (body-mounted)** could be knocked out of ideal position by normal movement, contact with the uniform and other equipment, or contact with another person in crowded conditions.
- **Limitations of the vertical field of view**, which were affected by the height of the subject of focus, especially when in close proximity.
- **The position of the member relative to the subject of focus.** The tactic of “blading” (standing side-on to a subject) meant the body-mounted camera was often pointing away from the subject.<sup>33</sup>
- **Poor stability during movement.** If a member was running or just walking briskly the camera jogged around. Given that this was a major complaint raised by the pilot participants, the researcher rating of 3.6 is surprisingly positive for discernible content during movement.
- **Many low-light recordings.** Most of the recordings were at night, when more incidents tend to occur, especially for the beats in the entertainment districts. But the RS3’s “fair” rating suggests that it consistently produced usable images during low light conditions.

### Clarity of image and lighting conditions

The overall mean scores for the clarity criteria were close: Axon Flex – 3.35; RS3 – 3.41. But the conditions weren’t comparable because we only field tested the RS3, rating it on a much wider range of lighting conditions than the Flex. As expected, poor lighting resulted in the lowest ratings for both the RS3 and the Flex. The Flex wasn’t tested at night or in poor outdoor daytime lighting.

### Clarity of sound

The RS3 earned an overall mean score of 4.17 on the five sound criteria, suggesting very good evidentiary potential on audio quality.

Understandably, distance or a noisy setting reduced audio clarity. The problem most frequently raised by pilot participants was hearing conversation recorded in a noisy context; 87% of them had recorded in a high noise area.

As previously noted, the researchers contend this problem mostly derived from the low quality ear buds or computer speakers the participants were using for review. However, improved listening equipment couldn’t compensate for recordings made in environments such as a bar with loud music.

The Axon Flex overall mean score on sound was 3.54. Acoustics in the test settings were varied but not fully representative of operational sound contexts.

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<sup>33</sup> This may be somewhat reduced with a head-mounted device if the user turns the head to look at a subject, but even here blading can still have the effect of pointing the camera away from a subject.

## **Use of force incidents: hands on**

Previous research has focused on the perceived value of BWV in reducing use of force. There are also claims that BWV helps in resolving use of force complaints (Rankin, 2013) (see [Section 1.7](#)). However, there is little existing research on the value of BWV in recording use of force incidents, especially those that are hands on.

When interviewed, pilot participants tended to offer the opinion that BWV footage was useless (or at least of limited value) if captured during a hands on, use of force situation. This was because the RS3 camera head invariably got knocked out of position or covered by clothing. As well, at close proximity the field of view was limited and the focus scattered because of dynamic movement.

In controlled testing of the Axon Flex, the same problems occurred, and the head-mounted camera frequently became dislodged and stopped recording altogether.

When the researchers rated use of force footage they confirmed the above concerns, but they still rated both the Flex and the RS3 better than “fair,” with the RS3 approaching a “good” score. The researchers used the following factors:

- ability to see and hear the interaction leading to the use of force (provided the camera was activated in time)
- ability to hear throughout the interaction (even if the visuals weren’t clear the audio could provide important information)
- ability to see and hear what happened once the situation was under control (especially for evidence that the member checked on the welfare of subjects, recorded any injuries, provided medical attention if needed, and read the subject his or her rights).

As discussed in [Section 1.7.3](#), representatives from Professional Standards Branch (PSB) agreed with the researchers’ conclusions.

## **Use of force incidents: gun or conducted energy weapon (CEW)**

No operational use of a gun was captured on BWV during the pilot. Some members filmed themselves at the firearms range with varying results, depending on how the RS3 was mounted and the height of the member. Controlled testing of the RS3 included some active shooter scenarios with variable video results. In general, we concluded that raising a gun tends to alter or obscure the field of view of the body-mounted RS3.

If the RS3 camera was mounted on the radio strap opposite the radio, it also interfered with raising and aiming a carbine. In this event, users either removed the camera or flipped it back over their shoulder. Either way, the camera can’t record the use of this gun.

Controlled testing of the Axon Flex included some scenarios where a gun was drawn and a “quarry” had a gun or other weapon. In these situations the head-mounted device was superior for visual capture of the context.

Some RS3 pilot participants captured use of a CEW, with one incident commended by supervisors as a positive example for training. However, the value here lay mostly in the capture of the entire incident from start to finish. This incident also involved hands-on use of force and at that point the issues and benefits noted previously also applied.

## 1.5. Using BWV: EPS Pilot Members' Experiences

### Key Findings and Conclusions: Members' Experiences

1. **The amount of BWV use varied by unit and individual.** Some of this depended on type of duty, and some was due to individual perceptions of the purpose and value of BWV technology.
2. **Deciding when to record is complex; no simple rule applies for all scenarios.** The decision can be affected by technical issues, priorities during sudden dynamic events, concern for the protection of sources, and dealing with sensitive situations.
3. **BWV will result in a notable increase on police work time.** The added time members spent reviewing video was somewhat offset by information gained and higher quality reports.
  - Pilot participants were selective about how often they reviewed video for reporting purposes, partly because footage often wasn't available on a same-day basis.
  - Work time would likely increase if video review became a daily part of the reporting routine.
4. **Using BWV effectively for reporting will require:** a review of current reporting practices; policy on how BWV should be incorporated into reporting; and a dedicated BWV reviewing area with controlled lighting and quality audio visual equipment.
5. **Participant perceptions of BWV impact on work approach** were as likely to be negative as positive.
  - Increased "professionalism" may be offset by hesitation and fear of judgement.
  - Members may be more careful and patient, but also more "robotic" and less effective in creating rapport.
  - Non-users and other first responders were at times hesitant to support BWV users, but at other times welcomed the presence of BWV.
6. **For BWV to succeed, the impact on frontline policing must be thoroughly understood and clearly addressed.**

Every member in the BWV pilot group participated in exit interviews designed to systematically capture their experiences with BWV. The interview methodology addressed the technical and process factors in using the cameras. It also covered the operational environment, the participants’ observations on the outcomes and impacts of BWV, and it drew out their overall opinions.<sup>34</sup> The data from these interviews inform the findings throughout this report.

These confidential, one-on-one interviews allowed the project team to collect much more nuanced data than possible through a short survey using closed-end questions. The interviews provided information about:

- the issues that influenced members’ decisions on when to record;
- reviewing and reporting with BWV;
- impact on members’ work time and tasks;
- impact on policing approach, including interactions with other incident responders.

### 1.5.1. Amount of BWV Use

[Table 2](#) (Section 1.3.2) shows the amount of storage used for BWV footage over the pilot period. Total files in this table include test and demonstration footage. [Table 4](#) shows the number of clips for each pilot group after we deducted obvious non-operational clips.

**Table 4: BWV Use by Pilot Participants**

PILOT UNITS	Months of BWV use #	Users #	Total Operational Clips #	Median Clips per user each month #
Downtown Patrol	17	19	2377	6.53
Downtown Beat	17	7	482	3.29
Whyte Beat 1	16	9	1142	7.31
Whyte Beat 2	16	11	1477	5.88
WEM Beat 1	10	3	185	6.20
WEM Beat 2	10	3	286	7.60
IDCU	19	3	1020	20.58
<b>TOTAL</b>		55	6969	N/A

As Table 4 shows, BWV use varied considerably by unit. We used the median average (rather than the mean) to partially offset the extreme differences in individual use within a pilot unit.<sup>35</sup>

<sup>34</sup> The interview schedule is available upon request.

<sup>35</sup> These differences are known statistically as “standard deviation.” For example, in one unit the lowest usage was 13 clips, while the highest was 481.

But these individual differences still distort the apparent monthly average, resulting in numbers that aren't representative of consistent BWV use. Such use produces an average range of 20 to 30 clips per user per month. Despite having the fewest actual operational days, the IDCU reflects this usage rate because its members always used their cameras during Checkstop operations.

The following sections ([1.5.2](#) and [1.5.3](#); Deciding When to Record; Sources and Informants) provide some insight into why the downtown beat has the lowest mean use. There are other operational factors that affected usage for all units and disproportionately for the downtown beat:

- special operations where some or all unit members were off the street for periods of time, or were in plain clothes
- a member was seconded to another unit not participating in the BWV pilot
- a member was absent for an extended vacation, illness or training
- some units had personnel changes that inflated the total number of participants but led to diminished total footage for some members.

While these factors had their affect, the interview data suggest that individual comfort with BWV and belief in its potential value were the greatest influence on use.

### **Members' Feedback: Using BWV**

[excerpts from in-person interviews with all BWV participants]

*I wasn't fond of the idea to start with. I think it impedes the way I police...going to calls and having the camera on you, I think it impedes...I can't think of anything that would change my view... I think there will be a lot of opposition to wearing a camera as part of daily patrol activities.*

*I would forget to take it out; I would forget to turn it on. I used it when I had it and I remembered to. I tended to forget when under stress. BWV is the last thing thought of when it might have been of the most value.*

*Before I had it I was very apprehensive and nervous that it might be used against me. Now, at the end, I've seen more good out of it. ... It's another tool we can use. Especially down the road because of the information captured, it is a positive.*

*What to record or not record? I pride myself on being quick to learn through muscle memory for other actions, but it just wasn't there for the BWV. The focus is on what is happening and not on the camera.*

*I don't have a problem with the BWV now. Initially I was scared and had a lot of questions. Once I knew I controlled the operation and understood the procedures and processes, I was fine with it. BWV is probably part of the new age of policing and we [EPS] probably need to keep up.*

## 1.5.2. Deciding When to Record

The question of when officers should – or should not – record is both fundamental and complex. Public opinion on oversight of policing often holds that BWV cameras should remain activated throughout an entire duty period. This is untenable for multiple reasons:

- currently available battery technology cannot support 10 to 12 hours of continuous recording
- the amount of data captured would be vast and mostly of no use
- there would be constant privacy and security violations affecting both the police and citizens captured on BWV.

Consequently, police who use BWV are generally provided with policy and procedures on when and when not to record. Those developed for the EPS pilot are included in [Appendix G](#) and discussed in [Section 4](#).

The pilot group used the RS3 camera in the field. It was easy to turn on to recording mode, but deciding when it was appropriate to do so – and then remembering to do it – was much more difficult. Issues about recording decisions were raised by 71% of the pilot participants.

### **Members' Feedback: Issues in Deciding When to Record**

[excerpts from in-person interviews with all BWV participants]

*It's technically easy, but it's always the situations where you want it most – the big call – that you forget to activate it... When you're planning your tactics, you're not thinking about turning on the BWV. In the same situations is when we might forget to hit our arrive button and dispatch have us in transit for two hours – there's too much in our heads.*

*I made decisions based on whether it would help me later. I didn't record ordinary day-to-day interactions.*

*On the street, when something happens in front of us, BWV is not the first thought. The SOPs were changed to give more discretion as to when to activate. But what is 'discretion'? To you, to me, to others?*

*If the BWV is not on because it is a calm situation and things suddenly go sideways, you can't put it on then. If I'm thinking about turning it on late, I'm focusing on that rather than the call itself.*

*It was easy because I only used it if I felt the situation might be a problem, or for traffic stops.*

The EPS pilot operating procedures set comprehensive guidelines for dealing with sensitive situations and when and when not to record. Nonetheless, members were faced with many difficult situations. They raised a number of considerations during the interviews that illustrate why discretion will always be necessary on situational basis.

- **Sudden dynamic events.** If members got involved in a tense interaction, such as intervening in a fight, they always believed their first priority was to control the situation safely; turning on their camera was secondary. They faced the dilemma between having to explain why they didn't turn their camera on at all, or having to explain why they turned it on late and captured only part of an event.

Pilot participants agreed that it was easy to start recording with the RS3 camera, but in volatile situations it was still one more action to consider during fast-breaking events. The project coordinator observed one such incident during a pre-pilot walk-along in the downtown area. A member was forced to quickly grab the arm of a man who was readying to throw a punch at another man. The member had restrained the subject by the time her partner took three strides to assist her. The subject did not resist and thanks to her quick reaction, the member prevented an assault. The coordinator noted that “had the member even thought for a second about turning on a camera the punch would have been thrown.”

The decision about if and when to activate the camera – turning it on too late or not at all – was a major concern for pilot participants. Repetitive, long term use of BWV would alleviate this concern somewhat; future technical improvements to support pre-recording or allow voice commands would also help. But to some extent these situations will likely remain operational conundrums that must be clearly addressed and supported by [policy, procedures](#) and [training](#).

- **Sudden death calls.** A sudden death can be a suspicious death, so capturing the scene at arrival could be of significant value. But members were divided on the appropriateness of this. While some always activated their camera, others believed it to be insensitive and were concerned about the footage being disclosed and seen by relatives.
- **Nudity.** Similarly, some members were torn between the protective value of BWV footage when confronted with a distressed, naked subject and the potential embarrassment to that person later if the footage were disclosed and played in court.
- **Potential suicides.** When responding to a potential suicide call the members' goal is to bring the distressed person to safety. Video footage of that effort can potentially have considerable evidentiary and training value. However, members must judge if the flashing camera light (or possible low battery beeping) might further upset the individual. There is also the question of notification of recording in any mental health situation. Procedural guidelines suggest members notify subjects of recording “when it is safe to do so,” and the project team considered this guideline sufficient for these situations. Members need clarity and assurance to use BWV confidently in any situation.
- **Discussions of tactics.** Tactical discussions between a supervisor and constable, especially those of a mentoring nature, are best done off camera. All the participating supervisors said they didn't consider it appropriate to keep cameras running during these situations.
- **Late to scene.** Sometimes a pilot participant, especially a supervisor, would be second or third responder at an incident. Supervisors noted that this allowed them time to reflect on the incident



and decide on the appropriateness of recording. As one supervisor pointed out, there are many questions to consider: “If members already there are not recording, should I? If they are recording and then I do too, do I have to repeat notifying? Is another recording needed? But I feel I have the hang of it for myself.”

### **Members’ Feedback: The Challenge of the Community Beat**

[excerpts from in-person interviews with all BWV participants]

*Even on the first day when the BWV Coordinator was along, I felt it wasn’t appropriate to record all interactions. The challenge was in deciding whether to turn it on or not. The quantity of interactions on the beat is a barrier to knowing.*

*Definitely were moments when I pre-determined not to use it. Sometimes there are conversations that I don’t want to record like casual conversations with regular people.*

*We have a beat member rapport with street involved people. So we may interact in a culturally appropriate way. Language is a big concern. An interaction viewed as an isolated event could be misinterpreted without the wider, ongoing context.*

As the featured quotes illustrate, decisions about recording were especially difficult for pilot participants in a community beat role.<sup>36</sup> The effect of BWV on citizens is addressed in [Section 2](#).

#### **1.5.3. Sources and Informants**

Members raised concerns about protecting sources and informants from the outset of the pilot. The project coordinator was on a preliminary walk along when a subject suddenly blurted out drug-related information. The member asked the coordinator, “What would I do now if I had been using BWV?”

This concern was reiterated many times during the pilot period and severely restricted camera use by the downtown community beat. Careful thought must be given to whether BWV is appropriate for all frontline policing activities.

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<sup>36</sup> We deliberately included a traditional inner city community beat in the pilot. Duties for all pilot beats, and to some extent the downtown patrol as well, included activities intended to create community connections, elicit information and develop sources.



### **Members' Feedback: Protecting Sources and Informants**

[excerpts from in-person interviews with all BWV participants]

*The BWV creates a barrier to cultivating sources. Sometimes my partner doesn't even know who my sources are. We don't include identifying information in our notes. I had an incident where a source went and called out – acknowledged me by name and I had the camera on – now I can't afford to use that clip for fear my informant is disclosed.*

*If BWV is mentioned or brought up it spooks them (but even writing notes can do that). EPS policy is one thing, but protecting sources is spelled out in the Criminal Code and the Canadian Evidence Act... I can't afford to have video that can be disclosed (which could happen if it exists).*

*BWV is very difficult for Beats because of source management. It was a headache because it could so easily identify a source. There are a limited number of people with a high frequency of interactions. They are reluctant to talk if there is a camera present. Some wouldn't believe that it was off when we told them that. These sources are very unpredictable. We can't tell when they are going to be willing to give information. They will do so suddenly and if it is caught on BWV we can't use the footage for fear of disclosure.*

#### **1.5.4. Reviewing and Reporting with BWV**

Previous BWV pilot studies from the U.K. and Victoria, B.C., claim that BWV had a positive effect on reporting by providing better evidence (Lauer et al, 2010; Process Evolution Ltd, 2007). They claim it even increased efficiency by reducing time spent on paperwork (Process Evolution Ltd, 2007). The data supporting these findings are not robust. The EPS pilot had mixed findings about the use of BWV for reporting purposes.

During the interviews, participants were asked to rate how they found uploading, reviewing, reporting and requesting copies when using BWV footage (1 meant "very difficult"; 6 meant "very easy"). They rated the technical task of uploading "easy" (mean score 5.33).<sup>37</sup> They gave reviewing of uploaded clips a score of 4.76; the ease with they could enter "use of BWV" scored 5.24; and requesting copies rated 4.74 – all reasonably good scores.

There were problems trying to determine how often BWV footage could stand as potential evidence for a charge. The project team was unable to track this using current EPS statistics for the following reasons:

- There was no automatic counting system to sort BWV footage from any other video type shown in the assigned field on electronically filed incident reports.

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<sup>37</sup> Members based at EPS Headquarters handed in their cameras, along with their radios, to the Vehicle Control Office. Most elected not to answer this question because it wasn't applicable; they didn't do the upload and the video was "just there" next shift. Pilot participants at other locations were responsible for plugging their own device into the system. See further details in the [Technical Review](#).

- The member filing the report was not necessarily the member with the potential BWV evidence.
- Ticketed violations (traffic and public disorder) didn't have a space to indicate video evidence. We instructed members to write the clip number on the back of the filed copy so the existence of footage would be disclosed, but there was no tracking method and tickets probably accounted for most charges that could use BWV evidence (see also [Section 3](#)).
- For the above reasons it was impossible for members to estimate how many of their incident reports potentially included BWV evidence.

Members were better able to estimate how often they reviewed BWV footage for reporting purposes (all incidents including tickets). However the degree of variation reported was extreme: 15% said they never reviewed footage when making out a report, while the same percentage said they reviewed their footage 95-to-100% of the time. The majority (56%) used the footage for reporting 20% of the time or less, and just 28% looked at it more than half the time.

The quotes below illustrate some of the reasons influencing member decisions to review BWV footage. [Table 5](#) provides further data quantified from explanations given by members during their interviews.

### **Members' Feedback: Using BWV for Reporting**

[excerpts from in-person interviews with all BWV participants]

*I didn't use the BWV for report purposes. I believe it should be by my notes, which are true to what I observed at the time. Footage may not be the same. It should not be the other way around (what the video says rather than what I perceived). There is stuff going on around us that members are not aware of at the time. I just reviewed it for the quality of the video.*

*I don't review too much right away as the report is usually done before the video is uploaded. I have occasionally reviewed on the device. So, if it's 1-2 days later, I might review it and note as part of the file. ...Couple of times I did review when making the report was when the incident went very quickly and I didn't get all the information at the time. Also for getting the times when things happened.*

*Reviewing was done entirely after upload. It was always on the computer by the next shift when it was wanted.*

*With priority calls and the same day reporting requirement, reviewing the next day is just not feasible. The video might contradict what you thought and had put in the initial report.*

*I review the video 100% of the time when I have it for a report. It is good for relating the incident and the charges – mine and other members.*

*At first I didn't review at all. But after seeing the other members do reviews, I will if I feel it is useful for detail for an interview or arrest report.*

**Table 5: BWV Reviewing and Reporting  
(Reasons volunteered for reviewing footage or not)**

Viewing (or non-viewing) Reason (members may have provided multiple reasons)	Percentage of Members (N= 55)
Like the BWV for reporting	11
Review for details and accuracy	56
Review to further investigations	11
Review for self-learning	24
Immediate upload needed for reporting	26
On-camera reviewing no good	16
BWV File label confusing/unclear	6
Rely on my notes for reporting	20
Unnecessary to review for most incidents	33

We expected that the viewer screen on the front of the RS3 camera would help the participants with review and reporting. But they found the screen images too small to see the detail they needed when reviewing. Also, the playback sound quality on the camera was poor and there was no headphone jack to improve this.<sup>38</sup>

The project findings on the use of BWV to inform reports shed light on this technology’s potential as a tool for improving report content and evidentiary value. At a minimum, using BWV for this purpose will represent a shift in reporting expectations and adjustments to current processes. Members will also have to be re-trained to help them best understand how to use BWV in support of their notes. At present, however, there is uncertainty about how BWV evidence will be viewed by the courts. Among agencies in Canada currently piloting or considering BWV, there is no agreement on when BWV footage should be viewed during the reporting process.<sup>39</sup>

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<sup>38</sup> Sound on the earliest RS3s models we used was very poor. It improved somewhat with the later models and did make a difference in user experience. The discovery that neither of the side sockets on the device was a headphone jack appeared to be a surprise to the manufacturer’s representative as well as to the project team.

<sup>39</sup> EPS and CPS pilot procedures allowed members to review video when making an initial report. Personal communication with the project coordinator have indicated that some agencies are inclined to only allow video review after initial notes are completed (for example, Internal Report, Hamilton Police Service, 2014, p.50).

### 1.5.5. Impact on Work Time and Tasks

The [Plymouth, U.K., pilot](#) (Process Evolution Ltd, 2007) found that BWV reduced paperwork; this led to promotional claims that BWV increases officer efficiency and allows more time on the street. The Phoenix, Ariz., pilot also compared work time for BWV users versus non users. Both studies used data produced by self-reporting.

The project team had concerns about how to measure accurately whether BWV indeed reduced work time. The nature of beat and patrol work – multi-tasking, interrupted reporting time, unpredictable daily changes to routine – makes it difficult to measure time on each shift explicitly devoted to reporting.

Nonetheless, we asked pilot participants specific questions based on the claims of the previous research. Did using BWV change (either more or less):

- time spent completing reports
- the quality of their reports
- investigation time
- the quality of evidence submitted
- time spent in court?

[Table 6](#) provides the findings for these questions from all pilot participants, whether they noticed a change in their work times or not. If a member indicated that using BWV changed their work on specific tasks, we asked them to *estimate* the impact on time. Here are their responses:

- 42% of participants said that using BWV had no impact on how they completed their tasks, with no work time effect
- another 20% noticed changes to reporting and investigating, but said it had no overall impact on work time (because the time they spent reviewing video was offset by time they spent trying to recall or find the information by other methods)
- another 29% said that reviewing had resulted in a small increase (just a few minutes) in time spent on reporting
- and 9% said that reviewing BWV meant a significant increase in time – 50% or more on a report (all of these participants said the increased time was worthwhile because it resulted in better reports and stronger evidence)
- three members cited incidents when using BWV provided major help with an investigation and saved considerable time (reducing it by more than 50% compared to the time that would have been necessary without the information on video).

**Table 6: BWV and Changes to Work Tasks**

WORK TASK	CHANGE TO TASK?		
	YES %	NO %	DON'T KNOW %
How reports are completed	44	51	5
Time for completing reports	35	60	5
Investigation time	24	66	10
Improved quality of evidence submitted	49	-	51
Time spent in court <sup>40</sup>	2	9	89
<u>Use of force</u>	18	64	18
<u>Everyday policing</u> <sup>41</sup>	44	49	-

**Members' Feedback: Impact on Work Time**

[excerpts from in-person interviews with all BWV participants]

*Next day I would review them all to check my report. If I wanted to make additions I would create the addendum.... The subsequent review adds quality to reports, but added work time is minimal and doesn't detract from my duties.*

*I had no increase to work at all and it assisted in that I didn't have to question others to verify information as it was on the video for my review. And there was a high increase in the quality of the report. It reduces investigation time because rather than having to try to think or phone and ask something, I can look at the video.*

*I did a Traffic stop....I gave the driver a ticket and let him go. But then another member... asked if I had got photo ID. I had not. But I took a screen shot from the BWV clip and emailed it to that member. I was given a false ID. I would say it really decreased my investigation time. Without the BWV I would have had to try to find out who he was. Go to the motel where the people had been staying; do a photo line-up. But with the BWV it was really quick to find.*

<sup>40</sup> Only 18% of the “don't know” group had actually been to court with BWV evidence, with the rest not having been to court with a BWV file.

<sup>41</sup> The percentages for “everyday policing” don't add up to 100 because the three members of IDCU didn't think their specialized duties should count in this category. Data were also missing for one case.

Based on what data we were able to collect (given our concerns about accurate measurement), we concluded that members' reporting time may be somewhat increased when they review BWV clips. However, this pays off with improved report details and potentially better evidence. It is also possible that members can save significant investigative time on further inquiries using information captured on the video.

### 1.5.6. Transporting Subjects

Participants' feedback revealed one unanticipated benefit from using BWV when transporting female subjects. Lone male officers generally don't transport female subjects, for obvious reasons. Thus, even the routine transport of a female witness, complainant or suspect requires the time of two members. But throughout the pilot and during the interviews, members commented that having BWV meant that one member could undertake the transport.

#### **Members' Feedback: Transporting Females**

[excerpts from in-person interviews with all BWV participants]

*Transporting a female - before BWV, I would not do it alone. The BWV is even better than a partner for this because I can do it without fear of allegations as it records everything. I have been really glad to have it for this.*

As well, members frequently used BWV to record the behaviour of male and female subjects during transport, especially when they were behaving abusively, clearly intoxicated, making threats or otherwise uncooperative. Although this was hard to track objectively, it seems likely that the presence of BWV would deter subsequent [complaints](#), or assist in resolving a complaint should one arise.

### 1.5.7. Impact on Work Approach

The aforementioned concerns about accurately measuring work time caused us to ask another question leading into the interview segment on specific work tasks. It was open-ended, taking a different approach to eliciting information on work tasks and time: "Are there any ways in which having BWV footage has changed how you do your work?"

The wording of the question was specific to BWV footage, rather than the camera. Surprisingly, the question drew valuable information about the effect of the camera on members' everyday approach to policing:

- 58% of the participants said having BWV changed the way they worked; one member said "maybe" it had.

The qualitative answers to this question consistently raised seven main effects, which are listed in [Table 7](#). The [featured quotes](#) (following the table) show a wide range in the level of concern members felt when wearing the camera, including the fear that it caused hesitation, a safety concern.

About half of the participants expressed concerns about swearing, which contravenes the EPS profanity policy. The policy does allow for culturally appropriate use of language, and some

participants said they felt confident they could justify any way they chose to speak. Nevertheless, this was a clear concern for members, which has also been raised by members of other police agencies testing BWV.<sup>42</sup>

**Table 7: BWV Changes to Policing Approach**

<b>CHANGE TO WORK APPROACH</b> (members could choose more than one “change”)	<b>N = 55</b> <b>%</b>
Concerns about language/swearing	49
More professional, careful, patient	18
Fear of judgement <sup>43</sup>	18
Fear of hesitation to act	16
Less natural, more like a robot	15
Concerns about members’ privacy	15
Concerns other members hesitate to assist BWV users	15

Previous research has generally included a positively-worded statement that calls for BWV users to rate the extent to which they agree the devices made them behave more professionally. The findings have been consistently that BWV had a “professionalizing” effect.

We chose rather to ask members to describe in greater detail how BWV affected their behaviour.

- Only 18% volunteered that wearing the BWV made them act more professionally.
- What emerged was that members tended to see acting more professionally as being more careful, patient, proper, or “robotic” in their interactions, and that this didn’t always result in a positive outcome.
- Also, 18% expressed a lack of confidence in how their actions might be judged by others.
- And 15% observed that some other responders who weren’t equipped with BWV hesitated to come to their assistance (see below, [Section 1.5.8](#)).

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<sup>42</sup> Section 5(1)(e) of the Police Service Regulation of Alberta prohibits any police officer from “using profane, abusive or insulting language” and is therefore included in EPS policy 12-A-2 (5)c. Discussions about language with other agencies yielded a suggestion from a U.S. agency that it would be necessary to adjust present policy, but this hasn’t happened yet. Other smaller agencies have indicated they addressed the issue with direct assurance that culturally appropriate language was recognized.

<sup>43</sup> This fear was inevitably worded as “ I don’t think I do anything wrong, but supposing someone thinks that I am ...”



## **Members' Feedback: The Effect on Everyday Policing**

[excerpts from in-person interviews with all BWV participants]

*I police the way I do and I am not rude or heavy handed so I have nothing to worry about.*

*I want to say "no". I hope it hasn't changed how I do my work – I don't think so. I think it did change me a little bit at first to be a little more proper...but it didn't take long to relax and go back to natural interactions. For example to say 'sir' in an interaction with a homeless person could be perceived by that person as being sarcastic, because it just isn't a normal interaction for them.*

*I don't think that I am doing anything wrong but what if someone watching the video thinks I am?*

*I am a lot more careful with people. For most of us, especially for me with less years of experience ... when we got the BWV, I was more formal. Our supervisor says not to worry and to be the same - he is - but he has 27 years of experience. If I forget about the BWV and swear or am more aggressive in my attitude it concerns me afterwards. I think I shouldn't have done that and am afraid of complaints (although I haven't had any while using BWV, and only one ever that is three years old and still unresolved).*

*The activated BWV made me more hesitant to take control of the situation other than verbally. For example there was a subject who began to gain the upper hand. Attempted to walk away in handcuffs. Eventually I got bitten by subject and used level two use of force. Hesitation is an officer safety concern.*

*To some extent, in some contexts, I think it can make me and other members less effective.*

If BWV is to be implemented successfully, considerably more understanding of the impact on everyday policing is needed – this should pay special attention to the meaning of “professionalism” for police, and how BWV might be used to evaluate performance.

### **1.5.8. Interactions with other Responders**

The pilot BWV users indicated that non-users were generally apprehensive of the camera, but that these concerns tended to diminish as non-users got more familiar with the cameras and the procedures for their use. Member privacy remained a concern however, and was a complication for participants when deciding to record.

## **Members' Feedback: Interactions With Other Responders**

[excerpts from in-person interviews with all BWV participants]

*Members who are not part of the project are apprehensive, but we were too at the start. It's a question of getting used to the exposure.*

*But members don't like it. They don't like change and there is a lot of negativity towards it. I can tell other members it is on but they will not necessarily be as aware of it. Or they change their behaviour and don't do what they should because of the BWV (don't use force, change how they police). But those around it more, it's not such a big deal now. There's video out there all the time, but the BWV has audio and that can be an issue.*

*It has been nice to see patrol in this division get a little more accepting of the BWV as the pilot went on. I think the members wearing it had a positive attitude and that helped. But, I do have to be reminded that it is on and to be careful. I started in a different era – different expectations about language/humour. And when BWV is on it reminds me to be more professional.*

BWV participants often told the project coordinator (informally and during interviews) that other first responders, especially mental health workers and Emergency Medical Services (EMS), expressed concerns if the BWV was recording. The coordinator looked for this when reviewing footage involving other services, but was unable to find an example of an objection to the presence of the camera. After further inquiry, she concluded that most of these concerns related to the potential disclosure of health information, which is addressed in the pilot [procedures](#) (Appendix G).

Incidents involving mental health issues raised difficult recording decisions. Subjects experiencing altered states and requiring medical attention are often highly aggressive; members weighed the value of recording these interactions against other considerations.

As awareness of the pilot grew, there were numerous requests to have a police BWV user present at a particular event. This included the occasional request, captured on video, of EMS or other health workers checking that the assisting BWV user had activated the record function.

There are clearly times when medical and social services would value BWV footage of interactions, but the current lack of clarity on BWV and privacy make this a complicated prospect. It was apparent during controlled testing at the [emergency preparedness exercise](#) that the EPS BWV devices were not suitable for fire department use. Firefighters would require special camera mountings that are resistant to water and extreme heat.<sup>44</sup>

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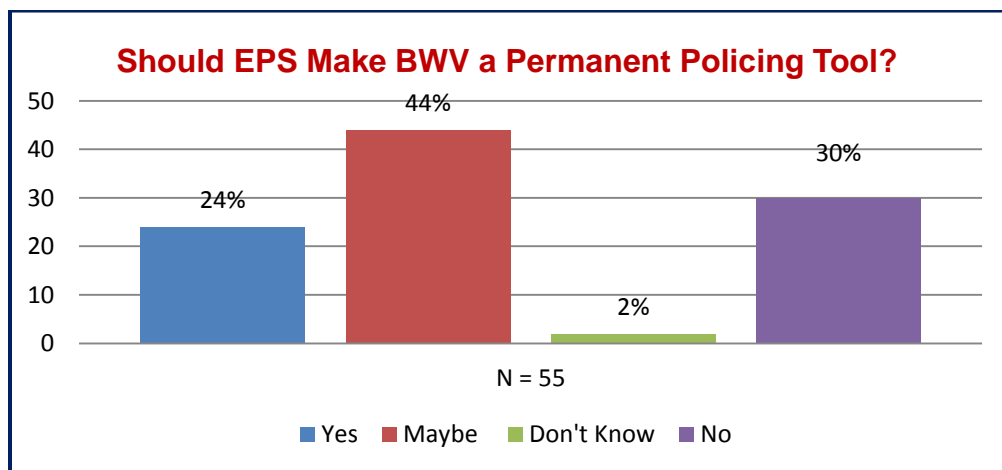
<sup>44</sup> Some fire departments do use cameras. Investigating this was beyond the scope of the EPS pilot.

### 1.5.9. BWV for EPS?: Pilot Participants' Feedback

At the end of the pilot we asked the participants if EPS should make BWV a permanent policing tool – the response was a resounding “maybe.” Most who answered “yes” or “no” added comments qualifying their answer with certain conditions. [Figure 1](#) illustrates the breakdown of responses to this question. The main qualifying factors offered by the participants are illustrated by the [selected quotes](#) following Figure 1 below.

- As might be expected from the findings for the only field-tested device (the Reveal RS3 SX), the top issue was a “better” [device](#); participants wanted an improved camera – smaller, lighter, non-intrusive, with adequate battery life.
- Second was an identified need for a secure and flexible camera mount that works with the EPS uniform and equipment.
- Almost one third of the participants expressed a desire to be able to use BWV at their discretion, and likened BWV to that of other optional EPS tools such as a CEW (Taser) or carbine, both of which require special training.
- The participants’ desire to use BWV at their discretion related to their concerns about when to record, which in turn related to their expressed need for more clarity on BWV policy and procedures.<sup>45</sup>

**Figure 1**



<sup>45</sup> As discussed in Section 4, participants rated the pilot policy and procedures for “ease of use” at a mean of 3.96 out of 6 and 70% of the pilot users had some issue with the procedures. They admitted that they often forgot the details, or never read the full version of the procedures.

As the [selected quotes](#) suggest, some members' opinions about BWV changed over the course of the pilot. Six members (11%) said their opinion became more negative, mainly due to their disappointment with the camera. Sixteen (29%) became more positive about using BWV.

Although these members wanted the camera improved, they saw definite advantages to the device they used during the pilot, and most of their initial apprehension had been alleviated. Another 7% said their opinion had shifted to "undecided." Interestingly, opinions about BWV were not significantly related to how much the members actually used it during the pilot.<sup>46</sup>

### **Members' Feedback: BWV for EPS?**

[excerpts from in-person interviews with all BWV participants]

*Now I think it is a great tool. But there are definitely areas for technical improvement. The quality is great with the HD lens....The biggest thing is to be able to decide when it's applicable. When I needed it I was glad to have it.*

*It's the "armchair quarterback" issue that really bothers me. It seems these days our word is not as valuable. I understand that the cameras are for accountability, but it's like we're not trusted anymore.*

*Even before I began using it I was not in favour of the system being tested....There would be positives to it [if] they come up with a system that definitely assists.... I'd use a better system to support my own credibility. ... A system that is stable, has a good field of view, and is small and with no screen (that is totally not needed) – I would use it.*

*I'm a firm believer in BWV – I was before and I am now....Everything is recorded now by citizens who just want to put it on the Internet in a negative light. BWV is for us to have our own to show how it actually played out. And it has evidentiary value.*

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<sup>46</sup> Not only was there no statistically significant relationship, there wasn't even a trend in that direction.

## 1.6. Using BWV: Opinions of Non-User EPS Members

### Key Findings and Conclusions: Non-User EPS Members

1. **When considering BWV as a policing tool, the majority were open to the idea;** but 80% have some reservations. About 20% were strongly for the idea and roughly the same percentage was strongly opposed.
2. **Concerns expressed by non-user respondents** were similar to those identified by the BWV pilot participants.
3. **Buy-in to a BWV program at EPS would require highly intensive internal communications.** Survey comments reflected significant misunderstanding about the pilot purpose and the content of provided policy and procedure.

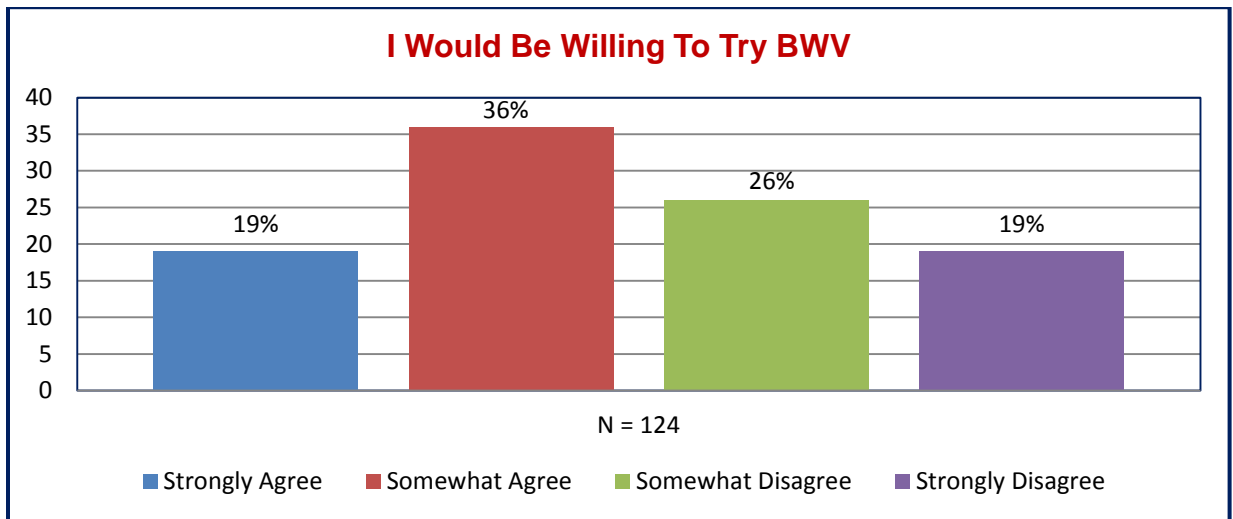
We created an anonymous on-line survey for sworn members who didn't use BWV during the pilot. It was linked to the EPSnet, an internal webpage designed to bring information to EPS members. A total of 152 members responded to at least some of the questions.<sup>47</sup> Of these, 146 previously knew about the BWV pilot and 98 had observed BWV in use. It isn't possible to determine to what degree these members represent the total sworn membership, but Figures 2 and 3 show a wide range of opinion on the possibilities for BWV as a policing tool.

Figure 3 shows that an almost equal percentage of respondents (around one fifth) are either strongly for or strongly against the idea of using BWV as a permanent policing tool. Just over one third seem open to considering the idea under certain conditions, which are detailed by the explanatory comments below. The remainder lean towards a negative view of BWV.

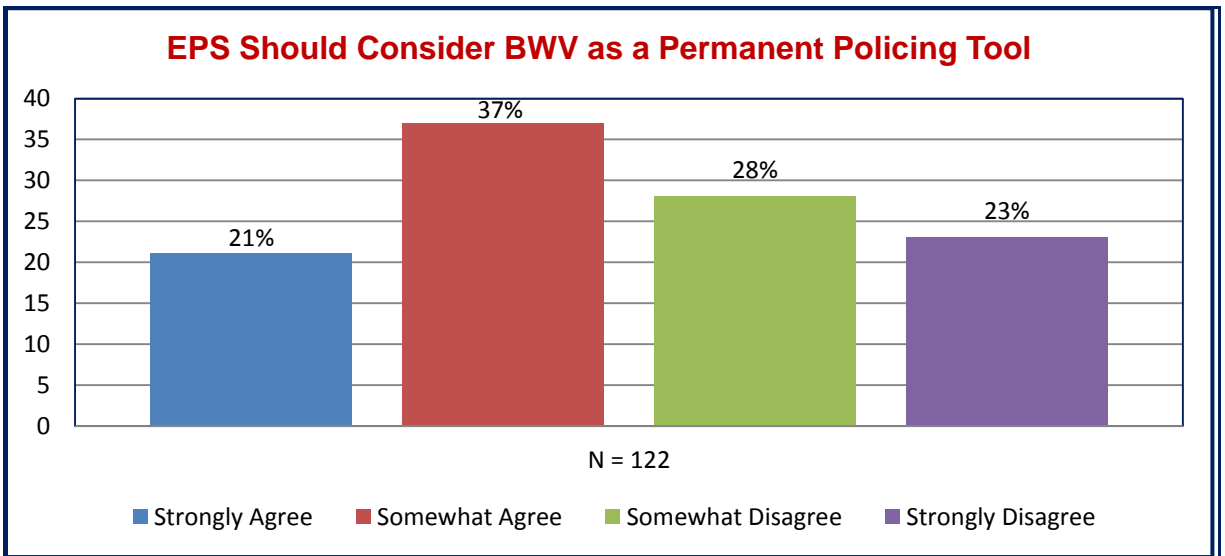
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<sup>47</sup> Some questions applied only if a non-user member had observed a BWV user. All percentages quoted are calculated based on the number of respondents for that question.

**Figure 2**



**Figure 3**



The survey respondents provided 283 comments to explain their opinions about BWV, reflecting the same range of issues and concerns as those advanced by the BWV users:

- **Inadequacy of the tested device** (too bulky; insecure mounting; inadequate battery).
- **Concerns about the viability of [policy and procedures](#)** for using BWV (especially related to activation and deactivation).
- **Negative effect on everyday policing** (fear that BWV would be used for micro-management, cause hesitation to act, decrease rapport with citizens and informants).
- **Concerns about members' privacy.**
- **Observations that the treatment of [BWV in courts](#) remains unknown** (especially how defence counsel will use footage).
- **Overall [cost of BWV](#) and possible alternatives for budgetary dollars** (better to invest in operational support such as more members, more training; IVV technology a better option for patrol).<sup>48</sup>

The majority of respondents (97) had observed BWV in use. Their comments suggest strongly that their opinions were influenced by negative feedback about the devices from BWV users. A number of comments also reflect inaccurate information or misunderstanding about the purpose of the pilot and the content of its policy and procedures. And there were observations that the devices were used inconsistently by pilot participants.

Overall, the survey responses show that any decision to adopt BWV at EPS would require intensive communication to create buy-in. Notably, of the 146 members who knew of the pilot only 30% heard about it via external media, in contrast to the 66% of the public who indicated awareness and a media source.<sup>49</sup> This underlines the importance, and challenges, of effective internal EPS communication (see Section 5, [training](#) for more on communication).

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<sup>48</sup> These points were only occasionally raised by the BWV users during their interviews, and were more frequent among the non-user respondents.

<sup>49</sup> Respondents to both the non-user member survey and the public survey could indicate multiple information sources. EPS members were less likely than the public to have heard about BWV via the extensive external media coverage throughout the pilot.



### **Non-User Members' Feedback**

[comments from the on-line survey of 156 non-user members]

*Please roll BWV out to general patrol as quickly as possible.*

*I do not want it, nor do I want to work around any with it.*

*I would be willing to wear BWV if the camera was small and compact and the policy regarding BWV was straightforward.*

*I have had two complaints in recent months...and BWV would have cleared them up pretty quick. To not have this technology is wrong.*

*I do not feel the body worn video system will be effective enough to justify its cost, especially when these funds could be used in other ways. Furthermore, there is a fear these video systems will be used more as a tool to "watch" members and possibly be used against them....I feel this will effect morale and work ethic in an environment where these are already huge issues for our service.*

[cont'd next page]

*The device creates anxiety in some of our members becoming involved. The risks outweigh the rewards. Do not spend more money on this foolish idea, when members' lives could be on the line!*

*It should be based on what the majority of members want, and how the courts see it. If it is working in courts and increasing conviction rates then I believe it will ease members' minds about it.*

### **1.7. BWV and Complaints to EPS**

One of the more consistent findings in other BWV pilots has been a reduction of complaints against police officers wearing BWV. However, our [Literature Review](#), shows that the data supporting these findings are actually quite limited. The reported percentages of complaint reductions appear impressive but the actual numbers involved are generally quite small. Another important factor is how complaints are categorized and counted, as this differs among agencies. For example, in some pilots only complaints about use of force were considered.<sup>50</sup>

Most previous studies compared complaint numbers during the pilot with those occurring for the equal period immediately prior to the pilot. They didn't report general annual fluctuation across several years. Other agencies may only record formal complaints, and ignore less formal contacts about potential complaint issues. EPS records both types of contact.

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<sup>50</sup> For example, the Mesa Police Department evaluation (Rankin, 2013). This and all other available assessments are reviewed in the Literature Review, [Appendix A](#).

### **Key Findings and Conclusions: Complaints to EPS**

1. **The pilot found no quantitative evidence that BWV had an impact on the number of complaints made.**
2. **A five-year statistical base (at minimum) is needed to identify complaint trends**, which must be understood in an overall community and organizational context.
3. **In an agency as large as EPS, reliably isolating the effect of any one influence on complaints is difficult.** There are considerable variations in the rate of complaints by geographic location, specific unit and type of duty. Changes in unit membership, leadership, and training are all ongoing factors.
4. **Professional Standards Branch observed that BWV makes a useful contribution** to a complaint investigation. Although the legislated complaints process allows citizens to appeal EPS decisions, in some cases BWV may help with earlier resolution.
5. **Members believe** that the presence of BWV may discourage some frivolous complaints but also encourage others, at least initially.
6. **The Canadian policing context for handling complaints is highly formalized, and differs from other jurisdictions that have reported reductions and early resolution of complaints.** In this culture it is unlikely that BWV would significantly reduce the time required to process complaints.

Other BWV studies also report benefits in resolving complaints sooner and reducing costs. Examples from U.K. and U.S. studies suggest that complaint processes across jurisdictions differ in formality quite significantly from those in Alberta.<sup>51</sup>

These factors are relevant for the potential impact of BWV on costs, time, and resources devoted to handling complaints. The EPS pilot took these into account when examining complaints made during and preceding our operational testing phase.

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<sup>51</sup> There may be minor variations among Canadian provinces and territories, but informal discussions suggest that complaint processes are legislated and subject to strict privacy protocols.

For EPS and most similar agencies it is difficult to measure in the short term the specific impact of BWV on the frequency of complaints. Also, EPS's existing complaint process places limitations on the value BWV may offer for resolving complaints.

### 1.7.1 Professional Standards Branch (PSB) Complaints Process : Background

There were organizational factors occurring alongside to the BWV pilot that might have affected complaint rates during the project period. These couldn't be untangled:

- Edmonton's position as a high-growth provincial capital and gateway for services and labour across northern Alberta
- an overall increase in police service calls
- changes to PSB file management that might influence the total number of complaint files opened and the number of informal complaints that become formalized.

During 2012, PSB introduced several changes to improve the complaint investigation process and file completion rate. These included a systematic file handling process, training for intake investigators, and developing an effective alternative dispute resolution program, through which 16 complaints were resolved in 2013 (EPS, 2014a).

To become a formal complaint, correspondence from a complainant must meet a set of criteria specified in section 42.1 of the *Police Act*. PSB also opens a file for a citizen or internal EPS contact that doesn't initially meet these criteria. This file may be reclassified subsequently as a formal complaint, or may just be a request for information on a professional standard. The majority of files opened in a year (EPS, 2014a) are the informal type. The BWV pilot considered both formal and informal PSB open files.

Citizens have 364 days after an event to file a formal complaint. The initial review and decision is the responsibility of the police chief, with a variety of processes to achieve resolution.<sup>52</sup> Citizens dissatisfied with an initial review decision can appeal to the Edmonton Police Commission. PSB reports that 14 months is the median time to complete a file (EPS, 2014a, p. 24), but in some cases final resolution may take be several years. The issue of time taken to resolve complaints was frequently raised in the BWV pilot user interviews.<sup>53</sup>

### 1.7.2. Complaints Statistics<sup>54</sup>

There is no quantitative indication that the use of BWV reduced the number of complaints or citizen contacts for the BWV pilot participants. Given the issues outlined below, we weren't able to find a statistically significant change (either up or down), in the number of complaints received by pilot participants.

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<sup>52</sup> A small number of files become statutory complaints (12 in 2013) if the alleged act by the member might constitute an offence under the *Criminal Code* or other relevant *Act*. These files originate as formal complaints.

<sup>53</sup> Note that the most frequent median average completion was 15 months (127 files) and the most serious allegations had a median of 17 months. These medians are offset by 54 cases taking on average only eight months to complete.

<sup>54</sup> Complaints statistics are drawn from EPS Professional Standards Branch Annual Report 2013 (PSB, 2014) and from special statistics reports provided to the BWV project by PSB.

If taken out of context, the pilot numbers might be construed to show an increase in PSB files. And participants raised the possibility of an increase for two reasons: specific requests for BWV presence at incidents anticipated to cause a complaint or contact; and the initial belief of some subjects that they were in the right (especially when intoxicated) and that BWV would support their position. It is equally possible that the presence of BWV discouraged some frivolous complaints. The member feedback quoted below shows perceptions that BWV served to do this.

First, the numbers – in 2013, the EPS dispatched officers to 147, 612 calls. There were 215 formal complaints made; a rate of just under 0.2% of dispatched responses, which was slightly down from 2012. Because many interactions with the public result from patrol and beat duties, the actual rate per interaction would be lower (EPS, 2014a).

[Table 8](#) illustrates the difficulties in untangling influences on complaints within a large police service. It shows the breakdown of formal complaints and informal contact files, by division and pilot unit, from 2009 until June 2014. There is some annual fluctuation, but the total of EPS complaint files is reasonably steady. However, there is considerable annual fluctuation among and within the various frontline operational divisions and units.

The busy downtown division, where the pilot intervention and control units were located, typically has the highest percentage of complaints and informal contacts. Similarly, the entertainment district beats consistently receive a number of complaints each year, while the IDCU receives very few.

The numbers in Tables 8 and 9 present different file counts. [Table 8](#) provides total PSB files generated by EPS unit, regardless of which members were in that unit over the year. [Table 9](#) shows complaints attached to BWV participants during the pilot period, compared to complaints for those same members in previous years. The movement of members among divisions and duty types interferes with intervention and control group evaluations. Changes in duties and leadership are important intervening variables in any attempt to assess the influence of BWV as a stand-alone factor.

In addition to those mentioned above, there are other issues when trying to track BWV influence on complaint rates. A file may not be opened in the same year the complaint occurred. The numbers in [Table 9](#) were adjusted in the special PSB report so the complaint was recorded in the year it occurred. In [Table 8](#) however, the numbers are for total files opened in each year.

Furthermore, the number of complaints against members is greater than the number of files opened, as some complaints involve two or more members; this occurred on several occasions during the pilot period. As well, the length of pilot period varied a little by unit, but the PSB special report also attempted to adjust for the actual commencement and termination dates for each member involved.<sup>55</sup> Finally, because some members had their BWV for over 12 months the complaint numbers for the pilot period may be slightly (but not significantly) inflated. As well there were several occasions when BWV users were specifically requested by non-users to attend an interaction because of a prior threat of a complaint. Despite this, when the pilot numbers are viewed in context, they fall within the range of distribution seen across previous years.

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<sup>55</sup> Members who were in a pilot unit for less than six months were excluded for the purposes of this comparison. Despite the adjustments, the pilot period extended for more than 12 months for some members. The best approximation with Table 8 is to combine 2013 and the first six months of 2014. For exact pilot periods for each unit see [Appendix D](#).

**Table 8: Complaints by EPS Total, Pilot Division and Unit**

<b>Key</b> FC: Formal Complaints IF: Contact Files	BREAKDOWN OF EPS COMPLAINTS											
	2009		2010		2011		2012		2013		2014 (Jan-June)	
	FC	IF	FC	IF	FC	IF	FC	IF	FC	IF	FC	IF
<b>Total EPS Complaints</b>	<b>203</b>	<b>433</b>	<b>331</b>	<b>464</b>	<b>215</b>	<b>792</b>	<b>218</b>	<b>857</b>	<b>215</b>	<b>841</b>	<b>126</b>	<b>363</b>
<i>Downtown Division</i>	44	94	47	90	46	88	33	97	36	112	40	45
<i>Intervention Patrol</i>	4	8	3	4	1	9	3	6	1	10	2	1
<i>Control Patrol</i>	5	8	6	5	4	7	3	9	3	9	0	1
<i>Intervention Beat Team</i>	0	0	0	0	2	2	1	4	1	4	6	1
<i>Control Beat Team</i>	0	0	0	0	1	4	1	3	1	2	0	5
<i>Southwest Division</i>	31	56	23	62	18	45	26	61	23	69	9	38
<i>Whyte Beat Teams</i>	4	3	0	5	2	1	3	7	1	7	2	0
<i>West Division</i>	25	67	26	76	39	70	30	99	37	77	14	30
<i>West Beat Teams</i>	2	9	3	7	3	4	1	5	2	5	1	2
<i>Northeast Division</i>	31	68	30	76	28	54	36	74	29	87	13	49
<i>Southeast Division</i>	14	39	21	47	21	57	19	51	19	60	10	29
<i>Other EPS areas</i>	58	109	62	113	55	137	63	158	65	156	37	97
<i>IDCU</i>	0	2	0	2	2	0	0	0	0	0	1	3

**Table 9: Complaints About BWV Pilot Users<sup>56</sup>**

Members' Pilot Unit Key: FC: Formal Complaint IC: Informal Contact	Complaints against BWV Pilot Users and Controls									
	2009		2010		2011		2012		Pilot 2013-Jun. 2014	
	FC	IC	FC	IC	FC	IC	FC	IC	FC	IC
Downtown BWV User Patrol	1	2	1	3	3	6	1	5	4	10
<i>Downtown Non-User Patrol</i>	4	3	3	3	2	2	3	9	7	9
Downtown BWV User Beat	7	8	1	3	6	1	2	6	9	3
<i>Downtown Non-User Beat</i>	4	3	3	3	4	5	2	4	3	1
Whyte Avenue Beats 1 and 2	9	1	5	6	8	5	8	6	9	10
WEM Beats 1 and 2	1	2	1	5	8	5	1	6	6	7
IDCU	0	0	0	2	2	0	0	0	1	4

### 1.7.3. Observations from PSB

Of the 272 formal complaints concluded in 2013, 46% were recorded as having no reasonable prospect of being proven or disproven (EPS, 2014a, p. 29). Clearly the presence of BWV would have the *potential* to assist in such cases.

Four PSB case files and a supervisor interview were completed during the course of the pilot. As of December 2014, none had been concluded. PSB representatives observed the following based on their experience with BWV:

- **BWV footage helped** with the investigation in all four cases.
- **BWV is only one contributing element** of an investigation and will only ever be considered as such. Members must be able to articulate clearly what they saw or heard at the time, as it may differ from what can be seen on BWV footage.
- **PSB was impressed with the quality of audio-video.** There are field-of-view-limitations with the video but audio recording helps.

<sup>56</sup> Table 9 figures are from published PSB Annual Reports and supplementary statistical reports provided by PSB to the project coordinator. EPS annual totals may vary slightly with these reports as files can be reclassified. Figures for Table 9 came from a special report.

- **Ideally, BWV should run from the beginning of an incident, but partial recording (due to late activation) is still helpful.** It is probably better to have a partial recording than no recording at all.
- **BWV may or may not help reduce investigation time,** depending on the clarity of the recording and whether the complainant accepts the initial EPS recommendation on a file or insists on a hearing.
- **We don't know how courts or review committees will interpret and apply available BWV.**

#### 1.7.4. Members' Perspectives

The interviews with pilot participants, and interactions between members and the project coordinator during the pilot, indicated considerable dissatisfaction with the EPS complaints process. The length of time to resolve complaints was the main issue, and lack of communication to involved members or their supervisors was also a concern.

#### **Members' Feedback: BWV and Complaints**

[excerpts from in-person interviews with all BWV participants]

*There is a current threat of a complaint where a person ....[Was] combative and verbally abusive, including a personal tirade against me. He says he will complain .... I hope he does – I've had copies of the video burned.*

*There was one incident where we had the cameras on because someone was threatening to complain. It had no effect on that person.*

*I don't recall a threat to complain while I've been wearing BWV.*

*Mostly no effect on complaints, but I had one incident when a citizen ... contacted my sergeant and threatened to complain, wanted to sit down with me. ... I thought, "why not – let him say his piece." When I told him it was all on video if he wanted to complain he did a 180 turnabout and was apologizing for causing a problem and saying it was his fault. There was no complaint made.*

*It will help with complaints. There is a PSB request to do with a partner. The BWV shows his demeanour. It is positive – pretty solid.*

*EPS policy says we shouldn't swear, but sometimes we have to. It's no good being polite when someone is very drunk or high on crack. ...Some know we are not supposed to swear and doing so will shock them, maybe stop them enough to focus on saying they will complain and then we can get them under control.*

Most members felt that in the case of a citizen complaint, BWV footage would be likely to assist a member. But they also expressed concern that BWV might be used against them to focus on minor policy infractions, if not by PSB then at a hearing or in court. Because none of the



complaint files involving BWV have been concluded, there is no evidence to support or refute members' hopes and fears related to complaints.

The members' quotes (below) show mixed but hopeful perspectives about the influence of BWV on complaints. Several members, especially on the entertainment district beats, thought that pointing out the camera presence forestalled the intent to complain. However, there was only one occasion when a member played back the video on the camera screen for a citizen who wanted to complain; the citizen backed off.

This marks a significant difference between Canadian policing culture and that in the U.K. and the U.S., where reports often refer to immediate video playback for citizens wanting to complain. The team considered the potential for *in situ* video playback a positive feature of the Reveal RS3 camera, but 54 of the pilot participants never used this feature. When asked why they hadn't, all indicated that it seemed counter to general evidentiary practices, with information provided only when formally requested. The highly formalized EPS complaints process also seems to pose an obstacle to the *ad hoc* playback of BWV footage.<sup>57</sup>

### 1.8. Use of Force at EPS

EPS collects use of force data via electronic control tactics reports (CTR). These are submitted for any force greater than soft, empty-hand control used for cooperative handcuffing.

#### **Key Findings and Conclusions: BWV and Use of Force**

- 1. There is no statistically significant evidence that the presence of BWV reduced use of force.**
- 2. EPS uses of force rates are fairly consistent since 2011**, although variable when analysed by division, unit or individual. This variability was evident within both the pilot and comparison periods.
- 3. Similar variations in use of force, and the factors that influence them, are likely to apply for any Canadian police service of similar size to EPS.**
- 4. BWV presence may cause EPS members to hesitate to use appropriate levels of force.** Training on use of force with BWV would be important to deployment plans; BWV can contribute to use-of-force reviews and future training.

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<sup>57</sup> Members also indicated safety reasons for not playing back video. People threatening to complain were often highly agitated and getting them under control was the priority. Even if calm, it would be necessary to allow the viewer to hold the device to see and hear anything clearly.

### **1.8.1. EPS Use of Force: Background Context<sup>58</sup>**

In 2009, EPS introduced a standard of “objective reasonableness” for evaluating appropriate use of force. In 2010, EPS recognized that engaged supervision is a critical link in the “reasonable officer response” process and introduced a two-category system of supervisory oversight for all reportable use of force events.

Category 1 is for minor occurrences – the lowest level of hands-on control and displays of force (canine presence, conducted energy weapon presence, and firearms at low, ready). Category 2 is for any greater use of force (Snidal, 2014a).

Once fully implemented in 2011, these initiatives resulted in a 40 % reduction in Category 1 incidents and 38% less for Category 2. EPS overall occurrence rates have been reasonably steady since that time. In 2013 over 60% of incidents were Category 1. The most frequently used form of control (de-escalation) of a dynamic situation was communication. Small increases in the total number of incidents are attributed to increases in the overall number of dispatched calls, and the availability of more canines and CEWs for incident control (Snidal, 2014a). EPS considers the use of force rates to be at the necessary level; major deviation from them would be a concern.

PSB complaint reports include a breakdown of the issue. In recent years, use of force is included in fewer than 20% of complaints. Tactics Training Unit does not consider the number of complaints associated with use of force a reliable measure of appropriate use of force.

### **1.8.2. EPS Use of Force Statistics 2012 - 2014**

Given the variables that can influence fluctuations in use of force, and the lack of a consistent pattern with use or non-use of BWV, the pilot data offer no discernible statistical effect on use of force by EPS members.

Because a controlled tactics report (CTR) is submitted for each member in a use of force occurrence, even if more than one member is involved, there are more reports than incidents. Table 10 shows the number of CTRs and occurrences from just prior to, and during, the pilot.

In 2013 there were 147, 612 dispatched calls, with a rate of 1.3% responses where any kind of force was applied. The rate for Category 2 force was 0.6%. Although total occurrences are fairly stable since 2011, use of force isn't evenly distributed across EPS divisions or types of response. Downtown Division accounted for 582 of all 2013 occurrences (Snidal, 2014a). For entertainment beat teams in particular, use of force incidents occur mostly through patrols in volatile areas, rather than from dispatched calls.

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<sup>58</sup> This information comes from EPS Control Tactics Statistics reports to the Edmonton Police Commission (EPC), which are provided every six months and publically available ( Snidal, 2014a; 2014b).

**Table 10: EPS Total Use of Force, 2012-2014**

Force Level	Controlled Tactics Reports			Occurrences		
	2012	2013	2014 (Jan-June)	2012	2013	2014 (Jan-June)
Category 1	2245	2313	1081	1077	1062	594
Category 2	1274	1291	550	904	925	387
TOTAL	3519	3604	1631	1981	1987	981

Personnel movement made it difficult to relate use of force data to specific units and time periods. It wasn't possible to separate numbers (regardless of the members assigned) for the *units* in 2009-2012. Instead, figures were generated for pilot participants for an equal number of days spent with BWV and without it. Days without BWV were counted as evenly as possible before and after the pilot period.<sup>59</sup> [Tables 11](#), [12](#) and [13](#) provide comparisons of use of force with and without BWV.

**Table 11: Use of Force, Non-BWV Period**

Pilot Unit Key C1: Category 1 force C2: Category 2 force	Use of Force Occurrences: <b>Without BWV</b>					
	Members Included (N)	Mean occurrences		Total Occurrences by unit		
		C1	C2	C1	C2	Total
Intervention Patrol	13	1.5	1.4	20	18	38
<i>Control Patrol</i>	10	1.4	2.1	14	21	35
Intervention Beat Team	8	3.0	2.1	24	17	41
<i>Control Beat Team</i>	9	1.8	1.6	16	14	30
Whyte Avenue Beat 1	9	1.9	0.7	17	6	23
Whyte Avenue Beat 2	10	0.9	1.3	9	13	22
WEM Beat 1	4	3.75	0.75	15	3	18
WEM Beat 2	4	2.25	1.5	9	6	15
IDCU	3	0.7	0	2	0	2

<sup>59</sup>Larry Snidal, who ran the analysis on November 18, 2014, divided the days before and after to minimize the days counted when members weren't serving with the pilot units during the non BWV periods. If insufficient days existed post-pilot, he counted more days from before the unit started with BWV.

**Table 12: Use of Force, BWV Pilot Period**

Pilot Unit Key C1: Category 1 force C2: Category 2 force	Use of Force Occurrences: <b>With BWV</b>					
	Members Included (N)	Mean occurrences		Total Occurrences by unit		
		C1	C2	C1	C2	Total
Intervention Patrol	13	2.0	0.9	26	12	38
<i>Control Patrol</i>	10	2.4	1.5	24	15	39
Intervention Beat Team	8	3.4	3.0	27	24	51
<i>Control Beat Team</i>	9	1.8	2.3	16	21	37
Whyte Avenue Beat 1	9	3.3	0.9	30	8	38
Whyte Avenue Beat 2	10	2.3	2.1	23	21	44
WEM Beat 1	4	4.75	0.8	19	3	22
WEM Beat 2	4	1.3	1.3	5	5	10
IDCU	3	0	0	0	0	0

**Table 13: Use of Force Differences, Non-BWV to BWV**

Use of Force Occurrences						
Pilot Units	Category 1			Category 2		
	Non-BWV	BWV	Difference	Non-BWV	BWV	Difference
Intervention Patrol	20	26	+30%	18	12	-33%
<i>Control Patrol</i>	14	24	+71%	21	15	-29%
Intervention Beat Team	24	27	+13%	17	24	+41%
<i>Control Beat Team</i>	16	16	0%	14	21	+50%
Whyte Avenue Beat 1	17	30	+76%	6	8	+33%
Whyte Avenue Beat 2	9	23	+156%	13	21	+66%
WEM Beat 1	15	19	+27%	3	3	0%
WEM Beat 2	9	5	- 44%	6	5	-17%
IDCU	2	0	-100%	0	0	0%
<b>Total Use Of Force</b>	126	170	<b>+35%</b>	98	109	<b>+11%</b>

It is important to consider use of force statistics in context. [Tables 11](#) and 12 show considerable variations in use of force: among units; between levels of force used; and within pilot and non-pilot time periods. Many factors influence this variability. For example, Category 2 use of force data for both Whyte Avenue beats show that five members were involved in *one incident* during the pilot period, but these count as five use of force entries in the total. Continuing with the Whyte Avenue beats, there were eight Category 2 use of force entries during the pilot in August 2013 (always a busy month). After the pilot ended, in August 2014, there were seven.

There is a danger of misinterpreting the data by comparing isolated numbers. For example, one could conclude that IDCU reduced use of force by a 100% during the pilot, but only two cases of Category 1 force were involved (since 2011, this unit normally has had no incidences in a year).

Other factors can impact use of force statistics. With Category 1 occurrences (which mainly involve displays of force and can be influenced by the presence of canines, carbines and CEWs), supervisors suggested that diligent review of all occurrences will affect reported totals. Also, the physical size of an individual officer can influence the need to display or use force.

Finally, when considering the percentages, one must observe that the actual numerical differences are very small. For example, consider the Category 1 numbers for both WEM beats where the incident totals are disparate, but the actual difference in both cases is just four.

### **1.8.3. BWV and Use of Force: Members' Perspectives**

Lack of statistical evidence of the impact of BWV on use of force doesn't mean that members didn't individually experience its effect, as the members' feedback reveals.

#### **Members' Feedback: BWV and Use of Force**

[excerpts from in-person interviews with all BWV participants]

*Regarding Use of Force: It hasn't changed my using it, but I do think about it afterwards and I would review the footage for those reports so as to increase the quality.*

*While acting supervisor, I was required to do a use of force review of an incident where the subject had facial injuries. BWV captured the arrestee telling me that these injuries were not from members, but self-inflicted.*

*I want to say "no, BWV didn't have an impact on my use of force". But the truth is there is a moment of hesitation, especially in a situation where I had time to think about whether to engage physically.*

*There was one time when I would have liked it on but it was a dynamic situation where I had to Taser a subject. I wasn't going to take my hand off my Taser in order to turn on the camera.*

*Even if the cameras are on we hold back if someone else used force because of fear of it being used against us.*

Of the pilot participants, 64% commented in interviews that the camera's presence hadn't affected their use of force, 18% couldn't say whether there was an effect (mainly because they so seldom used force) and 18% said that it did have an effect. Members' experiences that BWV presence can cause them to hesitate to use force are worth noting.

There are clearly potential benefits if BWV captures an audio-visual account from start to finish in a use of force incident. But, as the feedback suggests, recording a complete incident can be complicated by operational realities like [sudden dynamic events](#) (Section 1.5.2).

The participants didn't know how incomplete or failed capture of use of force incidents would be treated. This was a roadblock to their full support for a BWV program. As discussed in the section on [complaints](#) (1.7), there are early indications that partial BWV capture helps, but until we know the final outcome of such files, it is difficult to conclude how significant a contribution BWV can make in use of force incidents.

## 2. THE IMPACT OF BWV ON THE PUBLIC

### Key Findings and Conclusions

1. **The effect of BWV on citizens varies with the situation and is highly nuanced;** it is as likely to be negative as positive.
2. **The general public in Edmonton are mostly positive** about, and interested in, the concept of BWV. They have high expectations for this technology, which may not be realistic.

Discussions about the benefits of BWV invariably claim that it reduces aggression and rudeness from citizens and police, and that it promotes citizen compliance. This is based more on extrapolations from social theory (Farrar & Ariel, 2013; Ready & Young, 2014) than specific BWV research.<sup>60</sup> On the other hand, there are concerns that BWV may violate individual privacy and that many citizens will object to the technology.

There is little hard evidence to support either position. The data gathered by the EPS pilot paints a more complex picture. [Table 14](#) (below) presents data collected from citizens, EPS pilot participants, and other EPS sworn members who weren't involved in the pilot but who had observed BWV in use. The [public survey](#) section of the table is drawn from a poll of 329 citizens in three high traffic areas where we ran the pilot. The data reflect their opinions and expectations of the technology, with a majority expecting that the presence of BWV would have a positive effect on citizen behaviour, and a noteworthy portion expressing doubts (see [Appendix H](#) for details).

### 2.1. Aggression and Rudeness

It is impossible to measure the *absence* of an action or behaviour. Hence, we weren't able to calculate whether BWV reduced aggression or rudeness from citizens. Our best attempt was to correlate reduced use of force by BWV-equipped police with reduced citizen aggression. As discussed in [Section 1.8.2](#), we found no discernible statistical effect on use of force by EPS members equipped with BWV, so we can't draw any correlation regarding citizen behaviour. It is possible that at times, citizens' awareness of the cameras induced calm and polite behaviour that might otherwise have been different. But the pilot participants' observations on the issue came from situations where aggression and rudeness were already in play.

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<sup>60</sup> The research cited to support the effects of surveillance on citizen behaviour is dated (1980s) and sparse. The BWV research to date has relied on measurements of beliefs rather than observations of actions.

[Table 14](#) shows that 46 % of pilot participants observed that the presence of BWV had some effect on aggressive behaviour from citizens, and 58% observed an effect on rudeness. But of those noting an effect on aggression, 57% reported that the outcome depended on the situation, and was as likely to be negative as positive (see the following comments).

### **Members' Feedback: BWV and Aggressive Citizen Behaviour**

[excerpts from in-person interviews with all BWV participants]

*We don't have fights, or have to use force, but we do have to restrain at times; or operate with caution because a subject's behaviour is generally aggressive. I found that the BWV de-escalated a lot in these instances....A lot of people who were acting up or irrational, once they realized they were on video they changed their attitude and became more cooperative. My observation is the BWV had this effect the majority of the time.*

*People...who may want to stick around and intervene can be discouraged by the BWV. For example, I stopped a male, and two others started to come towards us, but when they realized I was recording they threw up their hoodies, turned around and walked away.*

*This group are ready to fight anyway. They seem to think that the presence of BWV will protect them from being touched by us.*

*If very intoxicated and/or agitated, they may not even realize what is going on, or understand that they need to calm down.*

*I am generally intervening after it has become physical, for example, a fight between citizens. So, no, the BWV doesn't impact this.*



**TABLE 14: EFFECT OF BWV ON CITIZENS<sup>61</sup>**

CITIZEN BEHAVIOUR Key: + Increased - Decreased +/- Depends on situation	PUBLIC SURVEY						BWV USER INTERVIEWS						NON-USER MEMBERS' SURVEY					
	Effect of BWV (N = 329) %			Type of Effect %			Effect of BWV (N = 55) %			Type of Effect %			Effect of BWV %			Type of Effect %		
	Yes	No	D/K	+	-	+/-	Yes	No	D/K	+	-	+/-	Yes	No	D/K	+	-	+/-
Physical aggression	72	17	10	13	81	5	46	42	9	8	35	57	14	86	N/A	29	29	42
Verbal rudeness/abuse	67	26	7	22	75	3	58	35	4	16	28	56	17	77	N/A	20	20	60
Complaints about police	68	19	13	36	57	4	22	44	33	17	25	58	11	81	N/A	50	30	20
Willing to chat informally	55	31	13	36	63	1	51	38	6	4	64	32	15	77	N/A	8	77	15
Willing to provide incident information	58	26	16	67	28	3	29	53	15	13	44	44	11	89	N/A	10	50	40
Compliance with informal suggestions	69	24	5	93	6	2	24	51	18	39	23	39	10	90	N/A	44	0	56
Compliance with formal instructions	71	22	6	93	6	2	35	51	9	44	11	45	18	82	N/A	50	0	50
Perform for the camera	N/A	N/A	N/A	N/A	N/A	N/A	44	N/A	N/A	100	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Citizen interest	N/A	N/A	N/A	N/A	N/A	N/A	17	N/A	N/A	100	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Distraction effect	N/A	N/A	N/A	N/A	N/A	N/A	13	N/A	N/A	100	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

<sup>61</sup> Percentages may not equal 100% due to rounding or uncodable data. Percentage for “Type of Effect” is calculated on the N for those answering “yes”. For the general survey, 98 had observed members with BWV, but not all had observed every listed behaviour. Percentages are calculated on those who did respond to each item (N varied between 88 and 97). The Summary of Findings from the BWV [Public Survey](#) is provided in Appendix H. The final three behaviours listed were voluntarily identified by users during the interview as being prompted by the presence of BWV. These items were not included in the surveys. The non-user on-line survey did not include a “don’t know” reply option. The research instruments for the surveys and interviews summarized in Table 14 are available upon request.

The pilot participants identified the “altered mental state” of a citizen (due to alcohol, drugs or mental illness) as the variable most often causing a non- or unpredictable-response when they informed that person about BWV presence. Citizens in this state are the ones with whom police most often intervene, especially on the entertainment district beats. Feedback from pilot participants, the project coordinator’s observations from walk- and ride-alongs, and BWV reviews all support the following conclusions:

- **Verbal rudeness directed at the police is routine**, especially in entertainment districts. Members ignore it if possible and handle it professionally when it must be addressed.
- **Fights break out suddenly in the entertainment districts**, often right in front of patrolling police. Their reaction has to be immediate.
- **Citizens are often so intoxicated they are unable to communicate sensibly**. It is unlikely they can process information about the presence of BWV.
- **The “altered mental states”** of citizens are frequently the cause for behaviour resulting in dispatched patrol calls.
- **While citizens’ degree of impairment is a factor in their response to BWV, so is the context**. The Impaired Driving Countermeasures Unit (IDCU) seldom has to deal with physical aggression from citizens, and compared to the entertainment beat experience, verbal rudeness is minimal. Unit members reported that most citizens were able to process information about BWV.

## 2.2. Citizen Compliance with Police

About one quarter of the public survey respondents doubted the ability of BWV to have any effect on compliance with police suggestions or formal instructions (Table 14). But 93% of those who thought it might have an effect felt it would be positive and increase compliance.

We asked the BWV participants if they noticed that initial lack of compliance from citizens improved once they became aware of the camera. About one quarter reported that awareness of the camera influenced compliance, and about 40% of these said this influence either depended on context or resulted in decreased compliance.

The participants identified two unanticipated factors as causes for the decrease in compliance: citizens wanting to perform for the camera, and “distraction” (included in [Table 14](#)).

Most of the pilot units (44% of BWV individual participants), raised the “performance” issue, but it was most predominant for the entertainment beat units. Members reported that citizens who were peripheral to an interaction would sometimes want to get into the video. When this happened, the member attempting to control the situation could be distracted. And on occasion, those directly involved with the police would ramp up their bad behaviour to show off to their

friends. Also, impaired subjects would sometimes pay less attention to the member because they were distracted by the camera.

Whyte Avenue beat members also reported that the cameras seemed to act as a magnet for some citizens to reach out and touch them – clearly not desirable. This phenomenon seemed unique to that district, as it was not reported by other units even when the project coordinator specifically asked about it.

The project coordinator’s observations from video reviews and walk- and ride-alongs support the participants’ observations on BWV and citizen compliance.

### **Members’ Feedback: BWV and Citizen Compliance**

[excerpts from in-person interviews with all BWV participants]

*How people react depends on the context. A high level of intoxication or a mental health issue, the BWV makes no difference at all. Sober or reasonably sober, if BWV is on they will make goofy comments and act silly. Domestic calls it depends: where people are just yelling and there is no evidence of physical violence, even if the camera is not recording but is present, I find people will make something up. ... Another time it could calm someone down. But it could just shut someone up when maybe it shouldn’t.*

*The presence of BWV might be more effective if the people we deal with were sober....I don’t think the camera is a factor, but how intoxicated they are and the setting they are in.*

*BWV won’t change the speed that they leave the area – find and get into a cab.*

*I did not find that the BWV had any impact on someone complying – that was the police presence. Individual member and skills feature in it. Personality is key – not the BWV presence.*

*If the subject is not going to listen to a cop with a gun and a Taser, they’re not going to care about the camera.*

## **2.3. Talking to Police**

Citizens talk to police in a wide range of circumstances: subject of an incident; victim or witness; informant; or, casual interaction (different for someone on the street than a middle class patron at WEM).

Fifty-eight percent of [public survey](#) respondents thought BWV would have an effect on victims or witnesses providing “incident information” (Table 14). Of these, 67% thought it would increase willingness to do so. When it came to informal chats with police, 55% of public

respondents anticipated an effect from BWV, but 63% of them thought it would decrease willingness to chat. Asked to consider how they would personally feel if captured on the video, 48% thought they would be pleased to have an accurate record, but the remainder expressed various degrees of discomfort at the prospect.

About half the pilot participants said that BWV had an effect on informal conversations with the public; 96% of this half reported either reduced willingness to chat or a context-dependent outcome. Of the 15 % of non-BWV carrying members who reported observing an informal chat, 77% thought it decreased willingness. These observations related primarily to everyday interactions with street-involved people and other potential [sources and informants](#) (Section 1.5.3). In contrast, 17% of the BWV participants said during interviews that the cameras stimulated additional interest and conversations with citizens, particularly among the “dinner crowd” on Whyte Avenue and at WEM.

When it came to citizens’ willingness to provide incident-related information, most pilot participants thought BWV had no effect. But the 29% of participants who observed an effect reported mixed outcomes. Some found the camera useful for recording witness statements, and that it was less intimidating when used at a person’s home. Others felt the camera intimidated some witnesses.

## 2.4. Public Objections to BWV Recording

### **Members’ Feedback: Objections to BWV Recording**

[excerpts from in-person interviews with all BWV participants]

*Some (but rarely) disliked being recorded, but once I explained it was the way we do things they never brought it up again.*

*Some would not agree with the BWV use and I had to explain reasons, rather than just deal with the situation (more at the beginning of the pilot)....Sometimes on a traffic stop someone would object and say they would complain, but no one ever did.*

Eight per cent of public survey respondents expressed concerns about surveillance and privacy, seeing BWV as just another technological invasion. Some questioned the researchers about the security of recorded footage before they answered how they felt about being on camera.<sup>62</sup>

The major issue for BWV recording is the reluctance of [potential sources](#) to talk if a BWV device is even present. Another significant concern is the effect on people with mental illness

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<sup>62</sup> This came from researchers’ feedback, but we didn’t get a number for how many people asked about security. Researcher training included information on the basics of the secure data management.

when, if they're aware of it, the mere presence of the camera can be upsetting. As the selected quotes suggest, there were other occasional objections to recording, some of which were satisfied by members' explanations about the purpose. For the most part, citizens were concerned about what would happen to the video and the fear it might end up on YouTube.

Occasional objections observed by the project coordinator tended to be at traffic stops, where some individuals considered their vehicles to be similar to their residences in terms of autonomy and privacy. On the other hand, recording with BWV appeared to be accepted happily by most drivers at Checkstops.<sup>63</sup> Overall, the public seemed accepting of BWV technology. As one member of the public commented, "if you don't have anything to hide what's the issue?"

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<sup>63</sup> The coordinator observed both reactions while on walk- and ride-alongs, with acceptance being the predominant reaction. She observed that objections were not very rational; for example, an objection to being recorded while arguing it was all right to text while in a vehicle at a red light.

### 3. BWV: LEGAL CONSIDERATIONS, THE COURTS AND CROWN PROSECUTORS

#### Key Findings and Conclusions: BWV in Court

1. **The pilot produced no evidence that BWV has significant prosecutorial value.**
2. **No significant trials using BWV evidence** from the EPS pilot took place during the pilot period. To the best of our knowledge, BWV evidence has yet to be shown during any court proceeding in Canada.
3. **There was no formal feedback from Crown prosecutors about BWV evidence** or its use in the courtroom, despite the project team's efforts to obtain it. However, there are some suggestions that prosecutors will need more time and resources to use BWV evidence effectively.
4. **Generally, expectations are high that BWV will strengthen evidence and increase guilty pleas.** No information about actual outcomes was available during the pilot.
5. **BWV pilot participants saw the potential to improve evidence,** but their experiences left them uncertain about actual impact. EPS member feedback suggests possible benefits through increased guilty pleas for ticket offences.
6. **BWV may have a detrimental effect on prosecutions in some cases,** according to EPS member feedback.
7. **Current legislation in Canada** does not deal specifically with BWV.
8. **Many courtrooms are not equipped to view BWV evidence, and many questions remain unanswered about how the courts will handle issues such as:** managing the volume of footage; disclosure, redaction and transcription; testimony by video technology experts; individual perceptions of video evidence; and the time and cost of viewing and presenting BWV as evidence.

## General legal considerations

### **BWV and the Law - Opinion**

*BWCs record not only the actions and speech of an individual, but also individuals' associations with others within recording range, including friends, family members, bystanders, victims and suspects. The recording of individuals through the use of BWCs raises a significant risk to individual privacy, and LEAs (law enforcement agencies) must be committed to only deploying BWCs to the degree and in a manner that respects and protects the general public's and employees' right to personal privacy. [Office of the Privacy Commissioner of Canada, 2015]*

*For police, the ability to record an individual committing a crime is great, but the reality of having BWV recording every second of every work day seems decidedly less great....they will be the first fully surveilled people in society and the idea of privacy in the workplace will be entirely obliterated. ...Ponder [this] for a minute....This universal recording environment will profoundly complicate security and privacy. [Palser, 2014, p. 2]*

The following legislation applies to the legal issues surrounding BWV (most are discussed in the EPS legal opinion (Lai, 2012, see [Appendix C](#)).

- *The Criminal Code of Canada*
- *The Charter of Rights and Freedoms*
- National and provincial *Freedom of Information and Privacy* acts
- Additional privacy law pertaining to other acts (such as health, child and youth protection, protection of police informants, and labour standards).

The project team submitted A *Privacy Impact Assessment* to the Alberta Privacy Commissioner as part of the project process (see Appendix B). To date in Canada, freedom of information and privacy legislation doesn't refer specifically to law enforcement use of BWV, and there is no Canadian case law pertaining to BWV evidence. Also, as of January 2015, no known trial had taken place in Canada where BWV evidence was shown in court.

In early 2015, the Office of the Privacy Commissioner of Canada, in collaboration with all provincial and territorial privacy commissioners, published guidelines for introducing BWV. These included a four-part test for justifying the use of BWV despite the potential intrusion on privacy:

- necessity
- effectiveness
- proportionality
- alternatives

Robert Palser (2014) offers a further perspective based on experience as a Canadian prosecutor and policy counsel. He raises unanswered questions about public and police privacy violations;



potential security breaches; daily, long term management of a “flood” of data; the development of effective policy and procedures; and current technological limitations of BWV that may be challenged in court.<sup>64</sup>

- **Data management issues arise in connection with the court process**, such as storage (to secure the chain of evidence); full disclosure; and review and redaction to protect privacy. Privacy is a factor for unrelated parties captured on video, the safety of police officers and informants, and the security of police facilities and tactics. For police officers there are additional privacy and labour standards considerations.
- **Crucial issues pertain to the perception and interpretation of video by the courts.** Research shows that different viewers reach differing conclusions about the same video (Harris, 2010), and that viewers have difficulty discerning truth from deception (Porter, Woodworth & Birt, 2000). Palser (2014) maintains that “people believe what they ‘see,’ but what they see on a monitor is not always the same thing as the truth” (p. 3). He further points out that introducing BWV evidence will increase the need for prosecutors to present video experts to speak about technical the aspects of recordings.<sup>65</sup>
- **There is also the question of expectations held by the courts about BWV devices.** A recent ruling from the Ontario Court of Justice involving video taken by a security officer’s cell phone is informative (*R v. Kamali*, 2013). Both parties agreed that the cell phone quality was good and that it provided an accurate and objective account, but defence and prosecution differed on the details of what that account would support.

### **Logistical and management issues**

In addition to legal considerations, there are logistical and management issues for the courts and BWV. In recent years, Alberta has seen a marked increase in both criminal and civil court cases, at times resulting in delays and charges being stayed (Lepp, 2013; Stratton, 2011). As well, over two million traffic and other regulatory tickets were issued in 2013.<sup>66</sup> With a justice system already suffering the “systemic effects of overload,” prosecutors are raising concerns about managing the large amounts of video data that routine use of BWV would produce (Palser, 2014, p. 3; Blake, 2014).

During the design stage of the EPS BWV pilot, the project team liaised with the Edmonton Crown prosecutor’s office to develop a brief questionnaire for every file for which BWV evidence existed. We gave a presentation to Crown prosecutors, consulted with the EPS Crown liaison and followed up with assistant chief Crown prosecutors to ensure the questionnaires were

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<sup>64</sup> In addition to Palser’s opinion, Toronto lawyer Nini Jones addressed police privacy and labour issues at the Canadian Police Association Meeting, Banff, September, 2014.

<sup>65</sup> There seems little doubt that use of BWV in court on a regular basis would place considerable demands for expert testimony. The EPS SMB director is already frequently subpoenaed to testify about CCTV footage from EPS facilities.

<sup>66</sup> Personal communication with Robert Palser, November 12-13, 2014.



filled out. We received no completed questionnaires. To our knowledge, no trial has taken place to date wherein EPS BWV footage has been presented in court.<sup>67</sup>

According to EPS Security Management Branch records, there were 121 requests for copies of BWV footage as of November 2014.<sup>68</sup> At least 102 of these were Crown requests. Some of the rest were from EPS Professional Standards Branch and others were for training, supervisor reviews, or a precautionary request from a constable anticipating a potential need.

### **3.1. BWV and the Courts: Members' Experiences**

The use of video evidence in court is not new, and pertinent case law exists, including for police in-vehicle video. In a 2014 EPSnet article, Edmonton's Chief Crown Prosecutor estimated that he sees a 30% increase in guilty pleas when quality video evidence is presented in docket court.<sup>69</sup>

However, BWV technology (and all video from personally-worn mobile devices) is new. In particular, specific police use of body-mounted cameras to record interactions raises unaddressed questions (Palser, 2014).

Our [public survey](#) (93% of respondents), and our survey of EPS members who didn't participate in the pilot (81% of respondents), found high expectations that BWV would strengthen evidence and lead to more guilty pleas. The BWV pilot participants acknowledged the potential of BWV to strengthen evidence, but only 49% could say that based on their experience it had actually done so. Their uncertainty stemmed from the following: limitations in what the cameras can actually capture in operational contexts, and lack of clarity as to how prosecutors and judges might handle BWV evidence.

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<sup>67</sup> At the time of the CPS BWC Symposium (September 23-24, 2014), no trial had occurred in Calgary either, although a number of traffic offences had gone to court.

<sup>68</sup> This was the count as of November 13, 2014. We know from IDCU records that approximately 40 requests are from that unit.

<sup>69</sup> "Full convictions thanks to video evidence" – EPSnet:  
<http://epsnet/NewsAndEvents/Articles/2014/August/BlakeSchols.aspx>

### **Members' Feedback: BWV and the Courts**

[excerpts from in-person interviews with all BWV participants]

*There were a couple of adjournments in order to have a video player present as BWV evidence had not been noted prior to the first appearance. However, once the BWV was disclosed these cases pled out.*

*The Crown and defence on this spousal [abuse case] said that the BWV was good evidence if it went forward. The Defence said it left nothing for him to question or challenge.*

*I have had some with BWV where they have pled guilty before court (hard to know if BWV was a factor). I had one withdrawn that did not go forward because of the BWV. Other matters can take over a year. There have been requests.... there are a lot of new prosecutors and they are overwhelmed and overworked. They don't read the file and they will throw out whatever they can.*

*I'd hate to have to try and explain why I recorded anything but what the focus should be. My notes are much better. Otherwise it just leads to questions. For example, the lack of audio on CCTV can/is used against us in court. Defence will point to us talking and say that is where we said things we did not. The attitude of the courts to members is an issue. The thinking is that BWV is there because the member is not trusted, so if it is not perfect they will blame the member.*

*It was my partner's case, not mine. The J.P insisted that the subject view the video (no copy had been provided) before the case went ahead. So it was postponed and the subject changed to a guilty plea and we never went back.*

In the absence of direct input from prosecutors with BWV files, the only available feedback on the use of BWV footage in the court process is from pilot participants. The project coordinator also observed three court proceedings. The combined findings are:

- **Possible reduction in not guilty pleas for ticket offences.** The BWV participants, especially those from the Whyte Avenue beats, perceived they had to attend court less for ticket offences, but there are no hard numbers available to quantify this.
- **Probable reduction in court attendance re: impaired driving charges from Checkstop operations.** IDCU members now routinely provide copies of available BWV footage for these charges and report they are attending court less often. However, they don't know the outcomes on these files, and while their reduced attendance could be caused by more guilty pleas, it could also come from more frequent Crown decisions to drop charges.
- **In some instances, a possible detrimental effect on the prosecution's case.** A member reported that a case didn't proceed because the prosecutor didn't think the subject looked very drunk in the video. The member stated, "My notes recorded that the subject smelled of

alcohol as well as the original driving reasons for the stop.” In another case, two members reported a charge dropped because of possible negative impact from the BWV evidence.<sup>70</sup>

- **In some cases, BWV footage was deemed irrelevant.** We know of two cases where the prosecutor said that footage was irrelevant.
  - a) One member reported that BWV footage for an impaired driving charge wasn’t used by the prosecutor because it only recorded the subject in the patrol car *after* the arrest.
  - b) In an assault trial observed by the project coordinator, where the court knew there was BWV footage, it was neither shown nor referred to by either prosecution or defence. The prosecutor explained to the coordinator as court adjourned that video of the victim at first contact and showing injuries was not relevant.<sup>71</sup>
- **Prosecutors are unaware that BWV footage exists.** This happened frequently with ticket offence files. The BWV evidence was disclosed and noted in the files, but prosecutors are overburdened and often not able to review files before arriving at court. Members will introduce themselves to the prosecutor and mention that BWV footage is available. In small courtrooms, subjects can often overhear these conversations and change their plea to guilty, but we can’t know if this is due more to the member’s presence or the BWV footage.<sup>72</sup>
- **Adjournments due to court viewing and awareness issues re: BWV footage.** Several members reported adjournments because the court had not previously been aware of BWV evidence. Also, traffic court (which hears all types of ticket offences) isn’t equipped to view video. On one occasion, defence counsel was reported to have requested time to review video but was unsure how to do so. In another case the judge insisted the unrepresented subject review the video before proceeding.

### 3.2. Potential Disclosure Issues

Pilot participants repeatedly expressed concerns about disclosure of BWV content and its potential for harm. This was about the accidental exposure of information on [sources and informants](#); breaches of citizens’ privacy (whether or not related to the incident being recorded); and the disclosure of private member conversations, personal information, or EPS tactics. EPS has a process in place for reviewing materials to be disclosed and redacting inappropriate information. However, this process doesn’t take into account the quality of police video (with audio) and degree of visual clarity provided by BWV.

During the EPS pilot, members noted the availability of BWV footage on their reports, but copies were only provided to the Crown when requested. We decided not to provide copies automatically to reduce the volume of footage needing transfer and review. With a permanent BWV program, more attention would need to be given to how footage is handled within the EPS

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<sup>70</sup> The subject then filed a complaint, which is now under review.

<sup>71</sup> COR 2014-06-10

<sup>72</sup> COR 2014-01-22.

disclosure, review and redaction processes, which are resource intensive and costly to support (Blake, 2014).

Conversations with U.S. police agencies suggested that disclosure problems can arise when multiple officers using BWV are present at an incident. One officer will take the lead and submit a report, with the danger that not all available BWV clips are noted. The project coordinator observed that this happened at times during the EPS pilot. There is some recent data management software that can help monitor this, but further testing would be essential.

In Canada, there are concerns about wide-ranging requests for disclosure by defence counsel, such as asking for all previous BWV footage from a particular member. Such requests have been made for CCTV footage from EPS facilities.<sup>73</sup> Members are also concerned that defence might focus on minor policy breaches, especially use of language, to divert focus from actual charges.

Over-burdened prosecutors (for whom time is of the essence) work with transcripts of formal interviews that are videotaped; many feel it is quicker to review a transcript than a recording.<sup>74</sup> Responsibilities for resourcing and providing transcripts from video vary across jurisdictions. In [Victoria, B.C.](#), where responsibility lay with the police service, the cost was considered a prohibitive factor in going forward with a BWV program (Laur et al, 2010).

### **3.3. Unanswered Questions about the BWV and the Court Process**

As yet, there is no evidence of solid evidentiary value from BWV. The data from the EPS 19-month operational phase are sparse. Serious charges that go to trial often take a year or more to resolve. Feedback from EPS members suggests that BWV probably helps to discourage not-guilty pleas for minor ticket offences.

We have seen that the introduction of BWV evidence to a previously unaware court can cause adjournment, as can a lack of viewing equipment. And we expect that BWV evidence will add time to prosecutorial review of cases. Also, prosecutors expect that BWV will result in more time on the witness stand for members and technology experts (Blake, 2014).

Other issues include: access to suitable equipment for reviewing video footage (for all court participants including defence counsel and unrepresented accused); whether transcripts are needed for BWV footage; and, if so, who would provide these transcripts.

Until we see examples of BWV evidence used during court proceedings, these important issues remain unclear.

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<sup>73</sup> Robert Palser of the Alberta Prosecution Service mentioned the issue of wide-ranging disclosure requests during his presentation at the CPS BWC Symposium, noting that almost anything that is “fruit of the investigation” can be considered “likely relevant” (Stratton CPS Symposium notes).

<sup>74</sup> Presentations by Robert Palser and Meagan Blake (Stratton CPS Symposium notes).

## 4. POLICY AND PROCEDURES FOR USING BWV

### Key Findings and Conclusions: BWV Policy and Procedures

1. **The EPS pilot identified several procedural issues that need clarification.** These have emerged as international discussion points, with no clear consensus for resolution:
  - Notifying subjects they are being recorded
  - The degree of discretion allowed for when to activate recording
  - Timing of BWV review for reporting
  - Use of BWV for performance management
2. **BWV policy and procedure must be clear, detailed and well communicated** (with comprehensive training) to address the complexity and variety of police work performed by EPS members.
3. **The EPS pilot policy and procedures are a solid foundation** for ongoing development of good BWV practice.

### 4.1. Development of Policy and Procedure for the EPS Pilot

In the U.K., the Home Office (Goodall, 2007) led in providing comprehensive guidelines for using BWV. In the U.S., both the International Association of Chiefs of Police (IACP, 2014) and the Police Executive Research Forum (PERF, 2014) released BWV guidelines. The PERF recommendations were similar to those from the U.K. Home Office, which were also reiterated by the U.K. Body Worn Video Steering Group (2013). The U.K. Home Office guidelines have been recently updated by the College of Policing (2014).<sup>75</sup> At the outset of the EPS pilot, the only available Canadian example was from the Victoria Police Department Pilot (2009).

Drawing on available examples, and especially on the U.K. Home Office Guidelines (Goodall, 2007), the EPS project team drafted initial policy and procedures. These went to a wide range of EPS stakeholders for feedback, which was incorporated into a second draft and sent back to stakeholders for final review. The final policy and procedures (see [Appendix G](#)) were circulated throughout the entire organization. An EPS Body Worn Video Advisory Committee (BWVAC) was formed consisting of the project team and operational representatives from some of the pilot units.

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<sup>75</sup> For additional information, see the Literature Review, Section 9 ([Appendix A](#)).

The group was mandated to address issues that arose during the operational testing, including necessary adjustments to procedures.<sup>76</sup>

## 4.2. Procedural Issues and Questions from Operational Practice

At implementation time in fall 2011, EPS's BWV procedures were among the most refined in North America and the only comprehensive Canadian example. As noted above, over the last two years development has progressed in the U.S. Currently, the Calgary Police Service is finalizing policy and procedure for their ongoing program.<sup>77</sup>

On the whole, the pilot procedures appear to have worked reasonably well. However, operational practice during the pilot raised some issues and questions. These came to light predominantly through the in-depth interviews with pilot participants. Almost 70% of them had some issue, in many cases stemming from not being completely familiar with all the details outlined in the operating procedures. Thirty-one percent of users stressed a need for more clarity.

### Members' Feedback: Policy and Procedure

[excerpts from in-person interviews with all BWV participants]

*The SOPs weren't difficult to understand, but members have differing perspectives on use. The problem was finding a shared perspective among other unit members as to when it was appropriate to record or not. Some members were very open to BWV use: some very opposed.*

*I understand what the policy and SOP says about using the BWV and notifying, but I do not like taking this approach with people. I don't like it being the first point of contact [to notify of recording]. I think it says, "I don't trust you." I don't want that to be the first vibe from me.*

*As per policy I am not supposed to choose not to use my camera on "low level" calls. Me saving the battery life so I have a camera that runs for a decent amount of time when I truly need it is technically breaching policy. Own discretion like any other tool we carry and we use it at our own discretion would be nice (I do recognize the issues with that though as some would use their "discretion" to never use the camera).*

*Policy needs to back us. We do not know where interactions will lead. The public will never understand how on a tough beat you have to immerse and relate to it.*

<sup>76</sup> When the operational phase began, EPS was beginning to separate policy statements from detailed operational procedures. After initial development, we separated our BWV policy statement from procedures for inclusion in the EPS Policy Manual. The pilot procedures are in [Appendix G](#).

<sup>77</sup> At the time of the CPS pilot in 2012, the EPS policy and procedure served as a model for CPS, which they blended with their existing in-car policy.



Operational realities prompted some early minor adjustments to the procedures, especially regarding the issue of when to start recording. For example, limited battery life made it impractical to turn on the camera at the point of accepting a dispatched call. There was also the issue of irrelevant footage to store, review and potentially disclose. We adjusted the directions on when to record to better manage these considerations.

Most of the clarity issues identified by pilot participants have now emerged as areas of international debate, with no clear consensus on how they should be addressed. These are:

- **Notifying subjects:** Our pilot participants felt that informing subjects about recording should be optional, especially in public places. They argued that the camera was easily noticed with its bright flashing light.

Legally, this is currently considered a grey area. British and American procedures continue to demand that members notify subjects about recording as soon as it is safe to do so. In Canada, privacy commissioners are calling for a notification requirement. Some cameras have notices that show they are recording. It isn't clear if this will be considered sufficient notification.

- **Discretion on when to activate:** This is the most contentious issue for BWV. Opinions range from requiring the camera to record continuously, throughout a duty shift (not even a technical option at present), to giving police total discretion on when to turn on the record function.

Both extremes are problematic, so the debate focuses on the degree of discretion allowed. Police work is complex and varies according to jurisdiction and assigned duties, so it is unlikely that universal agreement on discretion will emerge. Research indicates that simply allowing "discretionary use" results in a marked drop in recording activation (Rankin, 2013). As one EPS member remarked, "What is discretion? To you, to me, to others?" Some members suggest that discretion should extend to the option to use BWV, just as it does to the optional use of CEW (Tasers) and carbines, both of which require special tactics training.

Whatever an agency decides about the degree of discretion allowed with BWV, it will be important to establish well-conceived operating procedures and provide comprehensive training, so officers have a clear understanding of guidelines.

- **Timing of BWV review for reporting:** If providing valid evidence is the primary purpose of BWV, then having members review video footage is imperative. However, the existence of BWV footage raises questions about how it should be weighed alongside police notes. There is no agreement among current opinion about when BWV should be reviewed for reporting purposes, especially with use of force incidents. The EPS pilot procedures allowed for review at any time, for any type of incident, except for a serious incident when a member's weapon would be held for evidence at the scene. In such a case, the BWV camera would also be held.

EPS pilot members differed in their opinions about [review and reporting](#). Some preferred to rely entirely on their notes when reporting. Some completed reports based on their notes and then reviewed video footage as a check. And others used video and notes concurrently to write their reports. The [pilot operating procedures](#) didn't give explicit directions on when or how members should review BWV footage for reporting purposes, but such directions would be an improvement for future editions of the procedures.

- **Use of BWV for performance management:** BWV footage has the potential to help with performance management. EPS pilot participants accepted that when a complaint had been lodged, Professional Standards Branch would request video footage, just as they would with any other form of evidence. Members generally expected the footage to support them in the complaint process, and the outcome of some of these files will undoubtedly influence their attitudes toward BWV.

A greater concern for the pilot participants was that BWV might be used for more general performance monitoring, especially to pick on minor policy and procedure infractions such as swearing or failing to wear the uniform hat. During our pilot, footage wasn't readily available to supervisors for *ad hoc* reviews. Such requests had to be made formally and justified. Police associations will be concerned with any use of BWV for performance management, and there will be a need for clear policy on this matter.



## 5. BWV TRAINING: PLANNING AND RESOURCING

### **BWV Training: Key Findings and Conclusions**

1. **Training must be a major component in any successful BWV program**, requiring substantial investment of resources for planning and delivery.
2. **Pilot training failed to ensure consistent and uniform BWV practice by participants**, even though it was comprehensive and well-conceived.
3. The project team identified several key training issues:
  - **The need for specific tactics training** to develop muscle memory and integrate the use of the devices with other equipment.
  - **Participants tended not to read and absorb the full scope** of the operating procedures.
  - **Significant influence (positive or negative) was exerted by supervisors and informal leaders** on BWV use.
  - **Training must address organizational culture to create buy-in from members.**
4. **A successful training plan must include:**
  - Communication about program goals and benefits
  - The involvement of intended users and support personnel.
  - Tactical training on physical operation of the cameras
  - Learning modules for the operational procedures
  - Training of police leaders to promote buy-in in the field
  - Ongoing “refresher” training reviews
5. **BWV has its own training value as a self-evaluation tool for members, and has organizational value as an analytical tool for reviewing training.**

## 5.1 Training and Development Issues

### Members' Feedback: The Need for Training

[excerpts from in-person interviews with all BWV participants]

*They can put it in the policy as much as they like, but we are all individuals. This BWV was not standard from the day I was a recruit and it takes time to adapt.*

*On the job we often, technically breach the letter of policy in our day-to-day duty.... I don't even know every item of the policies and procedures. We feel that we have "Big Brother" looking over our shoulder. It isn't just the user, but also the partner or other member who might not have the BWV on. Now will the video be used for disciplinary purposes? I can articulate the justification for what I do/did, but it is the headache of being called on it.*

*If a member is confident enough it shouldn't alter anything. If it worries you, then you should probably change something.*

*It's like any other piece of equipment. The issues can only be solved by training from the beginning in using the BWV.*

- **The pilot training package was comprehensive and well-conceived, but it didn't deliver the desired outcome – consistent and uniform BWV practice by pilot participants.** They (and their supervisors) suggested adding a major training component: intensified BWV tactics training to develop muscle memory and integrate the technology with basic police training on other tactics and equipment.
- **In their interviews, the pilot participants also called for a different approach to ensure they fully absorbed new policy and procedures.** Sixty-nine percent raised issues about the pilot policy and procedures, with many admitting that they either never read the full version, or that they read it once and didn't remember details.
- **Training for those in support roles also demanded significant resources throughout the pilot.** As personnel came and went from various units, there was an ongoing need to train support personnel and pilot participants.

The project team developed a training package for the BWV pilot project consisting of the following components:

- **An internal communications plan** with initial information and regular updates posted to the EPS news page on EPSnet.

- **Training for support roles**, which varied depending on the role. For personnel handling IT support, help requests and disclosure requests, briefings were sufficient. For those in direct technical support positions, more hands-on training was required, including their involvement in developing device and data handling processes (see [Appendix E](#), Technical Review).
- **A training video** on how to operate the Reveal RS3 SX camera, including patrol use and policy basics.
- **In-person briefing** for pilot participants, telling them about project goals, how to use the camera, and BWV policy and procedures. There were pre-rollout and start-up briefings for the pilot units.
- **An e-briefing**, sent to the pilot participants' video folders, covering the same content as the in-person briefing, with links to the training video and policy and procedures.
- **A summary sheet** of key operational points and a diagram showing BWV technical operating steps. This was also sent to the participants' folders, with printed copies distributed at the in-person briefings.
- **Walk-along training**; at roll-out the project coordinator accompanied the pilot units for two days. Subsequent walk-along training tended to be one day or less as new members had peer assistance available.

## 5.2. Scope and Content of BWV Training

### Training Scope and Content: A Supervisor's View

*Police tend to resist change....Members should be involved in developing the policy and giving feedback on equipment selection and training....Training should include:*

- *Attending every single parade once at least (that's very time consuming) and you have to make sure everyone is included.*
- *Ensuring accessibility. Being accessible, paying visits is favoured. Allowing direct feedback.*
- *VOD casts on EPSnet rather than written articles.*

*For familiarity with the policy and procedures there need to be learning modules. Going over it together as a unit helps too. I have a printed version of a policy we need to discuss, so we can refer to it in hard copy and think about it.*

To start our operational phase, we tested BWV cameras in the laboratory and in controlled training situations before we began ongoing field testing (see [Section 1.1](#)). During controlled training testing we used mainly new recruits. This seems to be the ideal way to introduce BWV technology, because for these recruits, BWV came as part of their initial equipment package and was accepted along with the rest of their gear.

The Fort Worth, Texas, Police Department (Sikes, 2014)<sup>78</sup> has decided to equip front-line officers with BWV. They began with recruit classes and are moving gradually to train veteran officers. FWPD's insights on training mirror those mentioned by the EPS supervisor quoted above.

Scope and content of training can be divided into three essential areas:

- training for physical operation
- procedural knowledge and confidence
- and delivery for buy-in.

### **Training for physical operation**

Training for operating the BWV device is more complex than merely learning how to turn on and off the recording function. Members must have confidence in their ability to fit these actions into their previous tactics training for positioning and prioritizing the use of all their other equipment. Without careful consideration at the organizational level of how BWV integrates with all police tactics and equipment, confusion about how and when to use it will be a likely result. Decisions about tactics training for BWV will necessarily influence some of the critical questions about policy and procedure identified in [Section 4.2](#).

### **Procedural knowledge and confidence**

We found that EPS pilot participants tended to lack confidence in the operational procedures, partly because of some unresolved legal and procedural issues.<sup>79</sup> Training must stress complete familiarity with policy and procedures. The EPS supervisor quoted above suggested learning modules that members must complete successively and successfully. Possibly, a combination of unit learning and discussion, and on-line test modules, will provide the knowledge base necessary for members' confidence as they deploy BWV.

BWV does have the potential to build procedural and tactics confidence on its own. When we interviewed pilot participants about reviewing BWV footage, 24% volunteered the extra detail that

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<sup>78</sup> Fort Worth PD has conducted several rounds of BWV product testing, but hasn't done a formal evaluation or published a report. Hence, this agency isn't included in the EPS Literature Review. Information about FWPD comes from a PowerPoint presentation made at the CPS BWC Symposium (2014).

<sup>79</sup> See [Legal and Social Considerations](#); [Deciding when to Record](#); [Policy and Procedures for Using BWV](#).

they had done so for the purpose of self-training. These members all saw the value in BWV for this purpose.<sup>80</sup>

### Delivery for buy-in: trainers and police leaders

#### **“Culture Eats Training”**

*Regardless of how effective a training regime may be, the training will not cause the desired behaviour if the attitudes, beliefs, and values of the majority of people in the organization are inconsistent with the training. As a practical matter, formal police training is relatively brief...Culture, on the other hand, surrounds police officers at their workplace, and is present in all interactions. Culture must align with the training in order for the training to be effective over the longer term. The pressure to conform to the prevailing culture is significant, and the lessons of training will be ineffective if they conflict with the practice in the field and the expectations of fellow officers and supervisors. [Iacobucci, 2014, p. 117]*

Training must motivate members (not just those equipped with BWV but non-users as well) to buy in to the BWV concept. As the quote above emphasizes (Iacobucci, 2014, report to the Toronto Police Service), training can only be effective if it integrates with prevailing organizational culture – or in turn, if that culture is successfully molded by policy, procedure and training.

As documented in our [Literature Review](#), all reported BWV pilots to date found at least some degree of resistance to the technology – even with voluntary participation. EPS pilot participants and their supervisors gave some suggestions to increase buy-in, also identified in the Fort Worth experience (Sikes, 2014) and by PERF (2014):

- **involve the intended users** through all stages of the process including selecting and testing cameras and policy development (start with a diversity of perspectives and opinions)
- **identify police leaders**, both official supervisors and informal unit leaders, and train them as BWV trainers
- **implement an effective communications plan** that speaks clearly to the goals of the BWV program and its benefits to members.

Police organizations must also consider the question of oversight. Most BWV pilots have been coordinated by a sworn member seconded to that role, or who adds the role to other duties. Having a sworn member in this role can promote confidence that the coordinator understands the operational conditions and culture hosting the pilot. Potential disadvantages can depend on the

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<sup>80</sup> The interview question was focused on reviewing footage for reporting purposes only. In hindsight, it would have been valuable to ask specifically if members reviewed for self-training. Informal feedback suggests that the percentage of participants who used video to self-evaluate was much higher.

organizational placement of the sworn member coordinator – is it neutral or potentially biased (such as in the Office of the Chief or PSB)? A carefully selected non-sworn member can bring specific expertise to a pilot program, but may be perceived as lacking understanding of day-to-day policing. The ideal would be to share the project lead between a respected sworn member and a non-sworn member with relevant expertise.<sup>81</sup>

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<sup>81</sup> There is no simple answer to this. There is a strong body of literature that discusses (without agreement) the pros and cons of “insider” versus “outsider” researchers, especially concerning organizational research and program evaluation.

## 6. COSTS AND RESOURCES

### Key Findings and Conclusions: Costs and Resources

1. **Implementing and managing a BWV program for front-line use will require major financial investment in the \$multimillions** for an agency the size of EPS, and costs will extend beyond EPS to involve prosecutorial services and the courts.
2. **Such an investment demands reliable technology and hard evidence of outcome benefits.** Currently, we have no data proving the evidentiary value of BWV footage for prosecutions, and the available technology doesn't address all EPS operational requirements.
3. Among the police services that use BWV, **there have been no comprehensive cost-benefit analyses done to prove it delivers financial or time savings.**

### Considering the Costs of Implementing BWV

*While body-worn cameras can provide many potential benefits to law enforcement agencies, they come at considerable financial cost. In addition to the initial purchasing cost, agencies must devote funding and staffing resources toward storing recorded data, managing videos...providing training to officers, and administering the program. [PERF, 2014, p. 31]*

Our own experience through the course of the EPS pilot, and information from other jurisdictions, has shown that costs to launch and maintain a BWV program rise correspondingly with the scale of the program (Hamilton Police Service, 2014; Police Executive Research Forum (PERF), 2014).

Costs must be considered for a wide range of needs:

- **project management** for all stages and aspects of the program: from assessment through purchase; testing and operational coordination; and reporting requirements
- **personnel** to run every aspect of the program

- **hardware purchases** (devices, batteries, accessories, replacements)
- **hardware management** (storage; security and monitoring; life-cycle maintenance; returns; re-assignments)
- **uniform adaptations** to accommodate BWV devices
- **video footage storage** (purchase and management of storage method; retention periods and deletion process; long-term evidentiary storage)
- **data management** (choice, purchase and oversight of method; security; retrieval and review; investigative administration; FOIP and Crown disclosure requests; redaction and transcription demands)
- **supporting infrastructure** (IT support; bandwidth; desktop and vehicle capacity; upload stations)
- **policy and procedure** (development; operational and data management; review and revisions)
- **training** (content development; trainer training; roll-out; and on-going training for BWV users and various supporting roles)
- **communications plan** (internal and external; key milestones such as announcement to adopt BWV; at roll-out; at evaluation; for any media-attracting incidents)
- **program evaluation** (development of tracking and measuring processes; ongoing upkeep of records/statistics; periodic reporting).

[Figure 4](#) shows the substantial total costs for the EPS BWV pilot. The breakdown shows “projected costs” and “real operating costs.” The projected costs were for a two-year period, but we extended the pilot for a third year and the real operating costs for the 56 cameras we used operationally reflect this.

The “in-kind” labour contributions are difficult to estimate accurately, because members incorporated BWV tasks into their daily duties. The figure provided is likely an underestimate, mainly because of EPS stakeholder contributions that weren’t included in the original breakdown; but that we captured in the list immediately above.

Hamilton Police Service (2014) recently completed a report on the viability of a BWV program. It includes detailed estimates of various costs expected for a BWV program with 190 devices for shared front-line use. The report estimated a total of just under \$15 million over the first five years, and another \$3.25 million at the beginning of a new life cycle in year six.<sup>82</sup>

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<sup>82</sup> We are grateful to Hamilton Police Service for permission to cite this internal report.



**FIGURE 4: BREAKDOWN OF EPS BWV PILOT PROJECT COSTS<sup>83</sup>**

PROJECT COMPONENT	QUANTITY		DETAILS	Projected \$	Real Operating \$
	Planned	Actual			
BWV devices	20	63	@ \$1,500 per, including necessary accessories	30,000	94,500
Dedicated servers	1	6	Original estimate was 1 @ \$30,000, capacity 24 TB, based on one year minimum retention. Real operating requirements were six servers. <sup>84</sup>	30,000	80,000
Network switches <sup>85</sup>	0	14	@ 1,500-\$5,500 per, <sup>1</sup> 24-48 port GB/POE	-	31,000
Desktop computers	4	4	@ \$1500 per	6,000	6,000
Project coordinator	1	1	\$150,000 from the Canadian Police Research Centre grant.	200,000	300,000
<b>In-kind contributions<sup>86</sup></b>					
Labour	N/A	N/A	SMB Director & Technical Security Manager @ 20% each per Y1-2; Legal advisor @10% Y1, 5% Y2; SMB IT@ 15% Y1, 5% Y2; Corporate Communications advisor @10% Y1-2	159,000	159,000
Existing EPS technical infrastructure	N/A	N/A	Two servers	40,000	40,000
<b>TOTAL COSTS</b>				<b>465,000</b>	<b>710,500</b>

<sup>83</sup> A project grant of \$150,000 came from the Canadian Police Research Centre (now the Centre for Security Science). The “Projected \$” column shows anticipated approximate costs at the time of the initial proposal, which was for two years. At implementation time, the pilot scope was expanded to three years. The “Real Operating \$” column shows the approximate actual cost of the pilot. Purchase costs are in 2011/2012 dollars.

<sup>84</sup> Servers: only four were purchased new, with two available as surplus from another project. The current cost of these servers is about \$27,000 per.

<sup>85</sup> The network switches were purchased at approximately a 50% discount on list prices.

<sup>86</sup> **The project team is confident that the real in-kind contribution is greater than the amount shown.** We underestimated the in-kind contribution from EPS resources, especially the time and expertise from the SMB Technical Team to manage BWV equipment maintenance and data management processes. Without specific time-tracking we can’t provide a more accurate estimate. Also, existing EPS physical resources such as office space; equipment and supplies; the use of a technical development lab; and ongoing operational expertise and support; are “soft” costs – effectively nil to EPS but significant to the project, and a consideration for smaller organizations budgeting for BWV.

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## ***APPENDIX A: LITERATURE REVIEW***

### **The Promise of Body Worn Video: Considering the Evidence Analytical Literature Review For the Edmonton Police Service Body Worn Video Pilot Project**

Final Version  
December 2014

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### **Acknowledgments**

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We are grateful to Defence Research and Development Canada, Centre for Security Science for funding support for this project.

## **A1. Introduction**

Body worn video (BWV) is a recording device worn as part of an officer's uniform in order to capture an audio/visual record of events as they occur. BWV is thought to have major benefits for policing and criminal prosecution, but it is a new technology. Little systematic research is available concerning either technical or operational effectiveness in the policing, investigation and prosecution process.

The purpose of the Edmonton Police Service (EPS) Body Worn Video Pilot Project is to:

- a) Systematically assess the usefulness and effectiveness of using body-worn video (BWV) recording devices.
- b) Develop a base set of standards, protocols, and operational evaluations

This literature review is completed as a component of the overall project. The purpose is to:

- a) Gather together information and evaluation reports (including ongoing pilots) about BWV technology and policing from Canada and internationally.
- b) Assess the sources of information and strength of evidence provide in these materials.

## **A2. Sources and Review Approach**

Resources were gathered during the span of the EPS BWV pilot. Included are: information from manufacturers: news media articles: police media articles; organizational reports, guidelines and standard operating procedures; and as many BWV assessment and evaluation reports as could be identified and accessed. Several professionally or academically evaluated pilots are now underway in England, Canada and the United States (U.S). Where possible, information on those projects is included in this review. An extensive [bibliography](#) of references and additional information sources is made available at the end of this document. Additional information is provided from personal communications with police agencies that have conducted, or are currently conducting, testing of BWV technology.

Although most reports include some references for sources cited, only two prior specific reviews of information and research on BWV have been identified (Ellingwood & Yamamoto, 2014; White, 2013). These authors take the approach of reviewing issues/claims about BWV with reference to reports and other sources. In contrast, this analysis takes an approach that first separates information sources from research reports and then summarizes the latter with the intent of enabling comparison of identified findings and facilitating some overall conclusions about the strength of evidence to date. When reviewing evaluation reports attention will be given to the following factors:



- Technical Details (type of device, pros and cons, data management approach)
- Pilot Participation (who took part, for how long, under what conditions)
- Evaluation Measurements
- Reported Findings (impact on citizens and police officers, complaints, use of force, prosecutions)
- Conclusions and Recommendations

### **A3. BWV - The Way of the Future? BWV**

**The Future is Near?**

*It's coming and maybe faster than you think. There is nothing you can do to stop it.*  
[Fiumara, 2012:1]

*Body worn cameras will be present on every officer in the next three to five years*  
[Wyllie, 2012:3]

In the past decade, constant and immediate access to various kinds of digital information, including video, has proliferated exponentially. The capturing on video of negatively interpreted police actions is seen as a driver for equipping police officers with body mounted video devices that can record entire incidents from the police point of view (Ellingwood & Yamamoto, 2014; Fiumara, 2012; Greenwood & Streicher, 2013; International Association of Chiefs of Police (IACP), 2014; Prasad, 2013).

The idea that BWV is an inevitable necessity and will soon be common-place equipment for police is driven by manufacturers (Clark, 2014, Reveal Media, 2014a; Savov, 2014; Taser International, 2014; Wyllie 2012), and propagated by mass media (Greenwood & Streicher, 2013; McKerracher, 2014; Scowen, 2013; Schwartz, 2013; Shingler, 2014).<sup>87</sup>

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<sup>87</sup> The references provided are a small sample only. Reveal Media has a sophisticated news mining element to its website at: <http://revealmedia.com/news/>. Reveal incorporates media articles into its own presentation. Taser International has a news link on its site: <http://www.taser.com/taser-in-the-news>, as does VieVu: <http://www.vievu.com/news-and-media/news-2014/>. Both also have Facebook pages that serve the same purpose.

The often-repeated claims about the advantages of BWV are drawn from reports about In-Vehicle Video (IVV) (Drasin, 2011; IACP, 2004).<sup>88</sup> The IACP report concludes (p. 2) “that in-car cameras provided a substantial value to agencies using them, including:

- Enhancing officer safety
- Improving agency accountability
- Reducing agency liability
- Simplifying incident review
- Enhancing new recruit and in service training (post incident use of videos)
- Improving Community/Media perceptions
- Strengthening police leadership
- Advancing prosecution/case resolution
- Enhancing officer performance and professionalism
- Increasing homeland security
- Upgrading technology policies and procedures.

Discussions of BWV generally adopt very similar benefits with the added advantage that the body mounted devices go where the officer does, thus increasing the potential value.<sup>89</sup>

There are some dissenting media voices (Bear & Riekin, 2014a, 2014b; Hill, 2014; Vandenbrink, 2013), and as this review will show, actual testing of BWV systems reveals numerous technical and process challenges, along with currently unanswered legal questions that must be resolved if BWV is indeed to be the way of the future in policing technological tools.

#### **A4. Information or Evidence? Examining the Sources**

We live in the information age. We hear this statement all the time, but what does it mean in terms of finding sources of information and ascertaining the credibility of the content? Who are the information providers? What can be considered actual evidence?

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<sup>88</sup> It is beyond the scope of the EPS BWV pilot to assess the strength of research on IVV benefits. It is generally accepted that IVV has proved its worth, although it is noted that a number of U.S. agencies are moving away from IVV in favour of body worn cameras.

<sup>89</sup> For example, see the *Primer* by ManTech (2012, p. 3), which cites the IVV benefits from the IACP report (2004) as supporting the value of BWV. The *Primer* is then cited in the publisher’s summary as stating that, “Body-worn Cameras (BWCs) can play an important role as an officer’s technological partner, faithfully capturing what the officer sees and hears (National Law Enforcement and Corrections Technology Center, 2012, p. 1), although that is rather more than the *Primer* claims (p. 5) and no actual evidence about BWV use is included.

## Information or Evidence?

Definitions from EPS BWV Pilot Participant Members

**Information:** *Intelligence gathered for analysis*

**Evidence:** *Items gathered that prove or disprove a matter*

To illustrate the challenge involved in answering these questions in terms of body worn video, a simple exercise was conducted using Google.<sup>90</sup>

- The search term “body worn video” was entered and produced 31,600,000 results in 0.37 seconds. On the first page of results nine of 14 hits were for manufacturers. Only one of these was indicated as a paid advertisement; one hit was for Wikipedia; one was a mass media article; and three were police sources.
- Adding “police” into the search mix provided 13,500,000, but results were still dominated by manufacturers.
- The search was then refined to “body worn video camera” producing 11,200,000 results in 0.41 seconds. The same hits dominated the first page.
- A few minutes later, the “body worn video camera” search was repeated and produced 12,600,000 in just 0.34 seconds. This time 10 of the 14 first page results were manufacturers and three were mass media. The Wikipedia result was missing, but the EPS announcement of the BWV pilot was among the top ten hits!

This simple search exercise demonstrates the overwhelming amount of digital information and the way in which bias enters into the most available sources. Clearly it would be impossible to view every entry. A simple way to think of information versus evidence is to consider information as ‘clues’ to an issue and evidence as the ‘proof’ of the case – or the validity of the information collected.

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<sup>90</sup> The searches took place between 09.30 and 10.00, July 23, 2014. The same search at different times and on different machines can produce very different total numbers of results.

## **A5. The BWV Promise for Policing: Manufacturer's Claims**

It is understood that manufacturers have an interest in promoting their own product but for the first agencies to consider the potential of BWV, manufacturers' information was all that was available. In broad terms, manufacturer claims fall into two categories: technical specifications and operational value.

### **A5.1 Technical Specifications**

Police agencies interested in BWV technology use manufacturers' product descriptions and technical specifications as an essential investigative starting point (Clissold, Stratton & Tuson, 2013). The U.S. Department of Justice recently published a market survey detailing and comparing technical specifications of most currently available BWV devices suitable for policing (Man Tech Advanced Systems, 2014). However, with the technology still in relative infancy, new products are frequently released quickly dating these evaluative attempts.<sup>91</sup> Furthermore, the technical claims of manufacturers tend to be based on ideal contexts, and as the pilot test reports show, may not be achieved in operational use ([Section 7](#)).

### **A5.2 Operational Value**

Manufacturer claims about the operational value of BWV technology closely mirror the advantages listed in [Section 3](#), noted as deriving from evaluations of IVV.<sup>92</sup>

Positive news reports about BWV are also featured on manufacturers' websites and linked to promotion for available products (Reveal Media, 2014a, 2014c, 2014c; see also [footnote 90](#)). What is less well known, but sometimes captured in news reports, is that manufacturers will often provide cameras for testing free of charge or at a very minimal cost (Reveal Media, 2014d; Savov, 2014).

An information loop between manufacturers and news media is created within which the same basic information is constantly repeated, but supported by little or no actual evidence (see example below).

An example of particular interest is the *PoliceOne.Com* roundtable discussion with four experts (Wyllie, 2012). The experts are all BWV manufacturer executives representing four different companies (see box below).

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<sup>91</sup> The comparisons made in the EPS pilot in late 2011 are now very dated in terms of the technology evolution. Currently Calgary Police Service and RCMP Canada are undertaking assessments of devices now available.

<sup>92</sup> Similar examples to the one in the illustrative box can be found on the websites of most BWV providers. The EPS pilot purchased and tested Reveal Media RS3 SX (<http://revealmedia.com/about-reveal-media/>) and Taser International Axon Flex (<http://www.taser.com/products/on-officer-video/axon-flex-on-officer-video>).

## An Example From Taser International

### “AXON Flex Point-of-View (POV) Video Benefits”

(from: <http://www.taser.com/products/on-officer-video/axon-flex-on-officer-video> )

- U.S. law enforcement spends approximately \$2 billion each year to resolve claims.
- Agencies deploying POV video report dramatic decreases in complaints – many report 100% decrease in claims (UK Study).

**Testimony is Interesting. Video is Compelling.**

**Improves behavior** of all parties during police interactions.

**Reduces false complaints and lawsuits** by accurately capturing video from the officer’s perspective.

**Saves time and increases efficiency** – officers spend more time on patrol with automated workflows that reduce administrative workload.

**Pre-event video buffer** yields the greatest reduction in complaints and lawsuits when actions leading up to the incidents are recorded.

**Low light recording** best shows what the human eye actually sees.

**Enhances public trust and creates safer communities at a lower cost.**

## Expert Insights on Body-worn Video Cameras

[from Wyllie, 2012, p. 1]

*Officers are serving daily in a new “iReport” culture where virtually every citizen is equipped with video capable smart phones and are posting guerilla footage to the Internet almost as soon as an event happens.*

[Adam Rushlow, WatchGuard Video, PR and Marketing]

*Video saves time, money and sometimes officers’ jobs...most complaints and lawsuits...are dropped and many prosecution cases are uncontested or expedited.*

[Michael Millhollen, Digital Ally, Inc, Marketing Specialist]

*The biggest issues that body-worn cameras can solve are reducing litigation and complaints while increasing officer efficiency.*

[Steve Tuttle, TASER International, Founding Team Member]

*The deployment of BWV is a great cost-effective solution.*

[Steve Lovell, VIEVU, Managing Director]

Once the promotional hype is recognized, manufacturers may still be a good source of valuable information. In the *PoliceOne* roundtable, the four participants also provided tips for assessing and testing BWV products (Wyllie, pp. 1-2).<sup>93</sup> It was suggested that agencies should not adapt to the limitations of the product but look for key features, summarized as follows:

- Small single piece devices, with high quality video and no extra wiring.
- Devices and data management systems with security features.
- Consider both short and long term cost, along with back-end flexibility.
- Mounting options available to meet agency needs for how and where the devices will be worn.
- What is to be recorded and where – pre-event recording desirable.
- Battery life, recharging and replacement.
- Low-light performance.
- Method of data storage and management.

Some other important operation/evaluation considerations noted were:

- Test multiple products using the same officers (but multiple, fully trained, testers)<sup>94</sup> to identify what best meets the needs of the agency environment.
- Assign devices to individuals rather than sharing them in a pool.
- Consider the variety of contexts in which the BWV may be used.
- Ensure the system has a secure, retrievable data management system.
- Ensure an integrated approach to handling various video sources.
- Have standard operating procedures and enforce them.
- Provide sufficient training.

## **A6. BWV the Inevitability for Policing: Media Excitement**

In addition to the information loop existing between manufacturers' claims and media reports, both mass media and police agency media play a role in advancing the idea that police adoption of BWV technological is inevitable. As illustrated at the beginning of [Section 4](#), many millions of examples are available on the Internet. For the purposes of this discussion, a small sample of articles from Canadian media will be used as illustrations.

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<sup>93</sup> Which participant recommended what feature of BWV did tend to depend on the features possessed by their own devices.

<sup>94</sup> Toronto Police Service intends to take this approach in their forthcoming pilot. They will rotate four different types of device among four testing groups for three months each (Barsky, 2014).

As noted in [Section 3](#), perceived police misconduct is seen as a driver for equipping police officers with BWV and this holds for Canadian Media where the fatalities of Robert Dziekanski in Vancouver, Sammy Yatim, and other people in crisis in Toronto attracted calls for BWV (Iacobucci, 2014; Schwartz, 2013). Given this driver, the main benefit emphasized in Canadian mass media is police transparency and accountability. Potential problems most frequently noted are cost and privacy (CBC News, 2012a, 2012b, 2012c, 2013; Dykstra, 2013; McKerracher, 2014; Mui, 2013; Schlinger, 2014; Schwartz, 2013; Scowen, 2013; van Rassel, 2013; VandenBrink, 2013).

Although most articles include pros and cons, the majority of main headlines promote the idea of inevitability.

### **Canadian Media Headline Examples**

*Lights! Camera! Busted? Are on-body cameras for police officers a good idea?*  
[Scowan, 2013]

*Cops with cameras: Growing numbers of police armed with recording devices*  
[Schlinger, 2014]

*Police union wants video cameras for officers* [CBC, 2012a]

*Cop Cams now a Necessity*  
[McKerracher, 2014]

*Body-worn cameras a 'tremendous asset' for Edmonton police*  
[Klingbeil, 2013]

Concerns are reported from the Canadian Civil Liberties Association about citizen privacy and selective recording by police (CBC, 2012c Hui, 2013), while Police Associations are divided, with some having strong apprehensions about member privacy and costs detracting from operational priorities (Hui, 2013; Ontario Association of Chiefs of Police, 2013; VandenBrink, 2013).

### **Quotes from Canadian Media**

*But since none of the more than 20 officers at the scene were equipped with body-worn video cameras (BWV) – a technology more police forces are turning to – the public remains unaware of their perspective of the incident.*  
[Swartz, 2013]

*In Montreal the request for the devices came from police officers themselves, who say videos posted on line...often fail to show the full exchange in an intervention.*  
[Schlinger, 2014]

*The city police chief said he's not convinced mounting video cameras on officer uniforms will help the police or the public....[the] head of the city's police association echoed concerns about privacy....He questioned whether body-worn cameras would lead to increased accountability for officers and the public.*  
[VandenBrink, 2013]

*The Windsor Police Service is considering the use of dashboard and body-worn video cameras....Newly hired [Windsor police] chief told CBC News .... "It's an absolutely incredible tool. It provides almost indisputable evidence in court".*  
[CBC News, 2012c]

## **A7: BWV and Policing: Testing and Operational Evidence**

Despite the vast amount of information sources discussing BWV technology, the operational evidence to support claims about either the pros or the cons of this technology is sparse. Furthermore, existing research is spread around the world originating in significantly different policing and legal contexts, which weakens any potential for generalizing findings.

### **BWV: Claims Versus Evidence**

[White, 2013, p. iv]

*Although advocates and critics have made numerous claims regarding body-worn cameras, there have been few balanced discussions of the benefits and problems associated with the technology and even fewer discussions of the empirical evidence supporting or refuting these claims.*



Most existing, completed pilot testing has some or all of the following limitations:

- Voluntary participation in the testing group.
- Small participant numbers, with even less participation in feedback processes.
- Uncontrolled operational environment - it is probably impossible to control all the potential variables in the operational conditions of a large police service.
- Dated technological examples and findings (inevitable given the infancy of BWV).
- A lack of sound, relevant base statistics for meaningful comparison.
- Either professional evaluators with little knowledge of policing, or police officers with limited research experience and many other duties to perform.

As White (2013, p. 23) concludes in his review, there is still very little evidence to support or refute claims made about BWV technology. Currently, several in-progress pilots are attempting to improve the BWV evidence-base by forming pilot project **partnerships between an experienced policing lead and a professional researcher**. These efforts, as well as completed research reports are summarized in Sections 7.1 to 7.4 of this review.<sup>95</sup>

## **A7.1 Australia**

Several jurisdictions in Australia use or have piloted BWV but no evaluation reports were found via Internet searches and few personal contacts established. Lyell (2010) provides information on early consideration of BWV technology in Queensland, but no information has been found relating to actual pilots of BWV in that province. Information was provided for a recent pilot by the New South Wales Police Force.

### **A7.1.1. New South Wales Police Force, 2013 - 2014** (New South Wales Police, 2014a)<sup>96</sup>

#### **Technical Details**

✚ *No details of devices* tested.<sup>97</sup>

✚ **Equipping all NSW officers** on a shared basis would require 2,000 devices on a shared basis.

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<sup>95</sup> We are also aware that Reveal Media devices were tested in Hong Kong and that there has been some BWV testing in New Zealand, but have no details about these initiatives.

<sup>96</sup> A PowerPoint was provided to the BWV Team in September 2014. Further details of this pilot have been requested.

<sup>97</sup> According to a PoliceOne.com (2014) article the devices are Reveal Media RS3 SX.

- ✦ *An estimated 90 minutes of recording* per day would generate 1.3 GB of data per day equalling 930 TB for the first year.
- ✦ *Proposed data management solution*: Local storage for up to three months with controlled transfer to PHQ after local download. Transfer to tape after 3-4 months with automated recall for requested data.

### **Pilot Participation**

- ✦ *Devices were tested, for five week trial* periods at seven sites between July 2013 and April 2014. No other details currently available.
- ✦ Participating officers were trained on how and when to use the BWV device.

### **Evaluation Measurements**

#### **New South Wales Police BWV Pilot Terms of Reference**

- Establish the viability of Body Worn Video for use by NSW Police
- Implications for Operational Policing
- Implications for storage and retrieval of data
- Corporate ownership of policy, logistics and technology
- Costs for a roll out to operational police
- Ongoing procurement and systems management
- Training

- ✦ *Feedback from BWV users*.
- ✦ *Technical estimates* of device quantities, storage capacity and costs.

### **Reported Findings**

- ✦ *Useful evidence in court was anticipated* by 67% of BWV users.
- ✦ *A positive change in the behaviour of the public* was noticed by 40% of the users.
- ✦ *Positive public comments* were received by 27% of users.

- ✦ *No formal complaints* were received about the use of BWV.
- ✦ *Estimated cost* for 350 cameras, storage and management over 2 years at three sites \$8.9 million (AU) capital and 6.5 million (AU) recurrent.

## Recommendations

- ✦ *Continue with BWV trial*
- ✦ *Amendment to Surveillance Devices Act* to exempt police use of BWV in the lawful execution of their duties. Currently this *Act* requires consent of the parties to record except in public places. Amendment is also requested to the *Criminal Procedures Act 1986* as current evidential rules regard recordings as hearsay.
- ✦ *Negotiations with State Records Authority* on data retention
- ✦ *Further develop project assumptions*

## A7.2 Canada

Commencing in 2009, several small pilot studies were conducted in Canada. The best known of these is the Victoria Police Department Proof of Concept Study, which produced a published report. Unpublished information has also been provided to the EPS BWV Pilot Project to allow a summary of other pilot testing in Canada to date. Currently, policing agencies across Canada are highly interested in the potential of BWV. Toronto Police Service is in the planning stage of a year-long operational pilot (Barsky, 2014). Several Ontario police services have stated that will monitor this pilot before making any decisions related to BWV.

### **A7.2.1. Victoria Police Service (VICPD), BC, 2009.** (Laur, LeBlanc, Lane, & Taylor, 2010).

In 2011, Victoria had a population of around 352, 000. VICPD currently has 243 sworn members.

### **Body Worn Video and In Vehicle Video: Objectives**

*To examine the use of BWV and IVV, to test new equipment, and to attempt to compare results with those found in BWV research from the U.K.*  
[Laur et al., 2010]

## Technical Details<sup>98</sup>

✚ *Devices* were the head mounted Audax Archos 604 and eWitness.<sup>99</sup>

### **The Audax Archos 604** (pp. 27-29)

- *Mounting* was a problem. The head camera lacked suitable options for use with bike helmets or regular wear.
- *Multiple components* (head camera, cables, DVR and external battery pack) were difficult to fit in with existing equipment.
- *Battery life*, even with the additional battery pack, was only four to five hours.
- *Connectors* from camera lead to battery were prone to disconnecting.
- *Interference from radio transmissions* disrupted the otherwise good video image.

### **EWitness** (pp. 31-33)

- *Head mounting* was consider a suitable design for police use
- *Multiple components* (camera, breakaway cables, mount, DVR, battery pack) but was much lighter than the Audax system. The DVR was fragile and had to be carried in a breast pocket.
- *Connecters* were considered reliable
- *Battery life* was about three to four hours but batteries could be easily changed (three per shift needed).
- *Video and audio* were good with minimum to no interference from radio transmissions.
- *Vibration alerts* for recording and low battery (liked by users).

✚ *Data management*: A stand-alone non-networked server with two terabytes of storage was used with no backup system (p. 35). IVV and BWV footage only used 160 GB of space. Officers were responsible for downloading video at the end of each shift and for making evidentiary copies. Increased security measures are recommended if IVV/BWV use were adopted permanently (pp. 37-38). Video was viewed via Windows Media Player.

## **Pilot Participation** (pp. 41-42)

✚ *Twenty officers* were involved in testing. It is not clear how they were selected. They received technical and procedural training.

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<sup>98</sup> Only technical details for the BWV component of the study are reviewed. However, as there is some cross over in the pilot, discussion of pilot participation and findings requires mention of the IVV portion of the project.

<sup>99</sup> Initially the Taser Axon Pro device was also chosen for testing but because of uncertain availability and the third-party data management system with this mode, VICPD did not proceed (p. 9)

- ✦ **Four BWV devices** (and four IVV installations) were shared by pilot participants and tested between July 1 and October 30, 2009 (p. 3). It is unclear if some participants tested both types of technology.

### Evaluation Measurements

- ✦ **A participant survey** was the primary evaluation tool
  - *15 officers responded* to surveys. It is reported that six officers responded to questions on BWV, while nine answered for IVV (p. 42). However, some questions were common to both technologies, but results are not broken down by type of technology used. Furthermore, Figure 10 (p. 52) shows ten (66.7%) respondents saying that they used BWV equipment.
  - *Positive opinion statements* were the basis of all survey questions (for example, “The use of BWV improves the quality of evidence I can submit”).<sup>100</sup> A ‘neutral’ point was provided on the answer scale and this was sometimes utilized by the majority of respondents (p. 51 for example where 67% of the six respondents selected the neutral option).

### Reported Findings

Findings about BWV based on the officers’ survey responses must be considered with extreme caution because of the small number of respondents and conflation of answers with IVV. The data presented in the body of the report provide very little support for the summary of conclusions (p. 4) and at times seem at odds with these. The main areas of reported findings are:

- ✦ **Evidentiary value:** it is concluded that “BWV will contribute greatly to providing best evidence for court/inquiry purposes (p. 5). While officers believed this to be so (pp. 3, 45-46), only 40% actually prepared Crown reports (p. 50) and it is unclear whether or not video of either kind was significant in affecting increased charge approval or conviction rates. Importantly, the Crown is noted as being reluctant to use the video as evidence and requiring transcription (p. 40).
- ✦ **Impact on Citizens:** Officers were divided on whether or not the public response to BWV/IVV was positive (p. 43). Public feedback via the media was also mixed with privacy and secure handling of video being main concerns (p. 70). The majority believed the presence of video reduced citizen aggression, although a third either disagreed or were neutral on this (p. 47).

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<sup>100</sup> These kinds of statements lack neutrality, as either positively or negatively phrased, they suggest there is a ‘correct’ response. If they are used, they should at least be a mixture of positive and negative items.

- ✦ **Impact on Officers:** 67% of the nine officers responding for BWV indicated that it was not convenient to use and that it didn't make their job easier (pp. 54-55). Of the 15 total participants 80% did not agree that completing files with video saved time (p. 48). Furthermore, seven officers felt the BWV was not well received by co-workers (p. 58). Asked about expanding BWV use, five out of nine chose the neutral response, while four were in favour (p. 53).

## Conclusions and Recommendations

- ✦ **Further testing and evaluation** of BWV and IVV over a six month period is the final recommendation in the body of the report (p. 74). Despite the very mixed nature of the actual data obtained, the summarized conclusion is that “overall this technology was well received by police officers, members of the public and Crown Council....the study greatly supports the use of IVV and BWV in policing the Greater Victoria Area” (pp. 4-5).
- ✦ **VICPD did not proceed further** with IVV/BWV, however, because back-end data management costs including the expense of providing transcripts for the prosecution was prohibitive.<sup>101</sup>

### A7.2.2.Royal Canadian Mounted Police (RCMP), 2010, 2013, and ongoing

In 2010, RCMP Canada conducted a small BWV pilot project in Kelowna BC and Codiac Moncton (RCMP, 2011). In 2013, RCMP Nanaimo (Neilson, 2014) also ran a small-scale pilot of BWV. Currently, RCMP Canada is undertaking an in-depth Scoping Study of BWV. The literature review by Ellington & Yamamoto (2014) is a product of this project, which is now in the testing plan phase.

## Technical details

### Kelowna/Codiac

#### ✦ **Devices:**

- *A Taser Axon Pro* was tested non-operationally (the third party U.S. based data storage was a roadblock to operational use). Evaluation was generally positive, although the multiple component device was considered bulky. The head mounted position, GPS, buffering function, and 6-8 hour battery life were considered positive features.
- *10 VidMic*, combining BWV with a police radio were operationally tested. With the following findings:

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<sup>101</sup> Personal communications between Stratton and Brendon LeBlanc, January 31, 2012 and February 29, 2012.

- *Mounting* of Vid Mics could be on a jacket or external body armour, but video was often not focussed on the subject of attention.
- *Battery life* was insufficient at only three hours. Low battery issues a constant beep that could become a safety issue.
- *Operation was complicated* involving multiple steps that were distracting for the officer to check, again being a potential safety concern.
- *BWV and radio components* were found to be unreliable.
- *Video and audio* quality were considered excellent.

✚ **Data Management:** No details are provided, but download was reported as easy.

### Nanaimo

- ✚ **Devices:** DRIFT HD Sports Action Helmet *cameras* were issued to participating members. The devices were inexpensive but were not specifically designed for police work.
- *Video quality:* field of view and performance in various lighting was considered good to acceptable in low light.
  - *Battery life* was inadequate
  - *Data management:* Video was stored on a provided hard drive and download was reported as easy. File transfer and digital storage issues were experienced (no details).

### Pilot participation

#### Kelowna/Codiac:

- ✚ **Ten members were selected** (5 from each site) to test the BWV for six months commencing in January 2010. Usage appears to have been discretionary as 132 BWV clips were recorded (118 at Codiac; 14 at Kelowna).

#### Nanaimo:

- ✚ **Four constables volunteered** to carry BWV between May and September 2013. Guidelines for use were provided but activation was discretionary. Ongoing team meetings assisted in procedural training and adherence. The participants or the team leader were responsible for disclosure to the Crown (an MOU was in place to determine process and responsibilities). Evaluation was based on user feedback). Recording rate was estimated as twice per member per four shift block (pp. 1-3).

### Evaluation Measurements

- ✚ User feedback was the basis of evaluation in both Kelowna/Codiac and Nanaimo.

## Reported findings

### Kelowna/Codiac:

- ✦ *BWV recordings were useful* for a complaint, a suspicious sudden death, a domestic assault and several other incidents (pp. 8-10).
- ✦ *Members liked the idea of BWV but* felt equipment improvements were needed, especially having the device see what the members see (p. 11).

### Nanaimo

- ✦ *Impact on Citizens:* Public response in the form of comments to the officers was entirely positive.
- ✦ *BWV recordings were useful:* Three examples of BWV value are reported: two involved the use of a Taser by officers and the other was a domestic violence case where charges were laid based on the BWV evidence (pp. 3-5).
- ✦ *Disclosure* to the Crown was easily provided due to the pre-established MOU.

## Conclusions and Recommendations

### Kelowna/Codiac:

- ✦ The concept of BWV was positive but equipment features did not meet officers' needs. Further testing of additional products was recommended.

### Nanaimo:

- ✦ BWV has great potential for police purposes. All participants were strongly in favour of BWV and would like to continue using it (p. 5).

### A7.2.3. York Regional Police (YRP), 2012 (Pottage, 2012)

This was a small, exploratory and primarily technical performance evaluation intended for internal YRP consideration. Feedback from officers was gathered informally. YRP have kindly allowed EPS to report some of the testing observations, but emphasize that this was not a scientifically rigorous study.

### Technical details

- ✦ *Device:* One Panasonic WV-TW310 Body Worn Video Camera and charging base. It was selected because YRP already used the Panasonic IVV. The body mounted camera is attached to a battery pack by a cable. It has 'fisheye' field of view allowing it to capture a



wide context while mounted in various positions on the body. Fifteen to 30 second pre-recording is available.

- ✦ **Data management:** Gyro correction software stabilizes the image for viewing. Provided software has security features (See [Calgary Police Service pilot](#), for more details)

### Pilot Participants

- ✦ IT department, Operations Support; Use of Force Training Unit and trainees.

### Evaluation Measurements

- ✦ Technically evaluated and tested in a non-operational setting by the pilot participants based on their areas of expertise.

### Reported Findings (pp. 6-8)

- ✦ **The camera system was robust**, had adequate digital storage, and was not susceptible to radio interference
- ✦ **Video quality was generally good.** One concern was noted: the shooting position of the officer potentially obscured the view when the camera was mounted on the lapel, but this was not systematically tested.
- ✦ **Mounting was a concern** for the two-component device. Average size officers were selected to test the device during use of force training and lack of space was an issue. The camera tended to fall off during dynamic activities.
- ✦ **Battery life may be a concern** as even under ideal circumstances the eight hour standby mode is insufficient for a 12 hour shift.
- ✦ **The LED indicators**, located on the battery pack, made it difficult and distracting to operate.
- ✦ **Download time varied** depending on the bit rate configuration and was considered lengthy.

### Observations

The following observations were based on the perceptions of a small subset of testers only and are considered points for further investigation and consideration

- ✦ **Tactical applications:** the unit was not considered suitable as it is not submersible in water, does not have night vision and has not been tested for CS gas, fire or smoke. Furthermore concern about the disclosure of tactical operations was expressed.

- ✦ **Officer observations:** Testers were concerned about the bulkiness of the device and a potential safety hazard from the cable. Concerns were also expressed that the video could be used to monitor performance (p. 8).
- ✦ **Potential usefulness for the Traffic Unit** for evidence gathering was noted, especially for impaired cases (p. 8).
- ✦ **Legal ramifications** of adopting BWV are unknown and should be thoroughly investigated before further testing of BWV (p. 11).

#### **A7.2.4.Calgary Police Service (CPS), 2012-2013** (CPS,2013, 2014; Kiez, Rashid & Stratton, 2014)<sup>102</sup>

The City of Calgary has a population of just over one million. CPS reports an authorized strength of 2,045 sworn members, of which approximately 1,100 are in frontline or other duties being considered for BWV.

#### **Technical Details**

- ✦ **Devices:** 50 Panasonic WVTW310 wearable cameras were tested (see description above under [York Regional Police](#)). CPS was already using Panasonic IVV and wanted to test compatibility of BWV.
  - *Mounting was an issue.* The devices were considered bulky and awkward and space to mount the components was difficult to find. The clip fastening was initially flimsy and insecure, but the manufacturer worked with CPS to improve these.
  - *Battery life* was inadequate, especially in cold weather.
  - *Video-audio quality* was generally good, although reduced in low light or noisy environments.
- ✦ **Data Management:** Data were stored on dedicated servers installed at headquarters and overseen by IT and pilot project staff. Panasonic Arbitrator software was used. Initially this was not integrated with the IVV program but later in the pilot CPS tested the new version that integrated IVV and BWV clips. Initially this program was reported as satisfactory, but it is still undergoing testing as problems have arisen. Specific processes and staff duties were in place for vetting and disclosure.

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<sup>102</sup> Except where specifically noted, information is distilled from available resources combined with numerous personal communications between Stratton, Rashid and other members of the CPS BWC project Team.

## Pilot Participation

### Comments from CPS Pilot Testers

[From CPS, 2014, pp. 8-9]

*The program is a great idea – the cameras are not “up to standard” yet.*

*BWC [has been] an asset to both investigation and identification of a subject...It has also helped me to see the sometimes subjective view or missed details in dealing with a subject.*

*I began the pilot taking out the camera every shift. But after experiencing the battery issues constantly, I stopped leaving it on standby to conserve power. After a while I realised I was taking it out but not even turning it on during an entire shift, and therefore, stopped taking it out altogether.*

- ✦ **A cross-functional group** of 50 members (patrol, beats, mountain bike, canine, gang suppression) were trained to test BWV in various contexts. Volunteers piloted individual issue devices between November 2012 and May 2013. Some testers withdrew, or were transferred to work areas where BWV would provide no potential benefit.
- ✦ **Compliance was encouraged** but not mandatory. Self-reported usage levels varied significantly: one-third of the test group said they almost always took out the BWC; one-third reported using it some of the time; and the remainder rarely took the camera out.
- ✦ **2,561 video clips** were collected. Of the 54 pilot participants, eight submitted no recordings. 31 users had less than 50 clips each and just 8 collected over 100 Each.<sup>103</sup> Over 70% of the captured video was produced by 28% of the test group (CPS, 2014, p. 10).

## Evaluation Measurements

- ✦ **User feedback collected** via focus groups involving vendor, online survey mid and post pilot, and individual feedback. Not all users completed the survey (25 at mid-pilot and 32 at the end) (CPS, 2014, p. 1). Survey items consisted mainly of degree of agreement with positive statements, mixed with some Yes/No questions.
- ✦ **Statistics collected** for usage, disclosure requests

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<sup>103</sup> The number of clips does not represent the number of incidents. An incident of any seriousness usually results in multiple clips. CPS report an average of 2-3 videos per file with a tendency for Criminal Code events to have more and longer clips while traffic violations have fewer and shorter clips.

## ✚ *Cost-benefit estimates*

### Reported Findings

✚ *Potential safety risks* were perceived by 68% of respondents at the mid-point survey. With greater familiarity with the equipment this declined to 40% by the final survey. Concerns mentioned were:

- The device design, specifically the cord connecting the camera and battery
- Distraction when operating the camera (mentioned most often)
- Lack of support because non-BWV users tried to stay outside of the BWV field of view.

✚ *BWV gives a more accurate account* was the opinion of the majority of users, and 88% of those who submitted files to the Crown considered BWV improved the quality of evidence provided. However, some respondents cited examples of video not accurately representing the context and events occurring (CPS, 2013, p. 6).

✚ *Crown requests for BWV*: By August 2014, 76 requests had been received.

### ✚ *Impact on members*:

- Several members turned in their devices during the pilot due to perceived safety issues and/or technical issues associated with the BWV.
- Only eight of the testers wanted to keep their devices at the end of the pilot with poor opinion of the tested device being a primary reason. However, there was more support of the general idea of BWV with better equipment (CPS, 2013, 2014).
- The CPS project team concluded that not all members understood the purpose behind adopting BWV as a policing tool. For example some members thought the camera should be more covert; others felt the secure process for uploading and storing the video indicated a lack of trust in their credibility. A clear communication and training plan must accompany implementation of BWC.

### Conclusions and Recommendations

*CPS decided to move forward* with the aim of service-wide deployment of BWV by the end of 2014. The perceived value of BWV was considered to outweigh dissatisfaction with the tested product, which is considered surmountable. The following steps were planned and are underway at the time of writing:

- Issue a full Request for Proposal (RFP) process to identify all potential solutions currently available in the marketplace and build in proof-of-concept mechanisms to alleviate issues and concerns raised by members during the pilot study.
- Conduct a legal review.
- Further develop policy and procedure.
- Enhance the training plan.
- Develop an internal and external communications plan.
- Execute infrastructure adjustments.

### **A7.2.5.Edmonton Police Service (EPS), 2011-2014**

The City of Edmonton has a population of approximately 812,000. EPS currently reports 1,550 sworn members. This review is included as an Appendix to *Body Worn Video: Considering the Evidence*, the Final Report of the EPS BWV pilot Project, which provides a detailed account of the entire project. The Interim Report provides details of the project design and approach (Clissold, Stratton & Tuson, 2013). Brief details of the project are repeated here to allow easier comparison with other reviewed research.

#### **EPS Pilot Participants Comments**

[From Stratton, 2014a]

*I thought that it would be better – it looks better on TV.*

*I was chasing a guy with a gun. A very bad situation and the camera hit me in the face. I wanted to rip it off and leave it.*

*There is room for improvement: less bulky would be better; it should have a stable mount, no swivel head; and capacity to buffer so as to catch the beginning of an event if I am a little late activating it. Once there is a more standard practice for using it and all members are aware, it will be better.*

*Initially I was unsure about BWV. I thought I might have to worry about how I deal with every individual – that it would be used in a negative light. But if we have discretion on use and when to activate it, I think it is a very beneficial tool that captures exactly what is happening as it unfolds.*

## Technical Details

### + *Devices:*

- *Taser Axon Flex* (seven devices tested in controlled training contexts). The two part devices were complicated to operate. A button located on the battery pack required different numbers of presses to activate at standby (buffering) or record. Checking this meant looking at the device. The head-mounted camera dislodged during dynamic interactions. The Tactics Training Unit had safety concerns related to the placement of the camera at the side of the head and the potential for the detachable cord to be used as a weapon against members.
- *Reveal Media RS3 SX* (56 devices operationally tested). Members reported the devices to be bulky, insecurely mounted, uncomfortable, and interfere with carbine use.

### + *Battery life:*

- *The Flex* had excellent battery life under controlled setting. Approximately 12 hours on buffering and over four hours of continuous recording. It was not tested in very cold temperatures.
- *The RS3* had inadequate battery life for a busy shift (averaging 90 minutes of recording, less in very cold weather). The date reset to default with low battery.

+ *Video-audio quality* was generally good for both devices, although reduced in low light or noisy environments. Detailed rating will be included in the Final Report.

+ *Data management:* Significant technical, financial and resource challenges were experienced in order to implement BWV for Edmonton Police.

- *The Flex* was designed to operate using Evidence.com software which utilizes U.S. hosted 'cloud storage. Inability to find a local data management solution (along with the safety concerns) prevented operational testing of this device.
- *The RS3* DEMS software did not perform adequately at the time of the EPS pilot launch. EPS developed a script to utilize Microsoft Windows for managing BWV clips.<sup>104</sup>

## Pilot Participation

+ *Test groups were selected* with stakeholder input to provide data from a range of contexts (patrol intervention and control group; three community and entertainment district beat teams; Impaired Driving Countermeasures Unit). Appropriate activation expected.

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<sup>104</sup> See the [Isle of Wight Project](#) re use of the latest version of DEMS. The EPS Final Report will provide details on data management.

- ✦ *Personal issue Reveal Media RS3 SX devices* were tested by 57 members over the course of the operational pilot period (October 2012 – July 2014), with the expectation of use according to provided policy and procedure.

### Evaluation Measurements

- ✦ *Statistical comparisons* of intervention and control groups and pilot to previous years.
- ✦ *Participant Feedback* collected by in-depth personal exit interviews; informal individual and group feedback.
- ✦ *Researcher observations*
- ✦ *Video quality ratings*
- ✦ *Public opinion researcher administered survey*
- ✦ *General EPS membership on-line survey.*

### Preliminary Reported Findings

- ✦ *Policing contexts are complex*: there is no simple rule for operating BWV that is effective for all scenarios. BWV policy must harmonize with other policies. Members must have confidence in their operating procedures.
- ✦ *Impact on citizens*: Edmonton citizens had strongly positive views of BWV and high expectations of its evidentiary value. A majority believed it would reduce physical aggression from both citizens and police, but a minority (9%) thought it would aggravate the situation. Approximately 8% expressed privacy concerns. However when it came to informal interactions with police 63% thought the presence of BWV would have a negative affect (Stratton, 2014b).
- ✦ *Impact on members*: Most members recognize the positive potential of BWV, but do not think that the tested device meets an acceptable equipment standard. Many have concerns about personal privacy and think strong and clear policy must be enacted to protect these rights if BWV is to be adopted as a policing tool.
- ✦ *Prosecutorial value* has not yet been established.

### A7.2.6. Amherstburg Police Department, Ontario, Ongoing<sup>105</sup>

Amherstburg has a population of around 22, 000. Amherstburg PD has 31 members. The Chief of police would like to equip the 21 patrol members with BWV. Quick resolution of complaints is of particular interest. To that end he has been assessing and testing various BWV products. The current testing phase is scheduled to end December 31, 2014.

#### Technical Details

- ✦ **Three Silent Partner units** that combine BWV with a police radio were assessed as providing great video and having potential. However, secure mounting was a problem, the radio microphone was not loud enough, Battery life had only one hour of record time, and malfunction issues were experienced.
- ✦ **Taser Axon Flex** was considered a promising design, but the third-party outside Canada data management system was a roadblock to use and the device was not tested.
- ✦ **Ten Reveal Media RS3 SX** were purchased for testing, commencing January 1 2014.
  - **Mounting** that was safe and secure was an initial concern, but Amherstburg PS recently switched to external body armour. The camera is now placed in the vest pocket with the screen rear facing and the camera head turned to face out over the pocket. This has proved very satisfactory and also resolves a preference for a rear-facing viewing screen. In the context of this mounting, the movable camera head is a positive feature.
  - **Battery life** is not sufficient for a full shift, but for the purposes of the pilot recharging via patrol car laptops is permitted.
  - **Security concerns** are noted due to the unsecured SD card used in the RS3.
  - **Video Quality** was much improved by mounting the camera in the vest pocket and is reported as very encouraging at this point in the pilot.
- ✦ **Data management:** A 16 terabyte server to store the BWV will hold all the video for one year. After that, the next year will begin to overwrite previous data. If this proves to be too little space, The DEMs software provided with the RS3 SX will be used to manage data.

#### Pilot Participation

- ✦ **Eight selected patrol officers** (40% of the front-line personnel) are testing the devices with an expectation of activation to record police-citizen interactions. Detectives may use one of

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<sup>105</sup> Information provided in personal communications between Stratton and Chief Tim Berthiaume between August 2013 and August 2014.



the spare devices if available and have utilized the BWV to record statements and crime scenes.

### **Evaluation Measurements**

- ✦ *Statistics* for complaints, time attending court and any other relevant available comparison numbers.
- ✦ *Officer and supervisor feedback*
- ✦ *Public feedback*

### **Preliminary Findings and Observations**

- ✦ *Overall results to date are positive.*
- ✦ *Policing Context:* The Police Chief observed that Amherstburg PD is a small department in a town with one of the lowest crime rate in Ontario. Members are not going constantly from call to call and generally have plenty of time to operate the BWV when they responding. It is much different to that in Edmonton and other large cities. The volume of video to be stored will be far less than for large city agencies such as EPS and CPS. It is easier to monitor and control the use of the BWV devices and follow processes between APD and the Crown.
- ✦ *Some members are concerned* about the Big Brother Watching' potential of BWV.

## **A7.3 United Kingdom**

Various small-scale testing in the United Kingdom began around 2006, but if evaluations occurred, reports are not available.<sup>106</sup> At the end of 2006, the Devon and Cornwall constabulary took part in the Plymouth Head Camera Project, which was independently evaluated (Process Evolution Ltd., 2007). Between 2009 and 2010 BWV pilots took place in Renfrewshire and Aberdeen and where subsequently given an independent review (ODS Consulting). Currently a large evaluated pilot project is underway in the Isle of Wight (Hampshire police). These research efforts are reviewed here. As well, the London Metropolitan Police have begun testing 500 BWV devices supplied by Taser International (on-body camera) and Reveal Media (RS3-SX) (BBC News, 2014; Reveal Media, 2014e; Savov, 2014). Additionally the U.K. has provided

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<sup>106</sup> Process Evaluation Ltd. (2007) reports that 17 police forces in the U.K. responded to a Home office questionnaire about BWV use (p. 78). ODS Consulting (2011) state that in 2010 over 40 police force areas were using BWV.

guidelines for the use of BWV and several examples of operating procedures, discussed in [Section 9](#) of this review.

### **A7.3.1.Devon and Cornwall Police – Plymouth, 2006-2007** (Process Evolution Ltd., 2007)<sup>107</sup>

In 2006, Plymouth had a population of approximately 250,000 and around 1,000 police officers. The focus of the Plymouth project was on violence related incidents in domestic and public settings.

#### **Expected Benefits**

[Process Evolution Ltd., 2007, p. 48]<sup>108</sup>

- **Prevent** and **deter** crime, as the presence of a head camera is anticipated to change the behaviour of potential offenders;
- **Catch** and **convict**, as the head camera footage will provide best evidence for the CPS to act.

### **Technical Details**

✚ *Devices were unnamed* but described as “a small camera fixed to a headband. The camera is connected to a recording unit consisting of a hard disk drive (HDD) and a small liquid crystal display (LCD) screen for reviewing images recorded.” (Process Evolution Ltd., 2007, p. 69). Recording on the 50 pilot devices was operated by a remote switch attached to the officer’s lapel (p. 80). Feedback from the pilot users indicated the following pros and cons (pp. 78-80):

- A head-mounted device was considered the best option for point of view, but discomfort from the headband, weight of the camera, and complex usability were concerns that negatively affected usage.
- Integration of the recording device and cable with the uniform was also a problem.
- Operation of the record switch was difficult, especially when wearing gloves.

✚ *Video quality* was sufficient, but affected by lighting conditions.

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<sup>107</sup> This report was published as an appendix to Goodall (2007), *U.K. Home Office Guidelines for the Use of Body-Worn Devices*, and is often referenced to that report (which in turn may have authorship contributed to the publisher rather than the acknowledged author). In this author’s opinion, this leads to confusion in analytical review of this separate research evaluation from which the Home Office Guidelines evolved. Therefore it is reviewed and referenced separately in EPS BWV Project reporting.

<sup>108</sup> An elaborated version of the project objectives appear in Goodall (2007, p. 30).

✚ **Data management:** A stand-alone computer was installed in a central back office with an Archos AV500 100 GB hard drive adapted to include security software and supported by a backup device. Evidential footage was copied to DVD or equivalent. This was a data management advance from prior use of BWV where individual officers were responsible for managing their own video (Goodall, 2007, p. 31-32). At that time this system seems to have been considered satisfactory, although Process Evolution Ltd. (2007, p. 80) report some software issues and device/airwave interference.

## **Pilot Participation**<sup>109</sup>

✚ **Pilot length: 29 weeks.**

✚ **Pool-based issue** of 50 devices on a sign in/out system to record usage.

✚ **Participation was voluntary, unmonitored and inconsistent** (Process Evolution Ltd. 2007, pp. 71-72).

- 300 officers were trained to use the BWV.
- Approximately 150 officers booked out a device, but only about 40 are shown as taking a device out more than once and not all of these actually recorded footage, or had the BWV out for a full shift.
- Only 12 officers booked out cameras 20 or more times during the 29 week pilot, with just three using a device on every shift.

✚ **Footage recorded** (Process Evolution Ltd. 2007, pp. 73-74).

- 10,000 hours of duty time produced 3,054 recordings equal to 530 hours of video of which 29% was tagged as evidentiary.
- Although the mean recording time was 10.4 minutes, 60% of clips were under 10 minutes in length and 30% less than four minutes.<sup>110</sup>

## **Evaluation Measurements**

✚ **A set of seven targets** to be achieved rather than a straight comparison between BWV users and non-users during the pilot period (Goodall, 2007, p. 31; Process Evolution Ltd., 2007, p. 50). This approach complicates drawing strong conclusions from pilot data.

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<sup>109</sup> A precise description of methodology is not provided in the report and this summary is distilled from the entire report.

<sup>110</sup> The understanding of this author is that the guidelines were to record incidents from outset to conclusion. If so, these numbers also suggest that this direction was seldom followed, but the report does not speak to this.

- ✦ **Existing data were utilized** for comparison, especially crime incidence statistics. Graphs and tables provided show small differences (untested for significance) and considerable fluctuation within comparison years (Process Evolution Ltd., 2007, pp. 51-64).
- ✦ **Statistics collected during the pilot** (2006/07) were compared with the corresponding 29 weeks in the previous year (2005/06).
- ✦ **Officer feedback**
  - A questionnaire about the experience of using BWV (100 responses of which 19 reported never using the BWV).
  - An “ABC analysis” for work time comparison (although it appears only six BWV users completed their section, pp. 57-58).
  - Interviews with an unspecified number of officers.

### **Reported Findings** (Process Evolution Ltd., 2007, pp. 88-89)

The evaluator acknowledged the limitations of findings from the study, including the lack of statistical significance for reported trends. The following summary of findings should, therefore, be regarded with caution.

- ✦ **Violent crime reduction** occurred during the pilot period, but cannot be determined as an effect of BWV.
- ✦ **Violent crime detection increased** during the pilot period.
- ✦ **BWV provided better evidence:** anecdotal reports suggest BWV footage was helpful in court.
- ✦ **BWV increases officer efficiency** by reducing the amount of time officers spend on paperwork.<sup>111</sup>
- ✦ **Complaints were not received** against officers wearing head cams during the pilot, but overall numbers were too small to draw any conclusions.

### **Conclusions and Recommendations**

- ✦ The report concluded that head cameras are a positive step and that issues raised should be surmountable. It was recommended that the pilot be extended and assessed over a further 12 months. Re-engagement with potential users is suggested after issues raised are resolved.

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<sup>111</sup> This conclusion is particularly suspect as it appears to have been based on data from six officers and it just doesn't seem to make sense that officers with extra reporting to complete on BWV would spend less time on reporting, plus they had to go to a specific location to book out and return cameras. However, it appears that a lot of managing and review work took place at the back-end office where increases in workload are indicated (pp. 103-104).

## BWV or other Variables?

*During any pilot it is possible that the improvement will arise simply by the fact there is a focus on the use of head cameras. Also it may be the case that those officers booking out head cameras are generally more proactive*  
[Process Evolution Ltd., 2007, p. 62]

- ✦ Despite this recommendation, BWV use did not go ahead at the time due to budgetary constraints. In early 2014, Plymouth police re-introduced BWV use with a chest mounted device (Eve, 2014).

### A7.3.2 Grampian Police – Renfrewshire and Aberdeen, Scotland, 2010-2011 (ODS Consulting, 2011).

ODS Consulting were contracted to professionally evaluate information from previously conducted reviews of two separate BWV pilot projects in different Scottish policing areas. Understandably this imposed evaluation measurement challenges. There is also very minimal technical and pilot participation information and no feedback is included from the BWV users. At that time, Grampian Police had just over 1,700 officers serving 46 police stations in an area of 8, 737 square kilometres, with a population over 500,000.

#### Technical Details

- ✦ *Devices are not described*

#### ✦ *Data Management*

- **Renfrewshire:** Stand-alone servers were installed in two Renfrewshire police offices (one of which was Paisley). BWV supplier software (unnamed) was installed and an administrator was available at each site to manage files (ODS Consulting, 2011, p. 4).
- **Aberdeen:** Stand-alone laptops with non-networked software were provided with ICT support, described as “well managed” within the small-scale pilot (p. 5).

#### Pilot Participation

##### Renfrewshire (p. 4)

- ✦ *27 community police and park wardens*, in several locations, were provided with 38 devices between June 2009 and January 2010. The report does not indicate if devices were individual or pool issue.

- ✦ *Cameras were used on 2,500 occasions* with 583 evidentiary files retained. Of these, 86 were referred to the Procurator Fiscal (prosecutors' office). Other investigative evidence was also identified and applied.

#### **Aberdeen (p. 5)**

- ✦ *An unspecified number of officers*, working primarily multiple social deprivation communities, used 18 devices beginning June 1, 2010 for a three-month pilot. The report does not indicate if devices were individual or pool issue.
- ✦ *The cameras were deployed over 2,500 times* during the pilot period with 38 reports referred to the Procurator Fiscal.

#### **Evaluation Measurements**

- ✦ *Crime statistics comparison* for the pilot period with the corresponding weeks in the prior year and for the pilot areas against non-intervention areas.
- ✦ *Court outcomes analysis* of BWV cases versus all cases.
- ✦ *Qualitative case studies* (two) with park wardens.

#### **Reported Findings**

##### **BWV or other Variables?**

*It is difficult to show a causal relationship between the use of BWV cameras and changes in crime. In particular it is challenging to attribute any changes in crime to one specific intervention - given that there are other changes occurring simultaneously both at a societal...and a police force level.*  
[ODS Consulting, 2001, p. 7]

- ✦ *Reduction in criminal offences* is impressive in the deprived intervention areas of Aberdeen where BWV was employed (150 less, down 26% from the previous year). No similar reduction occurred in Aberdeen as a whole for that time period. However, the BWV project coincided with the introduction of a new community policing model so the contribution of the cameras is unclear (p. 8). Some indication of greater crime reduction in BWV areas is also present for Renfrewshire.
- ✦ *Increases in early guilty pleas* for BWV cases were found in both Aberdeen and Renfrewshire, although these were inconsistent by court location (p. 10). In Renfrewshire

cases were 71- 80% less likely to go to trial. A number of cases were dropped by the prosecution early on, and there is also indication that guilty pleas were less likely at intermediate and trial hearings. Reasons for this are not explored.

- ✚ **Complaint resolution:** In Renfrewshire, two complaints with BWV available, were resolved by the recordings clearly showing no police misconduct. In Aberdeen, five complaints were made where BWV was present. All five were found to be unsubstantiated. The two case studies from park wardens also relate to complaints where BWV upheld the conduct of the wardens (p. 11).

## Conclusions and Recommendations

- ✚ **Theoretical cost saving** during the pilot period was about £50,000 (calculated using a Home Office cost of crime index). But the £42,500 cost of the pilot does not appear to have been deducted from this.<sup>112</sup>
- ✚ **Unavailable or unverifiable information** that was identified:
  - Investigation time or the value that could be attributed to evaluating that.
  - Assaults on officers not wearing BWV, but qualitative indications are that the cameras deter assaults on officers.
  - The monetary value of making the public feel safer by the presence of BWV (not possible to assess).
- ✚ **Recommended if BWV is continued:** more robust IT support; information gathering and monitoring protocols are in place; and cost data analysis is improved.
- ✚ **BWV use expanded** to 350 devices in Aberdeen, but no further roll out has occurred since the amalgamation of all Scottish police forces.<sup>113</sup>

### A7.3.3. Hampshire Constabulary – Isle of Wight – in progress (Ellis, Jenkins & Smith, 2014)<sup>114</sup> <http://www.college.police.uk/en/21544.htm>

The Isle of Wight covers almost 147 square miles with a population just over 138, 000. The island is policed by the Hampshire Constabulary with approximately 225 officers located on the

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<sup>112</sup> The cost of the pilot provided only allows £2,400 for project development and training. No cost is indicated for overseeing the pilot and evaluating it, both of which would significantly increase the project costs.

<sup>113</sup> Personal communication between Stratton and Chief Insp. Laing, Police Scotland on 2013-10-28

<sup>114</sup> A description of this project is available at: <http://www.college.police.uk/en/21544.htm> . The description is also informed by a series of personal communications Between Stratton, project evaluator, Tom Ellis and Inspector Stephen Goodier, Hampshire Police.

island. Usage statistics for the full year of the pilot are provided but other reported findings are based on information available for the first six months only. There are no conclusions or recommendations at this time. The Final Report is expected to be released in early 2015.

### Technical Details

- ✦ **Devices:** 180 Reveal Media RS3 SX. Initial problems with a fragile camera head and weak battery catches were rectified by the manufacturer.
  - *Mounting* on external body armour was satisfactory with no issues raised.
  - *Firmware upgrades* have been provided during the pilot.
  
- ✦ **Data management:** Reveal Media DEMS software on 33 standalone base stations distributed across Hampshire and the Isle of Wight.<sup>115</sup> Data are stored on a desktop NAS drive. The 33 computers are connected to a network and the metadata are collected centrally.
  - *Pilot users* reported DEMS easy to use. It is the responsibility of officers to burn to DVD any copies required.
  - *Upgrades* have been provided during the pilot, including a date and time warning alarm and automatic date-time synchronization with the base station. A further upgrade is expected that will improve retention management and low resolution playback.
  - *There is scope for review* of tasks associated with storing, disseminating/sharing BWV and around storage and sharing of hardware.

### Pilot Participation

- ✦ **Mandatory Individual issue to 165 officers** (frontline response, traffic, neighbourhood, dog handlers and PCSOs) between July 1, 2013 and June 30, 2014.
  
- ✦ **Shared issue:** Four cameras between 46 members of the CID investigation team; six cameras between 12 custody officers for use in the custody block
  
- ✦ **Expectation of use** is that the camera will be activated when an officer is exercising a power in law or offering any direction or control.

### Evaluation Measurements

- ✦ **Crime statistics** comparison during pilot period, between BWV presence and non-presence.
  
- ✦ **Complaint statistics** for BWV comparison with the police district as a whole.

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<sup>115</sup> In total there are 500 Reveal media BWV devices in use across the Hampshire Police district. Only the 180 personal issue devices on the Isle of Wight are being evaluated.



✦ **Public opinion survey** at two time points during the pilot. Questions utilize positively phrased opinion statements (see [footnote 101](#)).

✦ **BWV user-officers survey** with questions that parallel those posed to the public.

### **Preliminary Findings**

✦ **20, 196 recordings** are reported for the duration of the pilot (average therefore 122 per pilot officer). Of these 4,409 are designated ‘important’, 1,214 as ‘regular, and 14, 342 were deleted after 31 days as not of evidentiary value. The remainder were partial downloads due to equipment or process failure.

✦ **Impact on citizens:** Members of the public at time one, had positive attitudes toward BWV use and high expectations for a positive effect from using it.<sup>116</sup>

✦ **Officers using BWV** (70% responded to the survey):

- Held similarly positive views about the potential effect of BWV.
- Were confident in using the cameras.
- Overwhelmingly value BWV deployment and the majority favour compulsory issue.
- Are evenly split on whether or not BWV reduces officers’ use of force.

✦ **A reduction in occurrences and crimes:** BWV presence showed a greater decrease than that found in non BWV affected areas. This was especially associated with public disorder occurrences.

✦ **A reduction in complaints** is reported for the Isle of Wight - down 4% (13) whereas Portsmouth saw an increase of 13 complaints (2.5%) in the same period.

### **A7.4 United States**

Small scale, mostly unevaluated, use of BWV is widespread across the U.S.<sup>117</sup> Interest in testing and evaluating BWV in large cities has grown over the last three years, especially following the

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<sup>116</sup> Time one results for the public survey are quite similar to those reported by the EPS pilot. EPS approached the survey differently in terms of type of question used and survey delivery. However, the issues asked about were very similar and so were the results.

<sup>117</sup> The Office of the Police Ombudsman City of Spokane (2012) states that 75 agencies in Texas alone are using BWV (p. 3) and list numerous other locations in various states. Not all use of BWV in the U.S. is official as officers are sometimes allowed to purchase their own devices.

New York court ruling that the NYPD must adopt BWV (Dillon, 2013; Long, 2013; Paddock, Dillon & Brown, 2013).<sup>118</sup>

Albuquerque PD was one of the earliest mid-size departments to officially begin use of BWV in 2010, making use mandatory on March 1, 2012. Initially, inexpensive cameras were used and were downloaded to officers' laptops (Police Executive Research Forum, 2012, p. 20). These cameras proved unreliable and cumbersome and were replaced by the Taser Axon Flex (KOAT 7, 2013).<sup>119</sup> Recently, Albuquerque has been in the news for failure to produce BWV after lethal use of force incidents (Dave, 2014; McKee, 2014).

In early 2012, the Department of Homeland Security assessed six BWV devices available at that time, on five technical and operational criteria. Composite scores for all devices were between 3.0 and 3.4 out of a possible five, suggesting no available product fully met the desired policing standard. Most of the evaluated products now have newer versions on the market, as documented in ManTech (2014).

The Office of the Police Ombudsman, City of Spokane (2012) overviewed the common concerns associated with BWV use, echoing findings from the U.K. and Canadian pilot studies already described in this review. Discussion included legal considerations ([Section 8](#)) and recommended policies for use ([Section 9](#)). With the exception of a paragraph citing the [Plymouth Head Cam Project](#), the report documents only the concerns in the use of BWV. Nevertheless, it is recommended that “the Spokane Police Department (SPD) take steps to incorporate BWV into its standard equipment” (p. 1).

In Texas, Fort Worth field tested Taser Axon Flex, having a prior good relationship with this company. Mounting and policy challenges were worked through. Data management and prosecutorial access is an ongoing process. Approximately 320 devices are currently deployed with plans for a total of 615 devices. Training, mentoring and policy development will be ongoing.<sup>120</sup> Houston and Dallas have conducted some testing and are going forward with RFPs to test a range of products.<sup>121</sup>

A Dallas PD representative reported that the department currently has 47 previously purchased cameras operating in the field. The officers using these devices have provided very positive feedback. One observation is that when citizens see the cameras on calls and traffic stops they

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<sup>118</sup> We have no information about a pilot project with the NYPD, but *Time* reports testing of two prototypes Google Glass devices (Sanburn, 2014).

<sup>119</sup> The device shown in the news broadcast is the Axon Flex, but it is referred to as a “lapel camera.” Concerns about the device are expressed by the police union. The personal notes of Asif Rashid from the PERF Critical Issues in Policing Conference September 11, 2013 were also used to support this information.

<sup>120</sup> Information for Fort Worth was updated following the Calgary Police Service BWV Symposium, September 23-24, 2014 at which Sgt. Scott Sykes of FWPD presented.

<sup>121</sup> Stratton's personal notes from Major City Chiefs Round Table Conference Call.

tend to be more cordial. Dallas PD has not yet had any cases go to court, but BWV footage has provided good investigative information. In summer 2014 it is intended to expand testing to 120 officers using eight different BWV products for two weeks each, on a rotating basis. A survey has been created to score their impressions of each unit. The survey includes ease of use, wearability on uniform, function in field, quality of playback, and time of download/video review. The use of BWV is first and foremost for evidence documentation. Officer accountability is a secondary effect as the department knows that 99% of officers are providing good work and service.<sup>122</sup>

In Florida, a pilot is underway to test 30 Axon Flex cameras, randomly assigned to willing participants matched with a control group (Lynch, Fridell & Jennings, 2013)<sup>123</sup>

By 2013, three BWV pilots designed in collaboration with academic researchers were in place (Farrar & Ariel, 2013; Katz, Kurtenbach and White, 2013; Rankin, 2013). Available information from these projects is reviewed below.

**A7.4.1 Rialto Police Department, CA, 2012-2013** (Farrar & Ariel, 2014; Dillon, 2013)<sup>124</sup>  
<http://www.college.police.uk/en/21544.htm>

Rialto has a population of 100,000. Rialto Police Department has a jurisdiction of 28.5 square miles and 101 sworn members. Chief Farrar's project, completed as part of his MA studies, utilized an experimental design and has become well-known and is widely cited.

### **“Being Watched” Effect on Police Use of force**

[Farrar & Ariel, 2014]

*We have tested whether police body-worn cameras would lead to socially-desirable behavior of the officers who wear them. Individualized HD cameras were “installed” on the officers’ uniforms and systematically-recorded every police-public interaction. [p. 1]*

*Although theoretically compelling, direct experimental research on how portable cameras affect human behaviour is currently non-existent. [p. 4]*

<sup>122</sup> Personal communication between Stratton and Dallas PD representatives, April, 21 2014

<sup>123</sup> This pilot is part of a Master's thesis. The researcher, Mathew Lynch can be contacted at [lynchm@mail.usf.edu](mailto:lynchm@mail.usf.edu) .

<sup>124</sup> Rialto Police Chief Farrar undertook this research as part of an MA program specifically concerned with evidence based policing at Cambridge University, England. Information in the report is supplemented by a personal communications between Stratton and Chief Farrar, April 10, 2013 and July 30, 2014.

Unlike the pilots from the U.K. and Canada, which emphasize purposes of evidence enhancement and citizen control, the Rialto study was specifically concerned with increasing officers' professionalism and reducing use of force and complaints. Farrar is on record as pointing out that an urban police force such as NYPD, many times larger than Rialto, would face a dramatically different set of financial and policy challenges (Dillon, 2013).

### Technical Details

- ✦ *Taser Axon Flex devices* were used in the pilot, with various mounts being tested (collar, cap, glasses, shoulder). The cap and glasses mounts provided best view in terms of tracking the officers' movements. Wires did not get in the way and detached easily if the device was grabbed. No problems were reported.
- ✦ *Battery life* was reported as at least 12 hours.
- ✦ *Data management* was via Taser's Evidence.com software. Video was automatically uploaded and tracked by the program.

### Pilot Participation

- ✦ *Pilot duration* was 12 months beginning February 13, 2012. BWV use continues and statistics are being kept for the second year.
- ✦ *Participation was mandatory* for all 54 patrol officers. The shift was the control/experimental unit, with shifts randomly assigned to intervention or control.
- ✦ *50,000 hours* of police-public interactions were collected.

### Evaluation Measurements

- ✦ *Statistical comparison* of Incidence of use of force (anything more than compliance hold) and number of complaints between intervention and experimental shifts, and against baseline statistics. A Poisson Generalized Linear Model was used to test for significance.

### Reported Findings

- ✦ *Use of force*: baseline data is acknowledged as showing infrequent occurrence of use of force (65 per year; 1.46 incidents per 1,000 police interactions) and few filed complaints (28 in 2011; 0.7 for every 1,000 contacts) (p. 7).
  - *Shifts without cameras* experienced twice as many use of force incidents as those with cameras. Overall use-of force per 1,000 contacts was reduced 2.5 times compared to the previous year, with only a very small downward trend since 2009 (pp. 8, 11).

- *When the experimental group applied force*, physical contact was always initiated by the member of the public. In the control group four out of 17 contacts were initiated by the officer (p. 9).
- *The experimental group used Tasers far more* when force was applied (in 5 out of 8 incidents) compared with the control group (4 out of 17 incidents). Incident logs suggest Tasers were employed when an officer was physically assaulted or threatened (pp. 8-9). It was observed that in over 50% of the use of force incidents, the subjects were intoxicated or impaired. All incidents were reviewed and considered appropriate and timely use of the Taser. There was no observable indication that hesitation to use lesser force led to greater Taser use.
- *Training on using verbal interaction* to control and deescalate situations was provided to officers prior to the start of the pilot.

✚ **Only three complaints** were made during the pilot period (two for the experimental group) compared to 28 in total during 2011 (p. 8), an overall reduction of 12%. However, notably, in 2010 there were 51 complaints, meaning a reduction of 45% occurred between that year and 2011. Also, there were 5 complaints made in the first six weeks of 2012, which were excluded from the pilot year (p. 11). However, in the second year of BWV use, there were only four complaints, suggesting that BWV may be a consistent and stabilizing factor.

✚ Rialto PD court costs were reduced 21% during the experimental year. In 2013 the reduction from the original baseline was 33%. This saving is attributed to BWV footage saving trials and court appearances by officers, which also allows them to spend more time on the street.

### Conclusions and Recommendations

✚ Findings support the theory that videotaped interactions will experience less use of force because of the fundamental tendency of rational beings to exhibit more desirable behaviours when they know they are under surveillance (p. 9).

✚ The possibility that the presence of the BWV also modified the behaviour of the public cannot be ruled out (p. 10).

✚ All 75 uniformed Rialto PD officers are now equipped with BWV.

#### **A7.4.2. Mesa Police Department, AZ, 2012-2013** (Rankin, 2013; Ready & Young, 2014)

The population of Mesa is around 450,000. Mesa has 796 sworn members. Evaluation reports from the Mesa PD and report from Arizona State University are now completed.

## Mesa Police Department BWV Pilot Purpose

[Rankin, 2013, p. 1]

*The evaluation focused on reducing civil liability, addressing departmental complaints, enhancing criminal prosecution and providing operational transparency.*

### Technical Details (Rankin, 2013)

- ✦ **Devices:** Axon Flex BWV was tested for ease of use, durability and comfort (Rankin, 2013, p. 1). Initial problems with wires detaching were resolved with new clips. Officers did not find the wires got in the way. Many placed wires under their shirt or body armour to make it less visible and susceptible to pulling out.<sup>125</sup>
- ✦ **Video and audio quality** were considered exceptional (p. 9).
- ✦ **Battery life** lasted for a 10 hour shift, with rare exceptions. A minimal amount of degradation was reported in extreme heat conditions (p. 9).
- ✦ **Data management** was via Taser Evidence.com software. This represented a workflow change for the records unit involving access to, and training on, the software. Officers required additional training related to entering necessary report information about the video clips. Additional process steps and equipment were required. An automated, integrated process is now in place. (pp. 9-10). Initial response from users indicated some concern with ease of using the system (p. 11).

### Pilot Participation

- ✦ **50 intervention and 50 control** group officers, matched for age gender and race. Devices were divided among four patrol divisions with three cameras assigned to traffic division officers. The evaluation period was October 1 2012 to September 30 2013.
- ✦ Some participants volunteered and others were assigned.

### Evaluation Measurements (Rankin 2013, pp. 6-7, 10-11)

- ✦ **Quarterly surveys** completed by the intervention group concerning their perceptions about the BWV systems.

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<sup>125</sup> Personal communication between Stratton and Lee Rankin, May 1, 2014.

- ✦ **Contact Cards** with 24 questions, completed by intervention and control officers on one randomly selected day per month for every contact on that day.
- ✦ **Volunteer versus assigned** usage tracked.
- ✦ **Mandatory versus discretionary activation**: the trial changed policy after six months and compared usage.
- ✦ **Comparison statistics** for complaints between the intervention and control groups and against the previous year.

### Reported Findings (Rankin, 2013)

- ✦ **Mandatory versus discretionary activation**: mandatory activation policy resulted in an average of 2,327 video files per month whereas during the discretionary activation period the average was 1,353 per month - a reduction of 42% (p. 10).
- ✦ **Initial survey results** Users believed (p. 11):<sup>126</sup>
  - BWV would improve evidence quality (80%) and it would help prosecute domestic violence cases where the victim was unwilling to testify (76%).
  - The BWV caused officers to behave more professionally (77%) and it would make them more cautious in making decisions (81%).
  - Very few thought BWV would increase officer safety and under half thought fellow officers were receptive to the presence of BWV.
  - Just under 24% thought the MPD should adopt a BWV system.
- ✦ **Complaints**: During the 2013 evaluation period the BWV users had a 40% (18 from 30) reduction in complaints compared to the previous year (pp. 11-12). Of these, just one was a use of force complaint against a BWV user compared to four in the prior 12 months. Dispatched calls in 2013 totalled 291,640 with 153 official complaints (0.05%). It is believed that the presence of the cameras helped to reduce false allegations.<sup>127</sup>

### Conclusions and Recommendations

- ✦ **Officers are more risk averse and cautious** about their actions when wearing BWV (Ready & Young, 2014, pp. 24-25).

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<sup>126</sup> The number of officers that actually completed the survey is not provided in either report. Total participant number is used in the multivariate analysis employed by Ready & Young (2014).

<sup>127</sup> From a personal communication between Stratton and Rankin, May 1, 2014.



- ✦ *BWV officers initiated more citizen contacts* (other than ‘stop and frisk’) (Ready & Young, 2014, p. 25).
- ✦ *Expanded personnel* to manage the program effectively would be needed if the BWV program were expanded (Rankin, 2013, p. 9).
- ✦ *Review for redaction time* required for public record requests was a particular concern. Total time to complete three requests during the pilot was 30.5 hours, with each video request entailing one to two hours of video (Rankin, 2013, pp. 12-13).

**A7.4.3. Phoenix Police Department, AZ, Ongoing** (Katz, 2012; Katz & Kurtenbach, 2014; Katz, Kurtenbach, & White, 2013; Smart Policing Initiative Phoenix, 2013).<sup>128</sup>

Phoenix has a population of approximately 1.5 million. PPD has 21 police districts over 140 square miles. As of April 2014, PPD reports 2, 856 sworn members. It is the fourth largest police department in the U.S. In 2013 the city recorded 130 homicides and PPD had 31 firearm lethal use of force incidents (the average per anum is closer to 15 incidents). Concerns about the erosion of police community relations have been increasing since 2010. Body worn cameras are viewed as a possible innovation to assist in addressing concerns. The 40,000 dispatches to domestic violence incidents are also a priority (Katz, 2012).

**Measuring Impacts of Police-Body Worn Cameras**

[Smart Policing Initiative Phoenix, 2013]

- *Increase police accountability: by recording police and citizen interaction; deterring unprofessional conduct; disproving allegations; reducing resisting arrest and officer assault incidents; increasing perceptions of legitimacy, trust, and satisfaction with the police; decreasing complaints; and reducing civil judgments.*
- *Increase the effectiveness of the police response to domestic violence: by improving officer recollection for reports and court; using videos as evidence; improving charging; increasing prosecution; and increasing conviction rates.*

<sup>128</sup> Information on this project is supplemented by a personal communication between Stratton and Kurtenbach, April 22, 2014 and the PPD website.



In 2012, a 90 day pilot with voluntary participation from 16 officers tested Taser Axon head mounted devices. Subsequently, Smart Policing funding was obtained to more effectively evaluate BWV technology (Katz, 2012; Katz & Kurtenbach, 2014). Some preliminary findings are available for the second round of testing. The Final report is pending.

### Technical Details

✚ *Devices*: 56 VieVu body-mounted cameras

✚ *Data management*:

- *Video* is uploaded to a server at the end of each shift with a police report number and type of call entered. Implementation was relatively easy compared to managing data throughout the process, which is a resource challenge.
- *Managing multiple user files* for disclosure is challenging. Officers must list on the report all those present, but there is no way of knowing if this is complete.

### Pilot Participation

✚ *Two squads* (intervention and control) from the Maryvale precinct (high crime/police activity area) beginning in 2012.

✚ *Mandatory usage, but initial voluntary involvement*. At the outset, a process of bidding on reorganized squads meant that officers knew they would be part of the pilot (but not whether intervention or control). Personnel changes within the squads occurred during the pilot period.

### Evaluation Measurements (Katz, 2012; Katz & Kurtenbach, 2014)

✚ *Statistical comparison* with data from months prior to pilot period and other police/court data.

✚ *Participant self-report surveys* at three-month time points and interviews (agreement with attitude/opinion statements).

✚ *BWV device meta data*.

✚ *Administrative records*.

## Reported Preliminary Findings (Katz & Kurtenbach, 2014)<sup>129</sup>

- ✚ *Increases in arrests, decreases in resisting arrest* are found for both intervention and control groups, with the camera users showing more arrests and no resisting arrest charges.
- ✚ *Complaint decline*: Both groups also had a decline in the number of complaints. The control group had 19 less (19.7%) whereas the BWV users had 25 less (44.4%). It should be noted that pre pilot, the users had less than half the number of complaints compared to the control, which exaggerates the percentage change attributable to the BWV.
- ✚ *Impact on Police Officers*:
  - *Comfort with wearing and using the equipment* appears to increase over the pilot period.
  - *BWV leads to fewer citizen contacts* according to a majority of participants.
  - *Use of force*: A majority of users think BWV affects the decision to use force.
  - *Job satisfaction is not improved* by BWV according to 90% of users. Only a minority felt that BWV improved officer training. Less than 20% think BWV use should be expanded.
  - *There are differences between the two squads* involved on all measures. Personal communication indicates that there are individual differences in frequency of use and application of BWV that do not appear related to general investigative abilities or performance. Leadership had been identified as a factor in BWV buy-in and usage.

## A8. Legal Considerations

The legal ramifications of police use of BWV are not established. Based on the available studies, BWV evidence appears to be well accepted in the U.K. and U.S., but less so in Australia. In the U.S., the American Civil Liberties Union, while noting pros and cons, has taken a fairly supportive position on use of BWV by police (Stanley, 2013). Recently the Canadian Civil Liberties Association provided Hamilton Police Service (2014, pp. 20-21) with a detailed statement about BWV (see quote [Final Report Section 3.3](#)). The position is taken that BWV is “a strong tool for accountability and transparency” as long as privacy rights are protected.

A distinction is made between CCTV, which monitors everyone and everything indiscriminately, and BWV which is focussed on specific interactions. Stanley struggles with the many tensions between citizen and officers’ rights to privacy and the recording, storage and deletion processes.

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<sup>129</sup> Supplemented from personal communication between Stratton and Kurtenbach, April 22, 2014 and Stratton and Choate, September 29, 2014.

Privacy laws differ between and within the countries and as yet there is little clarity as to how these may or may not apply to BWV. Many discussions of privacy issues conflate various types of surveillance from drones through CCTV to BWV (for example, Stanley, 2014, p. 18). There is little if any case law relating to BWV and current discussion reflect only opinion, often not from lawyers. There is a tendency not to consider that different privacy legislation pertains to individuals, private companies and public organizations, and that, in Canada, the latter includes various law enforcement exceptions.<sup>130</sup>

### **American Civil Liberties Union – Opinion**

*Although we generally take a dim view of the proliferation of surveillance cameras in American life, police on-body cameras are different because of their potential to serve as a check against abuse of power by police officers....Cameras have the potential to be a win-win, helping protect the public against police misconduct, and at the same time helping protect police against false allegations.*

[Stanley, 2013, p. 1]

*Technology rarely solves the whole of a complex human problem. It can help, but often it creates its own new issues; this had happened in law enforcement in the past.*

[Harris, 2010, p.13]

In the U.S., most legal discussion relating to BWV is concerned with Fourth Amendment compliance by police in enacting search and seizure (Harris, 2010, IACP, 2004). In Canada, at the time of writing, no trial involving BWV evidence is known to have come before the Canadian courts. Various legislations must potentially be considered:<sup>131</sup>

- *The Criminal Code of Canada*
- *The Charter of Rights and Freedoms*
- National and provincial *Freedom of Information and Privacy* Legislation
- Additional privacy law pertaining to other *Acts* (such as health, child and youth protection and protection of police informants).

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<sup>130</sup> See *IEEE Technology and Society*, 33 (2). The entire issue is devoted to opinions on various types of technology including BWV and illustrates this point well.

<http://ieeexplore.ieee.org/xpl/mostRecentIssue.jsp?reload=true&punumber=44> .

<sup>131</sup> In Australia the introduction of BWV evidence is prompting requests for legislative changes ( NSW police , 2014b: Police Association of NSW, 2014). This is also the case in U.S. states with two-paty recording consent laws.

Data management issues also arise in connection with the court process. Full disclosure must occur which means BWV from multiple officers at an incident must be accurately recorded. All clips must then be reviewed and inappropriate information redacted. A procedure must be in place for providing the BWV evidence in an accessible format and prosecutor willingness to use this type of evidence must be established (Fiumara, 2012; Lai, 2012; IACP, 2004).

Additionally, secure short and long-term storage must be established (for some crimes this may be over 50 years). Some data management software relies on ‘cloud’ storage hosted by a third party provider whose main and back storage servers may be located in other countries with differing access laws. Such storage raises further unresolved legal questions related to data ownership and responsibilities for security (Gartner Inc., 2013; Millan, 2011; Office of the Privacy Commissioner of Canada, 2012; Smart & Biggar/Fetherstonhaugh, 2012).

Harris (2010) also raises the issue of perception and interpretation of video by the courts, citing examples and experiments that have demonstrated how different viewers reach different conclusions about the same video. As the IACP (2004) conclude in relation to IVV, “admitting new scientific evidence into court is an arduous task for prosecutors for not all lawyers and judges are conscious to the ways of new technology” (p.50).

The EPS final report, will consider legal issues in as much detail as possible. The RCMP current scoping study also intends to include legal opinion.

## **A9. Policy and Procedure Guidelines**

As the EPS legal opinion provided for the BWV project emphasized, clear guidelines are essential if BWV is to provide useful evidence acceptable in court (Lai, 2012). Policy and procedure examples have been collected during the BWV pilot and are listed in the [bibliography](#) of sources accompanying this review. A base point for the U.K. and Canada, including the policy and procedure for the EPS pilot, has been the U.K. Home Office guidelines (Goodall, 2007). This remains one of the most comprehensive considerations of issues pertaining to the operational use of BWV. The more recent guide from the Body Worn Video Steering Group (BWVS, 2013), summarizes operational procedures from the Home Office but does not significantly change them.

In the U.S., examples are more disparate and have generally been less comprehensive. A survey conducted by the Police Executive Research Forum (PERF, 2013) indicated that one-third of agencies using BWV do not have written policies. Noting this, in 2014, the International Association for Chiefs of Police (IACP) issued a compendium of documents intended to serve as a basis for standardized BWV policy. These documents focus exclusively on the legal and

operational context in the U.S. without reference to any international work. The resulting “Body Worn Camera Model Policy” is not comprehensive (IACP, 2014). In September 2014 PERF released a more inclusive report, *Implementing a Body-Worn Camera Program*. PERF draws on various sources of BWV information, including international input, to provide discussions of issues to be considered in BWV implementation along with detailed recommendations for inclusion in policy and procedure. These recommendations are mostly quite similar to those included in the earlier U.K. Home Office Guidelines (Goodall, 2007).

Reviews of existing policy and procedure, along with personal communications during the EPS pilot, indicate a set of key operational issues that have proved challenging and remain unresolved:

- Is it necessary (always/sometimes) to inform citizens that police are recording with BWV?
- Should carrying/activating of the BWV recording be strictly defined and mandated, or should it be at the officer’s discretion? Alternatively, as PERF (2014) suggests, some combination of mandate and discretion. Whatever the choice, how is this to be managed and/or monitored?
- Should officers be allowed to review BWV footage when making a regular report?
- Should officers be able to review BWV footage before making a use of force report?
- How is sensitive and/or personal information captured on video to be handled?
- To what degree may BWV footage be accessed (and by whom) to monitor performance?

The EPS final report includes discussion of the above issues within the pilot and offers conclusions about good practice in using BWV.

## A10. Summary of Analytical Conclusions

### Considering BWV: Recommendations

*Any agency interested in the adoption of body-worn camera technology should proceed cautiously and consider the issues....most of the claims made by advocates and critics of the technology remain untested....Law enforcement agencies that are planning to adopt [BWC] should employ rigorous evaluations of the implementation and impact of such systems.*

[White, 2013, pp. 25-26]

*The decision to implement body-worn cameras should not be entered into lightly. Once the agency goes down the road of deploying body-worn cameras...it will become increasingly difficult to have second thoughts or to scale back a body-worn camera program*

[Police Executive Research Forum, 2014, p. v]

The EPS BWV Pilot Project is tasked to systematically assess the usefulness and effectiveness of using body-worn recording in operational policing. As part of that goal, the previous detailed review attempts to:

1. Separate untested sources of [information](#) from actual assessments and evaluations of BWV technology ([Section 4](#))
2. Systematically summarize the same basic components of each available assessment that potentially contributes [evidence](#) about BWV ([Section 7](#))

[Section 5](#) looks at manufacturers' claims about the technical and operational value of BWV to policing. For the first police agencies to test BWV, this was the only technology-specific information available. Consequently, indicators of possible value from using BWV were extrapolated from technically dated reports about in-vehicle video systems (IVV) and the documented general value of any digital evidence to prosecutions.

This review found that most BWV manufacturers have sophisticated promotion strategies in place that feed the promised positives of BWV to mass and police media. Positive media coverage is then promoted as 'evidence' of the product's value. An interesting twist in this information loop is provided in a *PoliceOne.Com* roundtable discussion with four [BWV experts](#) – all manufacturer executives.

[Section 6](#) examines Canadian media articles about BWV and illustrates how [headlines](#) push the inevitability of BWV for 21<sup>st</sup> century policing. It is noted however, that the substance of most articles does include both pros and cons of the technology.

Fifteen separate assessments from 13 police agencies spanning Australia, Canada, the U.K., and the U.S., are detailed in [Section 7](#). Four of these are very small-scale Canadian assessments, included because they add to the accumulation of available evidence.

As [White \(2013\)](#) concludes, there is still very little solid evidence to support or refute most of the claims made about BWV technology. Careful examination of completed and on-going assessments and evaluations reveals numerous reasons for this that are very apparent when reading the summaries provided in [Section 7](#). The following list summarizes the issues that make currently available evidence limited at best:

- ✦ ***Disparate existing research*** in terms of geographic location, policing context, pilot length and scope, methodology, and the technology tested.
- ✦ ***Rapidly evolving technology***: some of the foundational studies tested technology that is now obsolete (Process Evaluation Ltd., 2007; ODS Consulting, 2011; Lauer et al, 2010). Even devices tested by EPS and CPS beginning in 2012 are now being replaced by newer models.
- ✦ ***Small sample size***: Although some police agencies in The U.K and the U.S. have now equipped large numbers of officers with BWV, excepting the ongoing Isle of Wight pilot, most reported projects have involved between 30 to 50 devices and some far fewer.
- ✦ ***Voluntary participation***: Participation in some of the pilots, especially the earlier ones, was by choice, which inevitably influences outcomes, especially views about using BWV.
- ✦ ***Intervening variables***: The earlier evaluation designs made no attempt to control the operational environment. Most of the ongoing pilots have used a quasi- experimental design with intervention and matched control groups. However, the larger the police agency the more difficult it is to control for other factors that could equally well be influences in any findings (e.g., personnel changes in the pilot groups, leadership changes, implementation of other policing programs or policy changes).
- ✦ ***Lack of relevant and reliable baseline statistics***: Almost all studies that have used comparisons with existing statistics have struggled to find prior records relevant to evaluating BWV performance. Complaint and use of force statistics are most commonly employed because they usually exist. Total numbers are, however, often small, meaning that pilot participants probably had few incidences pre-BWV. Findings may report high percentage



changes when only a few cases are involved.<sup>132</sup> As well, available baseline statistics sometimes indicate significant natural fluctuation.<sup>133</sup> Ten-year averages would be needed to more reliably understand any influence from BWV introduction.

- ✦ ***Reliance on self-report surveys:*** With the exception of the EPS pilot, other evaluations have depended primarily on participant responses to surveys relying upon the level of agreement with positive statements (such as “using BWV provides better evidence”). Such items suggest there is a ‘right’ answer and disallow nuances in interpretation and experience. Response rates tended to be quite poor and surprisingly negative overall, given the voluntary participation in the pilots and bias of the questions towards the positive outcome.
- ✦ ***Summarized conclusions do not accurately reflect reported findings.*** In analysing the available reports a distinct trend was found to summarize the most positive of findings while overlooking the more negative aspects included in the substantive report. Recommendations at times are at odds with the findings. When reports are subsequently cited in support of BWV it is almost invariably the summarized conclusions and recommendations that are considered.<sup>134</sup>

Despite the serious limitations listed above, there is some cumulative support for the following findings - although this is not all positive in content:

- ✦ ***BWV may provide good evidence and assist investigations.*** BWV quality is generally reported as enough to produce potentially valuable evidence, although camera stability and resulting capture are noted as often less than perfect. Strong case examples of how BWV assisted in investigations exist. But it is not clear that BWV evidence leads to additional successful prosecution or investigations often enough to warrant the costs involved.
- ✦ ***BWV helps reduce and resolve complaints.*** Every evaluation that has looked at complaints has reported some complaint reduction, along with examples of how the BWV footage has assisted in resolving potential or formal complaints. Most of the resolutions have supported the officers, although occasionally a finding against an officer is reported.
- ✦ ***Use of force is reduced during BWV pilots.*** Evaluations that have measured use of force report reductions, which are usually quite small when the number of incidents is considered

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<sup>132</sup> See the [Mesa pilot](#) for example where use of force complaints were reduced from 4 to 1 and reported as a 75% reduction.

<sup>133</sup> The [Plymouth](#) evaluation is a good example of this.

<sup>134</sup> The citations by manufacturers are good examples of this (see references for Reveal and Taser in the [Bibliography](#)). Also: Fiumara (2012); ManTech (2012); Office of the Police Ombudsman City of Spokane (2012), among others.



rather than percentages. However, the introduction of BWV seems, in most cases, to have been accompanied by some additional de-escalation training or other program measure. Furthermore, when given the opportunity to do so, participating officers have indicated concerns that the presence of BWV may cause them to hesitate in using warranted force.

- ✦ ***BWV devices need to improve.*** Even where police agencies have decided to go ahead in adopting BWV technology, current limitations of devices are noted. In particular, battery life, secure adaptable mounting and operational reliability are issues. Notably, these issues have not changed significantly from 2007 until the present.
- ✦ ***Data management is costly and challenging:*** The larger the agency the greater the costs and challenges reported in managing BWV data, whether or not manufacturer's software was employed. A secure storage system must be established and overseen that has sufficient capacity to comply with disclosure demands and retention schedules.
- ✦ ***BWV use has a mixed impact on officers.*** Despite the voluntary nature of most pilot participation and the potential positive bias in the way feedback is collected, pilot participants provide very mixed responses to the value of using BWV. While most seem to remain open to the *potential* value of BWV, and there are many anecdotes of value in specific incidents, overall response is not a resounding endorsement. Particular concerns are the adequacy and safety of current equipment options and fears of 'big brother' surveillance and being disciplined for minor procedural infractions. As well, few believe that BWV makes their job easier or saves them time.

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***APPENDIX B: EPS BWV PRIVACY IMPACT ASSESSMENT***

**Privacy Impact Assessment: Full Questionnaire**

**Privacy impact assessments must be submitted to the Information and Privacy Commissioner with a covering letter from the Head of the FOIP public body or the CEO of the HIA custodian.**

Project <sup>1</sup> Information	
<b>Project Name:</b> Body Worn Video Pilot Project	<b>Date:</b> 2012-01-15
<b>Organization<sup>2</sup>:</b> Edmonton Police Service	

Contact Information	
<b>Name:</b> Dr. Mary Stratton	
<b>Title:</b> Research Analyst/Coordinator	
<b>Office:</b> Security Management	
<b>Phone:</b> 780-391-5579	<b>Fax:</b> 780-421-2151
<b>Email:</b> mary.stratton@edmontonpolice.ca	

<sup>1</sup> Throughout this questionnaire, the term 'project' is intended to subsume the words 'scheme', 'program', 'initiative', 'application' and 'system', as well as any other word or term that refers to a defined course of endeavour.

<sup>2</sup> Throughout this questionnaire, the term 'organization' is used to refer to a public body under the *Freedom of Information and Protection of Privacy Act* or a custodian under the *Health Information Act*. When appropriate, the term may also refer to an affiliate under the *Health Information Act*.



#	QUESTION	Yes	Yes and No (partial, incomplete, in preparation, etc.)	No	N/A	Encl. Ref.
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**A: Organizational Privacy Management**

**PREVIOUS PIA SUBMISSIONS**

A1a	Has organizational privacy management information for questions A2 through A7 previously been provided with another PIA?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
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**Note/Elaboration:**

A1b	If so, has any of this information changed since the previous PIA was submitted? <i>If "No", please provide the title and date of the previous PIA and proceed to section B of the questionnaire.</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
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**Note/Elaboration:** Current Policy Attached

**PRIVACY POLICIES AND CONTROLS**

A2	Is there an organizational strategic plan or business plan that addresses privacy protection? <i>If so, please enclose.</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
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**Note/Elaboration:** In general, EPS policy and procedure provides detailed and comprehensive guidelines regarding the collection, use, access, disclosure and disposal of personal information. The policy/guidelines regarding privacy protection provided to EPS employees is both general and unit or section specific (e.g. Release of Information Policy for Correspondence Unit). If necessary, EPS policy can be readily implemented, rescinded or amended by way of directives. In addition to the policy created by the EPS, the EPS and its members must also comply with the privacy provisions of various federal (e.g. the Youth Criminal Justice Act) and provincial (e.g. Freedom of Information and Protection of Privacy Act, the Child Welfare Act, the Young Offenders Act and the Police Act) legislation. Specifically regarding compliance with the FOIPP Act, in about 1996 the EPS created the EPS Freedom of Information and Protection of Privacy Unit (FOIPP Unit). This Unit is managed by the EPS FOIPP Coordinator and is generally responsible for the education of all members of the EPS about the FOIPP Act and for the processing of all formal FOIPP requests. The FOIPP Coordinator's responsibilities include to:

- implement policies, guidelines and procedures to manage EPS compliance with the provisions of the FOIPP Act,
- provide advisory services to the EPS regarding the FOIPP Act
- develop and deliver training programs to all EPS employees including volunteers on the FOIPP Act
- ensure that all information management systems within the EPS meet the requirements of the FOIPP Act with regard to both access to information and protection of privacy
- establish and maintain information control in collaboration with all internal stakeholders to ensure that all records can be located, retrieved, and acted upon within legislated time limits
- ensure consistency in the application of other acts and regulations which relate to the prohibition or restriction of the disclosure of information when such acts and regulations supersede the FOIPP Act
- respond to requests for the correction of personal information
- coordinate all investigations with respect to the EPS or its members by the OIPC
- assist in approving EPS programs and activities to ensure that they are in compliance with the FOIPP Act
- manage all FOIPP requests.

#	QUESTION	Yes	Yes and No (partial, incomplete, in preparation, etc.)	No	N/A	Encl. Ref.
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A3	Does a written privacy charter or policy exist? <i>If so, please enclose.</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
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**Note/Elaboration:** Please see A2

A4	Have privacy guidelines been developed for various aspects of the organization's operations? <i>If so, please enclose.</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
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**Note/Elaboration:** Please see A2

A5	Is the organization subject to statutory provisions regarding privacy and confidentiality, other than those provided by the Freedom of Information and Protection of Privacy Act and the Health Information Act? <i>Please enclose details.</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
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**Note/Elaboration:** As alluded to in A2 above, aside from the FOIPP Act the EPS and its members must also comply with the privacy provisions of other federal and provincial statutes including: (1) Youth Criminal Justice Act, S.C. 2002, c.1, (2) the Child Welfare Act, R.S.A. 2000, c. C-12, (3) the Police Act, R.S.A. 2000, c. P-17, and (4) the Security of Information Act, R.S. 1985, c. O-5. In addition to these statutory obligations, the EPS and its members also have a common law duty to protect the privacy of police informants. In addition, when commencing employment, non-sworn EPS members must swear an Oath of Secrecy.

A6	Are organizational policies or procedures in place to ensure that:					
	▪ There is a business purpose for all personal information collected	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	▪ There is statutory authority for the collection of all personal information	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	▪ Individual consent is obtained whenever possible	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	▪ Individuals are duly informed of the purpose and authority for collection	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	▪ Information about personal information collected is readily available to individuals	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	▪ Personal information correction and annotation are available when required	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
▪ Physical records are appropriately stored and managed to maintain privacy	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
<i>Please enclose copies.</i>						

**Note/Elaboration:** The legal authority governing the collection of personal information by the EPS is established in Part 2 of the FOIPP Act. As a police agency, the primary purpose for the EPS to gather personal information is "law enforcement" as defined in the FOIPP Act. Correction and annotation to personal information is the responsibility of the EPS FOIPP Unit. All EPS managers have a duty to maintain privacy over the physical records in their area's possession or control. Although in certain circumstances the EPS will inform persons of the purpose and authority for collecting personal information and will sometimes receive consent regarding such collection, the FOIPP Act provides an exclusion from this obligation to law enforcement agencies (Sections 33 and 34; see also A2 and attached EPS policy.)

#	QUESTION	Yes	Yes and No (partial, incomplete, in preparation, etc.)	No	N/A	Encl. Ref.
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A7	Are privacy controls in place in the organization?					
	▪ Need-to-know policies and procedures for personal information access	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	▪ Physical security and access controls	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	▪ IT security and access controls	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	▪ Waste management controls for personal information	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	▪ Records management & disposition schedules	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	▪ Others	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	<i>Please enclose copies of related documents.</i>					

**Note/Elaboration:** In general the EPS employs both physical and electronic security measures to protect its records. Specifically, the public has only limited access to all police facilities. EPS employees themselves are individually assigned identification/card-keys allowing and tracking access to certain protected areas within EPS buildings. That said, depending on the nature of the work being carried out by a specific unit or section, an additional high-security key is also individually assigned and required to gain access to a particular area. Regarding network and data base access, each EPS employee must log-on using an employee identification number and individual password. As an additional safety feature, after a set period of inactivity, EPS computers automatically enter into a hibernation mode requiring the original user to re-enter his/her password. All EPS networks are protected by firewalls and background anti-virus programs. It is also important to note that each individual network user has a private drive of which no other EPS employee can access. All access to personal information is in general tracked either physically (e.g. written access request) or electronically (e.g. employee identifiers).

**PRIVACY STRUCTURE AND ORGANIZATION**

A8	Is there an appointed privacy director or champion within the organization? <i>If so, please identify the position.</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
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**Note/Elaboration:** The EPS has a full-time FOIPP Coordinator who is responsible for the overall management and day-to-day operations of the EPS FOIPP Unit. (Please see A2). In addition, the managers of the EPS are directly responsible for privacy issues related to their particular area.

A9	Does a management reporting process exist to ensure that management is informed of any privacy compliance issues?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
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**Note/Elaboration:** Although the EPS FOIPP Coordinator operates primarily as a direct delegate of the Chief of Police, a chain of command is in place. This chain of command ensures that any affected managers are advised of any privacy compliance issues and that such issues are promptly and appropriately dealt with.

A10	Is senior management actively involved in the development, implementation and/or promotion of privacy measures within the organization?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
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**Note/Elaboration:** Although the primary responsibility regarding the development, implementation and/or promotion of privacy measures within the EPS falls to the FOIPP Coordinator, senior management in the EPS often take a very active role in and are encouraged to provide feedback on such processes. For example, the EPS has a dedicated section to deal with organizational security issues (Organizational Security Section) and public notices regarding high-risk offenders. (Behavioral Assessment Unit)

A11	Are employees with access to personal information provided training related to privacy protection?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
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**Note/Elaboration:** All EPS members have been provided with basic FOIPP training and have access to the FOIPP Coordinator and other legal advisors. Some of the legal advisors are also available to provide after-hours legal advice. Those employees dealing specifically on a day-to-day basis with issues pertaining to the collection, use, disclosure, retention and disposal of records have, in some cases, been provided with enhanced FOIPP training. The EPS FOIPP Unit also provides "refresher" sessions on FOIPP through such mediums as GDM training and area specific information sessions.

#	QUESTION	Yes	Yes and No (partial, incomplete, in preparation, etc.)	No	N/A	Encl. Ref.
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<b>B: Project Privacy Management</b>						
<b>PROJECT DESCRIPTION</b>						
B1	Has a summary of the proposed project been prepared, including a description of the needs behind the development of project, and how the proposed project will meet those needs? <i>If so, please enclose.</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

**Note/Elaboration:** Abstract prepared for CPRC funder is included.

B2	Has a listing of all personal information or data elements to be collected, used or disclosed in the project been prepared? <i>If so, please enclose.</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
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**Note/Elaboration:** The possibilities associated with the use of Body Worn Video (BWV) in criminal investigation and prosecution processes has been considered. Provisions under the Criminal Code and under FOIPP that relate to law enforcement have been carefully reviewed. The cameras will collect both audio and video images however the nature of the project makes it impossible to predict the precise nature of the personal information that may be collected throughout the pilot. Part of the project purpose is to identify any related issues that may arise through the use of BWV.

B3	Have diagrams been prepared depicting the flow of personal information for this project? <i>If so, please enclose.</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
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**Note/Elaboration:** A diagram is attached. The video held by Property & Exhibit Unit will be subject to the same use, disclosure and security policies and procedures as other items held by that Unit.

B4	Have documents been prepared showing which persons, positions, or employee categories will have access to which personal information? <i>If so, please enclose.</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
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**Note/Elaboration:** All EPS employees have enhanced security clearance. Access to BWV pilot video will follow the existing EPS CCTV policy. Technical staff will have access to recordings in order to produce DVDs and manage and maintain the systems. Requests for recordings will be made using the EPS 'Help Desk' system which tracks and authorizes by file number and/or chain of command. Automated or semi-automated processes will produce DVDs of recordings that have been requested and these DVDs will be handled as evidence by the Evidence Management Branch, which has an established process for making these available and/or copying them. Video storage systems are controlled using Role Based Access Control (RBAC) and are limited to those administrators who require access to produce DVDs and manage and maintain the system.

<b>AUTHORITY FOR COLLECTION, USE AND DISCLOSURE</b>						
B5	Has the legal authority for the collection, use and disclosure of all personal information for this project been established? <i>Please enclose relevant documentation.</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

**Note/Elaboration:** Collection, use and disclosure will occur within the legal authority that generally applies to law enforcement purposes (see Section A). Sections 33(b), 39(1)(a)(c), and 40(1) provide the legal authority.

B6	Does individual consent provide the primary basis for the collection, use and disclosure of personal information for this project?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
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**Note/Elaboration:** In most cases personal information will be collected indirectly for law enforcement purposes.

#	QUESTION	Yes	Yes and No (partial, incomplete, in preparation, etc.)	No	N/A	Encl. Ref.
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B7	Have arrangements been made to provide full disclosure of all purposes for which personal information is collected? <i>Please elaborate.</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
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**Note/Elaboration:** The collection of personal information is for the purposes of law enforcement and section 34(2) of the FOIPP Act is not applicable (see Section A).

B8	Have the purposes for which the personal information is collected been documented? <i>If so, please enclose.</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
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**Note/Elaboration:** These are stated in the high-level project plan and scope - CPRC Call 2\_app-form\_EPS BWV.doc and summarized in the B1Abstract.

B9	Is personal information used exclusively for the identified purposes and for uses that an individual would reasonably consider consistent with those purposes?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
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**Note/Elaboration:** Any personal information captured by the BWV cameras will occur in the course of policing and will be used only for law enforcement purposes.

**PRIVACY RISK ASSESSMENT**

B10	Will personal information collected or used in this project be disclosed to any persons who are not employees of the responsible organization?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
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**Note/Elaboration:** Information relevant to criminal prosecutions or other legal proceedings may be disclosed in accordance with section 40(1)(v) of the FOIPP Act. If applicable, personal information may also be disclosed pursuant to other subsections of section 40 of the FOIPP Act.

B11	Will this project involve the collection, use or disclosure of any personal information beyond Alberta's borders? <i>If so, please provide details.</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
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**Note/Elaboration:** Not very likely, but possible if a criminal investigation crossed provincial/territorial or international borders.

B12	Have this project's potential risks to privacy been assessed? <i>If so, please provide documentation.</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
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**Note/Elaboration:** It is part of the pilot project to identify these risks and make recommendations to mitigate those found (see B1 Abstract). However the EPS safeguards and policies regarding the use, security and disclosure of personal information will apply to all personal information collected.

B13	If potential risks to privacy have been identified, have means to avert or mitigate those risks been incorporated into the project design?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
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**Note/Elaboration:** The privacy implications for each investigation to which video is attached will be considered as part of the usual legal process for law enforcement investigations and proceedings and also as a relevant component of the pilot project evaluation.

B14	Have key stakeholders been provided with an opportunity to comment on the privacy protection implications of the proposed project?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
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**Note/Elaboration:** This will be a component of the project throughout its various stages. EPS legal advisors have reviewed these implications as part of the preparation of this PIA. EPS sworn members involved in the pilot process will be actively engaged in considering and commenting on the privacy implications. Crown and defence counsel involved in court cases where

#	QUESTION	Yes	Yes and No (partial, incomplete, in preparation, etc.)	No	N/A	Encl. Ref.
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BWV is attached will actively assess the privacy implications of each incident. Various methods will be used to inform and gain input from the general public throughout the pilot project period

B15	Are project staff trained in the requirements for protecting personal information and aware of the relevant policies regarding breaches of security or confidentiality?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
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**Note/Elaboration:** All sworn EPS members are aware of privacy requirements (see Section A2). The BWV project Team will maintain ongoing contact with legal advisors throughout the project. The project is occurring under the direction of the Security Management Branch. The project coordinator (non-sworn EPS member) is an experienced professional social researcher observant of the ethical code for conduct of research with human subjects.

B16	Are personal identifiers used to link or cross-reference multiple databases?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
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**Note/Elaboration:** This BWV Project will not use personal identifiers to link or reference pilot research data. However, information contained in video footage associated with a specific law enforcement investigation or prosecution may have linked personal identifiers attached in keeping with established laws and legal procedures (see also B4).

**PRIVACY CONTROLS AND SECURITY**

B17	Have security procedures for the collection, transmission, storage, and disposal of personal information, and access to it, been documented? <i>If so, please enclose.</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
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**Note/Elaboration:** See Section A and B4

B18	Are privacy controls in place for the project?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	▪ Need-to-know policies and procedures for personal information access	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	▪ Physical security and access controls	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	▪ IT security and access controls	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	▪ Others	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<i>Please enclose related documentation.</i>						

**Note/Elaboration:** See Section A concerning the established information, physical and IT security procedures of EPS and also B4.

In addition, data collected that relates solely to the pilot project evaluation will not have personal identifiers attached. Researcher observation will be kept in a locked cabinet in a locked office.

B19	If personal information will be used in the electronic delivery of services, have technological tools and system design techniques been considered which may enhance both privacy and security (e.g. encryption, technologies of anonymity or pseudo-anonymity, or digital signatures)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
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**Note/Elaboration:** There will not be an electronic delivery of services to the public. The same safeguards that exist for CCTV will be used. Video storage systems are controlled using Role Based Access Control (RBAC) and are limited to those administrators who require access to produce DVDs and manage and maintain the system. The Canadian Police Research Centre will not be provided personal information in the products delivered to it.



#	QUESTION	Yes	Yes and No (partial, incomplete, in preparation, etc.)	No	N/A	Encl. Ref.
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**AUDIT AND ENFORCEMENT**

B20	Have arrangements been made for audit, compliance and enforcement mechanisms for the proposed project, including fulfillment of the commitments made in the PIA?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
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**Note/Elaboration:** Due to the 'bleeding edge' nature of this pilot project - audit, compliance and enforcement mechanisms specific to the use of BWV do not yet exist. However the funding agreement with the Canadian Police Research Centre has a reporting and review schedule to oversee compliance with the Project specifications. It is at the core of this project to develop and test policy, protocol and procedures, train participants accordingly, and oversee their application. Observations and/or recommendations pertaining to these will be included in the final reporting on this project (which will not include personal information). EPS policy and procedure regarding internal audits applies to all EPS risk management, control, and governance processes. (Internal Audit Branch policy attached)

**General Notes:** This is a research pilot project of the efficacy of a potential new law enforcement tool.





***APPENDIX C: EPS LEGAL OPINION ON BWV***

**Privileged Legal Opinion Removed**

Please direct inquiries to EPS Legal Services Branch



## ***APPENDIX D: BWV DETAILED METHODOLOGY***

### **Edmonton Police Service Body Worn Video Pilot Project Detailed Methodology**

Mary Stratton, PhD.  
December, 2014

## **EPS Body Worn Video Pilot Project: Background**

The Edmonton Police Service (EPS) Body Worn Video (BWV) Pilot Project began in Fall 2011 and ran until Fall 2014. It was the first in Canada to receive federal funding for a professionally designed assessment and evaluation of the concept of this technology. At the commencement of this project there were very few examples of BWV evaluation in Canada or internationally.<sup>135</sup> The EPS evaluation developed an innovative approach suited to the EPS environment. Findings are intended to provide an evidence-base on which to make future equipment decisions, and to contribute policy and procedure for good practise related to the use of BWV.

## **Assessment and Evaluation Approach**

The EPS pilot was designed to be a professional, objective analysis that took a collaborative team approach involving stakeholders as key informants throughout all stages of the project. A communication plan was developed as part of the project approach. This included informing and surveying members of the public as well as frequent internal communications via presentations and published updates.

### **EPS Body Worn Video Pilot Project**

#### **Rigorous and collaborative assessment and evaluation involving:**

- ❖ Laboratory and development environment testing
- ❖ Tactical training environment performance and safety
- ❖ Intervention (operational) testing with control group comparison
- ❖ Special operational context testing
- ❖ User interviews (including video users such as Crown Prosecutors)
- ❖ Researcher observations
- ❖ EPS background statistics

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<sup>135</sup> [Appendix A](#) provides a detailed analytical review of all identified assessments of BWV technology in policing

A mixed method design<sup>136</sup> applied quantitative and qualitative performance measures to collect technical and field performance data with relevance to the following:

- ✦ Hardware efficiency and durability (such as equipment integration, video quality, climate performance, battery life, and field robustness).
- ✦ Aspects of integrating the BWV technology into existing systems to achieve overall operational effectiveness.
- ✦ Technical and security issues relating to the retention, management, retrieval and disclosure of recording devices.
- ✦ The impact of the technology in settling disputes and settling complaints.
- ✦ The effectiveness of BWV for preventing/reducing harm to police first responders and public safety.
- ✦ Strategies and costs for deployment: video storage and retrieval.
- ✦ Logistical burden; and a rationalization of potential value versus cost of implementing the technology.
- ✦ Contribution to an evidence-based foundation for future good practice, including: developing standards, protocols, procedures, and training specific to the application of these.
- ✦ Contribution, by direct application or as a model for similar assessments in other policing and/or first responder jurisdictions interested in BWV.

## The PICO Approach

The first stage of developing evaluation questions and criteria for the BWV pilot project was based on the application of PICO questions,<sup>137</sup> which pose a specific set of inquiries to the evaluation issue. The idea behind the PICO model is one of adapted experimental design applied in a real-world context, often referred to as ‘quasi-experimental,’ because it is impossible to control all other factors outside of the project that may influence the measured outcome. Nevertheless PICO provides a good organizing tool for development of and assessment/evaluation design.

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<sup>136</sup> [Mixed Method designs](#) strengthen the validity of findings and recommendations by integrating quantitative and qualitative approaches to theory, data collection, data analysis and interpretation. The synthesis of data from differing perspectives broadens understanding of the research context.

<sup>137</sup> This approach was recommended at a *Premergency* evidence-based research workshop, provided on behalf of Defence Research and Development Canada, Canadian Police Research Centre (now the Centre for Security Science), attended by # Peter Clissold, September 13-14, 2011.

## PICO QUESTIONS

- P** What **populations** are involved?
- I** What **intervention** is employed?
- C** What **control** on the intervention is in place?
- O** What is the measurable **outcome**?

For the EPS BWV pilot, the PICO model was applied to the broad research question: When we compare police officers in Edmonton (population), who use body worn devices (intervention) with those who do not use BWV (control), what do we find (outcome)?

### **Populations: Selecting Participants**

Prior to selecting the site and participants for the BWV pilot, the project team engaged in key contact meetings and presentations with representatives of a wide variety of EPS divisions and special units. As well, the Project Coordinator went on a series of eight ride and walk-alongs with patrols and beats distributed across the City of Edmonton. Observations made and input from EPS members during these ride-alongs provided important contextual information that assisted in participation decisions.

The Downtown Division, located at EPS headquarters, was selected as the site for the primary BWV intervention and control groups. This division reports the highest number of incidents across a wide range of different charges and issues. As well, the primary information management system and Security Management Branch are located at headquarters, facilitating coordination, monitoring and support for the project.

Initially four downtown patrol squads and two beat teams were selected to be the intervention and control groups. Selection was based on matching up schedules to allow the best possible statistical comparisons. Assignment of the patrol squads to be control or intervention was arbitrary. One beat team had just completed participation in another pilot project, so was assigned to the control for the BWV project.

Due to the Axon Flex not proceeding to operational testing, only one Downtown Patrol squad (and its control unit) ultimately took part in the operational testing.

The process of consultation indicated that it would be advantageous to the overall assessment of BWV potential to also include some special context testing in the pilot plan, even though control comparison would not be possible for these groups. The following areas were selected:

✚ ***Traffic Impaired Driving Countermeasures Unit (IDCU).***

EPS is committed to year-round awareness and enforcement efforts to reduce impaired driving and patrols routinely perform traffic stops. Additionally, checkstop operations throughout the year, and particularly during the Christmas and holiday seasons, are considered a successful strategy in impaired driving reduction. The IDCU coordinates and participates in checkstop and associated Targeting Alcohol Driving operations. It was decided to place BWV units on the sworn members permanently assigned to the IDCU commencing with the Christmas checkstop campaign 2012.<sup>138</sup>

✚ ***Whyte Avenue Entertainment District Beats.***

Whyte Avenue has a high density of bars and restaurants located along a six block area. Numerous small theatres and music venues are located close by. Several high visibility festivals also take place in this area. Located close to the University of Alberta, Whyte Avenue is attractive to students, but draws a broad demographic overall. The two beat teams working Whyte Avenue were identified as encountering unique and frequently challenging circumstances, which at times have become volatile. It was decided that placing BWV units on both beat teams for six or more months would be of value in assessing the usefulness of this technology for entertainment districts. While this eliminates the possibility of a strict intervention-control evaluation, it will still allow some comparison with annual statistics coupled with more qualitative data.

✚ ***West Edmonton Mall Beat.***

The huge West Edmonton Mall (WEM) is essentially a micro-city within a city. As well as shopping, it includes entertainment attractions for all ages. There is a large concert venue, smaller dance venues, a bar strip, a hotel, cinemas, water and amusement parks and other smaller attractions. A community police station is located within the mall from which a beat team operates. Members of this beat have agent status within the mall and work closely with mall security. The mall is surveyed by extensive CCTV, but is known to have areas where radio communication is poor or absent. This beat team is considered to work in a context that involves the range of incidents experienced by other beats and patrols but which has a set of unique social and technical conditions, including that of constant surveillance. It was decided that placing BWV units on the WEM beat would provide additional data and information of value to an overall assessment of BWV potential. WEM beat participation was scheduled as the last roll-out component expected to be in

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<sup>138</sup> Each checkstop initiative selects different participant members from volunteers who must be certified in the use of the Intoxilyser 400 D/Intoximeter FST approved screening devices. Therefore equipping all members working a specific check stop poses particular monitoring challenges for pilot purposes.

operation for approximately six months. This component went ahead, but by the time of roll-out, the beats had been reorganized and were not assigned only to patrol WEM.

Members of the units selected to test BWV were informed of their expected participation. All other EPS members were informed of the project via the EPSnet online news medium.

#### **✦ *Emergency Preparedness Exercise 2012***

The EPS Disaster and Emergency Operations (DEOPS) unit offered the BWV Project Team the opportunity to participate in the tri-service Chemical, Biological, Radiological, Nuclear and Explosive (CBRNE) emergency preparedness exercise, which occurred during the controlled testing phase of the pilot. This provided an excellent early controlled setting test of the selected BWV equipment. The exercise is reported in [Appendix F](#).

### **Intervention and Control Groups**

Analysis of available previous evaluations ([Appendix A](#)) of BWV for policing suggested that establishing solid intervention and control measures had proved challenging, especially as most pilots have been relatively short-term. Voluntary participation with multiple users of each device also impeded reliable outcomes. Measurement of police officers experiences of using the devices has been limited, almost exclusively, to self-administered brief surveys utilizing the rating of opinion statements. This approach disallows any nuanced response or explanation of respondents chosen answers.<sup>139</sup>

The EPS pilot had the following advantages:

#### **✦ A three-year project span allowing:**

- a. A depth of controlled environment testing to ensure that equipment was put through a full range of technical and tactical contexts that cannot be guaranteed to occur during daily operations as they may be infrequent but critical.
- b. Front-line operational testing over a complete twelve month cycle of climate and operational fluctuation.
- c. The use of multiple data collection tools to provide an in-depth understanding of organizational issues and members experiences in using this technology.

**✦ A full-time Project Coordinator/evaluator** with professional research training and the opportunity to design and oversee the project as a non-sworn EPS member. The coordinator was

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<sup>139</sup> Technicalities of surveying are beyond the scope of this document, but briefly, to be valid and reliable survey items must be thoroughly pre-tested to see if they measure what is intended. Even then, researchers investigating why people answer as they do often get some surprises. Opinion statements must be phrased either positively and negatively and therefore fail to pose an issue in a neutral way.



able to be immersed in the organizational operations and yet bring a relatively objective observational eye to the evaluation.

- ✦ **EPS base statistics** over five or more years for complaints, use of force and various incidence breakdowns potentially providing statistical comparisons the matched intervention and control group for the pilot period. Also allowing comparisons for the special context groups for periods during and prior to the piloting of BWV.
- ✦ **Individual issue, assigned (non-voluntary) participation** with specified policing contexts and geographical areas. Assignment was by membership in the selected units. Members leaving a unit left behind their BWV device for re-assignment to any incoming member.

## Outcome Measurements

### Main Research Question

*When we compare police officers in Edmonton who use body worn devices with those who do not use BWV what do we find (outcome)?*

This main research question was broken into specific outcome statements reflecting the project goals. Next, measurement questions were generated based on findings from previous research and/or other claims about BWV illustrated in [Figure 1](#). A matrix of proposed project measurements was then created ([Figure 2](#)).<sup>140</sup>

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<sup>140</sup> The version in this document has minor differences to that included in the Interim Report. This version has been adjusted to better reflect measures that proved actually viable

**Figure 1: BWV Outcome Statements and Measurement Questions**

<b>OUTCOME STATEMENT</b>	<b>RELATED QUESTIONS TO BE MEASURED</b>
<i>Effective for dual use in and outside of the car</i>	<ul style="list-style-type: none"> <li>▪ How do officers find the BWV equipment integrates with their overall equipment?</li> <li>▪ How efficiently does the BWV operate inside cars?</li> <li>▪ How efficiently does the BWV operate on the street?</li> <li>▪ How efficiently does the BWV operate inside buildings?</li> <li>▪ Does change of temperature have an effect on the BWV operation?</li> <li>▪ How easy/difficult do officers find the BWV to operate?</li> </ul>
<i>Efficient system for BWV data system deposit, storage and retrieval</i>	<ul style="list-style-type: none"> <li>▪ How easy/difficult is it to establish a deposit, storage and retrieval system in the EPS environment?</li> <li>▪ How easy/difficult do officers find the deposit system to operate?</li> <li>▪ How effective do system administrators, members, Crown prosecutors find system to be?</li> <li>▪ Are requests for evidentiary video clips being met?</li> <li>▪ How does the efficiency and accuracy of storage, sorting and retrieval of BWV compare to that of similar EPS systems (such as CCTV)?</li> </ul>
<i>Discouragement of aggressive behaviour from citizens</i>	<ul style="list-style-type: none"> <li>▪ Does awareness of the activated BWV affect citizens' behaviour?</li> </ul>
<i>Reduced need to employ force</i>	<ul style="list-style-type: none"> <li>▪ Does use of the BWV affect the need for officers to employ force?</li> </ul>
<i>Reduction in citizen complaints</i>	<ul style="list-style-type: none"> <li>▪ During the pilot period has there been a change in the amount of citizen complaints received?</li> </ul>

<p><i>Reduction in Internal Affairs complaint investigation time</i></p>	<ul style="list-style-type: none"> <li>▪ Does the presence of BWV footage impact the amount of time needed to investigate a complaint?</li> <li>▪ Does BWV footage affect the accuracy and/or clarity of the investigation and/or the acceptance of the conclusion?</li> </ul>
<p><i>More clear-cut and efficient investigations</i></p>	<ul style="list-style-type: none"> <li>▪ How do the outcomes of investigations compare between Intervention and control groups?</li> <li>▪ How are Crown Prosecutors adapting to the inclusion of BWV as evidence?</li> <li>▪ What are the opinions of Crown Prosecutors regarding technology related to BWV?</li> <li>▪ Does the availability or absence of BWV influence the decisions of Crown Prosecutors to prosecute?</li> </ul>
<p><i>Stronger evidence at court leading to increased guilty pleas and convictions</i></p>	<ul style="list-style-type: none"> <li>▪ How do the numbers of investigations resulting in guilty pleas compare between Intervention and control groups?</li> <li>▪ Of not-guilty pleas going before a judge, how do convictions compare between Intervention members and control members?</li> <li>▪ Of not-guilty pleas going before a jury, how do convictions compare between intervention members and control members?</li> <li>▪ How do judges respond to the inclusion of BWV evidence?</li> <li>▪ How is video technology used in the courts?</li> </ul>
<p><i>Reduction in officer time spent in court</i></p>	<ul style="list-style-type: none"> <li>▪ Does the use of BWV impact the time officers spend in court?</li> </ul>
<p><i>An overall reduction in investigation and reporting time</i></p>	<ul style="list-style-type: none"> <li>▪ How much time in total do intervention members compared to control members take to complete an investigation process?</li> </ul>

**Figure 2: BWV Pilot Project Measures**

BWV Element Measured	Comparative	Analytical	Criterion Performance Based	Expert assessment	Criterion Qualitative	Statistical	Intervention/ Control	Interview/ survey Qualitative	Interview/ survey Quantitative	Researcher Observation
Prior BWV evidence	X	X								
Existing BWV technology	X	X			X					
Short-listed BWV Technology	X	X	X	X	X					
Selected BWV Units Technical Performance	X		X	X			X	X	X	X
Selected BWV Units Officer Safety	X		X	X						X
Policy & Protocol (SOP) Practice Effectiveness		X		X				X		X
Communications Plan Effectiveness				X	X	X				X
Body Worn Effectiveness Front-line Policing		X			X	X	X	X	X	X
Car Mounted Effectiveness			X		X	X	X	X	X	X
Data Management Effectiveness	X		X	X	X					
Effect on citizen aggression							X	X	X	X
Effect on Use of Force	X					X	X	X	X	X
Effect on Complaint Investigations	X					X	X	X	X	X
Effect on Investigation Efficiency	X						X	X	X	
Effect on Strength of Evidence							X	X	X	X
Effect on Prosecution Outcomes				X				X	X	X

## Data Collection and Analysis

The mixed method approach to this multiple site and many-faceted evaluation required the development of numerous data collection records and several approaches to data analysis.

The following research instruments were designed:<sup>141</sup>

- Spreadsheet of technical criteria for evaluating available BWV devices: 22 devices assessed
- Technical Review Evaluation Form<sup>142</sup>
- Video quality criteria evaluation sheet: 39 Axon Flex clips rated (20% second rated and agreed); 107 RS3 SX clips rated (20% second rated and agreed). Put in basic rating criteria.<sup>143</sup>
- Interview schedule for in-person interviews with BWV operational users: 56 completed (100% participation)
- Adapted interview schedule for non-user supervisors of pilot group members: 4 completed (100% participation)
- Interview schedule for in-person interviews with Professional Standards Branch investigators (four completed)
- Questionnaire for Crown Prosecutors with BWV-included case files (none received)
- Public Opinion In-Person Survey (329 responses collected)
- Electronic survey for general EPS sworn members -non-pilot participants (166 responses)
- Key Contact Record Template (KCR) (121 records)
- Court Observation Record Template (COR) three completed)
- Usage record/ informal feedback form (up to eight time points depending on unit and performance pattern)

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<sup>141</sup> Research instruments applied in the EPS BWV Evaluation may be available upon request.

<sup>142</sup> The details of the technical assessment are provided in [Appendix E](#).

<sup>143</sup> See also [Video Rating](#)

A variety of other data records were also kept:

- A list of inquiries for information about the project including a record of information provided and received (63 as of December 2014).
- A list of all identified external and internal media on the pilot project with hard copies and links to articles on file
- Electronic copies of all background materials identified/received
- Researcher and participant observation notes

The following data analysis tools and methods were applied:

- Basic textual analysis to (background materials for the [Literature Review](#))
- Criterion analysis (technical assessment of available BWV technology; video quality rating), recorded using Excel spreadsheets
- SPSS software for statistical analysis (Public Opinion Survey; quantified components of the BWV user interviews and associated Use of force and complaints statistics)
- Survey software General Membership Electronic Survey
- Thematic analysis of qualitative components of BWV user and other stakeholder interviews (Microsoft Word assisted)<sup>144</sup>; observation notes and usage records
- Analytical thematic integration of quantitative and qualitative data to address the research question components.

## **Video Rating Criteria**

Operational video clips were assessed against 18 criteria combining elements of technical specifications with operational performance. Each was rated on a five point scale between unusable and excellent in terms of potential evidentiary contribution. It was recognized that any such rating is to some degree subjective, however the system was made as systematic as

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<sup>144</sup> Purchasing and using Atlas.ti qualitative software was considered. However, it was decided that for the number of interviews, the amount of qualitative data gathered on the mixed-method interview instruments, and the level of analysis required preparation for entry into the software would have been too time-consuming for the resulting benefit. Microsoft Word searchable functions allowed qualitative excerpts to be sorted thematically and easily located for reporting purposes.

possible. The findings are reported in Section 5.3.2 of the Final Report, which also provides a list of the criteria and the mean ratings for both the RS3 SX and the Axon Flex.

### **Limitations of the Methodology**

Every research design also has limitations. Limited monetary and time resources are common to almost all evaluation projects. As evaluation of a pilot project of necessity involves measuring new territory unanticipated factors are also unavoidable. Large organizations introduce procedural changes and multiple new initiatives on an ongoing basis rendering strict intervention-control measurements impossible. The following issues emerged during the BWV pilot:

- ✦ **Limited technical resources.** The Security Management Branch technical team manage multiple projects among which the BWV pilot was a relatively small initiative. Managing the devices and the data was more time consuming than anticipated, particularly finding a viable automated, networked data management solution. There was insufficient capacity to continue test new versions of Manufacturer's software as these were released or to introduce any new approach to managing devices once the operational testing was underway. Findings address some of the arising issues and [Appendix E](#) provides technical details
- ✦ **Personnel in motion:** EPS has considerable internal mobility. Members moved in and out of the pilot units, either permanently or temporarily. At one point in the pilot a member from the intervention patrol had permanently moved to the control group, another from intervention was on loan to the control patrol unit and a third had moved from the control to the intervention unit. Obviously this interferes with reliable statistics comparison. As well, there were numerous leadership changes from the sergeant level upwards. This introduced an additional variable to be considered in any statistical changes that might be identified. It also meant that incoming personnel had to be identified and briefed on the pilot.
- ✦ **Viability of baseline statistics:** EPS regularly collects many operational statistics. However, the way in which some are collected was not readily compatible with extracting those pertinent to the BWV user and control groups. In particular, numbers relating to work time and type of calls were too generic to be meaningful in terms of assessing any change because of the use of BWV.

### **In Conclusion**

The methodology applied to the EPS BWV Project was successful in producing rich data of a depth a quality that adds significantly to previous research on BWV in Canada and internationally. The use of interviews was instrumental in producing nuanced information about EPS members' experiences of using this technology and highlighting operational factors that must be considerations in adopting BWV as a policing tool.





## ***APPENDIX E: TECHNICAL REVIEW***

### **Edmonton Police Service Body Worn Video Pilot Project Technical Review**

December 2014

Authors:

Rick Tuson, Technical Security Advisor, Security Management Branch  
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## **Introduction**

The purpose of this review is to provide the technical details of the Edmonton Police Service (EPS) Body Worn Video (BWV) pilot project. Findings relating to the devices, controlled training and all aspects of operational testing are covered in the Final report Section 5. This Review deals with the technical aspects related to:

- Selection of BWV Technology
- Device Functionality
- Video quality
- Data Management
- Device Management
- Data Storage
- Power
- Technical support

Although every agency will have unique features, any BWV program is recommended to consider the stages and technical components covered in this review.

## **Selection of BWV Technology for Testing**

### **First Stage Assessment**

In early 2012, an initial analysis of available BWV cameras was made based on the identification of products available in the marketplace and the specifications provided by the BWV suppliers. The following 12 companies were identified as offering a total of 16 types of BWV equipment advertised as suitable for policing:<sup>145</sup>

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<sup>145</sup> Panasonic requested to demonstrate a prototype BWV system, but this was not ranked as it was not expected to be in production in time for the EPS pilot project field testing phase.

- Audax
- Coban Viewu
- CopVu
- eWitness
- MPH Muvi
- Reveal Media
- StalkerVue
- Tactical electronics
- Taser
- Vidmac
- Viewu
- Wolfcom

A spreadsheet comparison was created using the following 22 criteria:

Audio	Monitor
Battery life	Mounting options
Dimensions/weight	Security
DVR	Plug and play (file format)
Encoding	Pre-event recording
Frame rate	Primary Camera
GPS	Recording resolution/options
Instant playback	Secondary (back-up camera)
Low light/night capability	Still image capture
Memory amount/type	Type of camera
Upload connections	Weatherproofing

### Second Stage Assessment

The initial rankings resulted in a short list of the following five BWV units with sufficient initial criteria to warrant further research:

- Audax Big Brother ([http://www.audaxit.co.uk/big\\_brother\\_head\\_cam.html](http://www.audaxit.co.uk/big_brother_head_cam.html))
- eWitness HD Pro ([http://ewitness.com.au/ewitness\\_products.html#eWitnessHD](http://ewitness.com.au/ewitness_products.html#eWitnessHD))
- Wolfcom 3<sup>rd</sup> Eye (<http://www.wolfcomusa.com/>)
- Reveal Media RS3SX (<http://www.revealmedia.com/buy-t166/cameras/rs3-sx.aspx>)

- Taser Axon POV (<http://www.taser.com/products/on-officer-video/taser-axon>). The vendor indicated that the Axon had just been replaced by the Flex.

The BWV team developed a 41-question “Technology Evaluation Form” based on the original assessment criteria plus additional features identified by the Team as desirable. This questionnaire was sent to the short listed vendors soliciting their responses.

## BODY WORN VIDEO TECHNOLOGY EVALUATION FORM

#	Type	Question
1	<b>General</b>	How many separate components does this Body Worn Video (BWV) equipment have and what are they? (Camera, DVR, battery pack, cable, microphone, other)
2		What is the <u>total</u> combined weight of all the components in this BWV system?
3		Does the BWV system have a screen for field playback?
4		Is there internal data storage?
5		Is there removable storage?
6		What type of removable storage is used?
7		What is the maximum capacity of the storage? (Identify both internal and external)
8		Explain how the removable storage is physically secured?
9		What other security features exist?
10		Can the internal memory and/or removable storage be password protected and managed by an administrator? Explain and provide details of this process
11		Do the recordings contain video encryption?
12		Are the images watermarked?
13		What "Video Tampering" checks are included with this solution?
14		Can the battery be replaced in the field?
15		What is the specified battery duration? (by resolution setting, standby, and recording modes)
16		What is the specified battery recharge time?
17		What is the weather (waterproof) rating of the equipment?
18		What is the specified outdoor temperature rating of the equipment (In Celsius)?
19		What is the impact performance rating?
21	<b>Camera Features</b>	What is the camera field of view? (In Degrees)
22		Is the camera capable of auto backlight compensation?
23		Is the camera capable of auto focusing?
24		What body mounting options does this camera include? And available for separate purchase?
25		What in vehicle mounting options does this camera include?
26		What low light/night technology does the camera incorporate? Provide specifications/ratings.

<b>BODY WORN VIDEO TECHNOLOGY EVALUATION FORM (Contd.)</b>		
<b>#</b>	<b>Type</b>	<b>Question</b>
28	<b>Recording Features</b>	What resolution settings does this technology include?
29		Can the resolution settings be selected and then locked by an administrator?
30		What frame rate settings does this technology include?
31		Can the frame rate settings be selected and then locked by an administrator?
32		What stabilizing technology is incorporated? Please provide details.
33		Is there pre-event recording? If so what amount? Is audio recorded during pre-event recording?
34		Is there post-event recording?
35		Is Geo-tagging included? If so, how does it make use of this feature (e.g., embedded within Video, Photos)?
36		Does the technology permit still photos to be taken? If so what is the resolution of these photos? Can the photos be taken while recording video?
38	<b>Video/system Management</b>	What is the upload transfer speed? (by resolution/frame rate)
39		What management software is provided and what features does it include?
40		What mechanism is used for system/network interface? (ie: transfer mode, docking station)
41		Are the body worn video devices capable of using network time protocol?

### **Selected BWV Devices and Specifications**

Following consideration of the responses from the short-listed vendors, two devices were selected for further testing:

- Reveal Media - RS3-SX
- Taser - Axon Flex

**TABLE A: SPECIFICATIONS: SELECTED BWV MODELS**

Specification	Reveal Media RS3-SX	Taser Axon Flex
Primary camera	Articulated 120 Deg. Field of View	3.2"L x 0.796"W x 0.71"H ;15g; 75 Deg. FOV
Secondary camera	N/A	N/A
Mounting options	Car Dashboard, Body, Handheld, Tabletop	Oakley Flak Jacket, Headband, Collar Mount, ball Cap Mount, Helmet Mount, Epaulette Mount, In Dash Mount
Memory	Solid State Up to 32 GB SD Card	4-8 GB internal (depending on settings)
Recording resolution	800 X 400; 768 X 576; 1280 X 720;1920 X 1080	640 X 480
Frame rate	30 or 60 fps	30 fps
Encoding	H264 (video); MPEG-4 (audio)	MPEG-4 (Video); MPEG-4 (Audio)
Pre-event recording	30 seconds	30 seconds without audio
Instant playback	Built-in screen and playback on device	Only Via phone application or MDT application
Still image capture	N/A	N/A
GPS	N/A	Via phone application
Password protected recordings	External device changes settings; can be user or administrator controlled	Secure web storage, settings changed using web application.
Monitor	Inbuilt forward facing	Smart phone Bluetooth integration; no monitor on device
Audio	Built in, automatic sensitivity microphone	Built in microphone
Connections	External camera input USB2 to docking station/PC	Bluetooth to smartphone, USB 2 to docking station/PC
Weatherproof	IP 54	IPX2- MIL- STD 810F Method 506.4 procedure 1 (rain & blowing)
Plug and play	N/A	Smart phone integration, no monitor on device
Dimensions	98mm X 60mm X 25mm	Camera 3.2"L x 0.769"W x 0.71"H Controller 2.6"L x 0.76"W x 3.3"H
Total weight	140 grams	108 grams cont'd next page
Battery life	2.5 hours (estimated record time)	Standby 12+ hours Record time 4 – 12+ hours depending on setting
Other	No external wires	External wire camera to controller Low light capacity 1 lux, online storage Android and IOS based application

## **Findings and Conclusions: Selection Process**

- ✦ Body worn video was a new technology in the early stages of its evolution.
- ✦ It remains ‘bleeding edge’ technology at time of writing.
- ✦ No single available product would be able to address the entire front-end camera and back-end data management features desired by EPS.

### **Device Functionality**

Due to data management issues discussed in the following section of this technical review, full functionality testing of the Axon Flex was not undertaken. Section 5 of the main report does, however, report findings relating to the operation of the Flex in controlled environment testing.

The Tables B and C, following, capture the RS3-SX performance advantages, disadvantages, faults and resolutions noted during preliminary testing. Additional findings related to the impact of these issues on operational use of the BWV RS3-SX are provided in the Final Report Section 5.



<b>TABLE B: RS3-SX PERFORMANCE</b>		
<b>Item</b>	<b>Advantages</b>	<b>Disadvantages</b>
Pre-event recording	Provides recording prior to device activation	Battery Performance was reduced when using pre-event recording
Audio		Playback audio levels were found to be insufficient when the BWV device speaker was used.
Battery	Battery was replaceable	Battery at 2.5 hours (or less) of capacity was insufficient. Extra batteries had to be carried. External battery was not available until a later date. It would not have been easily added to the full equipment belt and would require an additional wire connector.
USB connections		Only a limited amount of devices could be connected to a single computer.
External battery charger	Allowed spare batteries to be available	Single battery charger only available necessitating extra charger purchased for each device.

<b>TABLE C: RS3-SX FAULTS AND RESOLUTIONS EXPERIENCED</b>	
<b>Type of Fault</b>	<b>Resolution</b>
<b>USB Connector.</b> Interior of the proprietary 3.5 mm connector port used was prone to break, causing inability to upload video or charge device.	Manufacturer was informed resulting in future product enhancements. Replacement devices were provided to reduce impact to the officers.
<b>Time and date reset:</b> low battery resulted in arbitrary resetting of date to factory default.	Not resolved during pilot. Manufacturer has now implemented firmware and software updates.
<b>Camera neck breaking</b> away from device body	. Replacement devices were provided to reduce impact to the officers.
<b>Rubber operation button covers</b> would fall off	Manufacturer was informed for future product enhancements. Replacement button covers were provided to reduce impact to the officers.
<b>Battery latch insecure</b> at times resulting in potential battery or SD card loss.	Manufacturer was informed resulting in future product enhancements. Replacement devices were provided to reduce impact to the officers.
<b>On-device sound playback poor</b>	Manufacturer was informed resulting in future product enhancements. Later purchases and replacements had improved, but not excellent, on-device sound.
<b>EPS custom software script</b> (required due to poor or no management software) would stop running and had no automatic alert message.	Daily checks were undertaken as due to the limited project duration, further investment was not applied to resolving this issue.
<b>USB proprietary wires sometimes failed</b>	Manufacturer supplied replacements. Proprietary wires should be minimized as they could not be purchased locally.
<b>Manufacturer provided USB Hubs</b> proved unreliable for 24/7 operation. Power cycling and/or resetting the connection to the computer was required to restore functionality.	Replacing with higher end USB hubs resulted in no available driver for the proprietary BWV device being available. An alternative mass produced USB hub was identified and used, but only certain models from this USB manufacturer were successful.

### **Findings and Conclusions: Device Functionality**

- ✦ The RS3-SX device and associated hardware had numerous functionality issues further underlining the newness of this technology.
- ✦ Work-around solutions were found that allowed continued operational use and the manufacturer was responsive to feedback.

### **Video Quality**

Frame rate is the number of frames captured in one second. This is usually expressed as Frames per Second (FPS). By default most inexperienced users will set the frame rate to the highest possible configuration. This may be the correct approach, but there are some considerations. It is generally accepted that 15FPS and higher is indiscernible to the human eye, however It's recommended to request legal opinion as court precedent may be best able to solidify the requirement. Setting the device to a high FPS when a lower one is sufficient will also increase storage requirements. This will be applicable both on the device and for the network storage. Technical cross examination in court may be raised should the video not contain a high enough rate.

Video Quality is a measurement of perceived video degradation. To measure the quality of a BWV Device recording the best means is to perform the recording under different circumstances and then review the video for noted areas of degradation.

Auto-backlight compensation provides a means of automatically brightening a subject who is standing in front of a window or light, and at the same time reducing the brightness that occurs behind the subject.

Low light ability is the capability of the camera to handle low light conditions. Ensure testing is carried out in this regard and the low light capability is accepted.

Video Quality, Auto-backlight compensation and Low light ability can be determining -factors on the ability to accurately identify the subject.

Settings selected for the RS3-SX are provided under [Device Management: Hardware](#). Section 5.3 of the Final Report presents findings related to the operational experience of video quality. Appendix D (Detailed Methodology) provides the criteria against which operational video quality was assessed.

## **Data Management Software**

### **Evidence.com Testing and Findings**

The Taser Axon Flex incorporated the use of Cloud Storage through a product called Evidence.com. This solution was hosted by Amazon.com in the USA and resold as a storage solution by Taser.

### **Advantages of Flex Cloud Storage**

Taser claimed that Evidence.com provides a more secure chain of evidence because most manual handling of digital evidence is eliminated and all access is tracked and reported. The need for local storage and associated technical support is also removed.

Files can be accessed directly via a web browser by any authorized person. Thus, in the case of video evidence, authorized users from police services, prosecutors and the courts can all directly access relevant footage eliminating the need for local storage either on servers or in the form of multiple DVD copies.

### **Risks of Cloud Storage**

There are three main and overlapping areas of concern relating to Cloud storage of data: privacy, security and cost. The following issues were considered by EPS.<sup>146</sup>

- ✦ Data stored in the Cloud is physically and logically out of the control of the originating organization/individual.
- ✦ Questions arise as to which jurisdiction controls/owns the data. Currently most Cloud operators are based in the United States, or are subsidiaries of companies that are US owned.

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<sup>146</sup> A Briefing Note was prepared by the Project Coordinator (August 12, 2013, on file) summarizing issues raised in a number of law-related and industry sources (available on request).

The implications of the US *Patriot Act* raise significant privacy and security concerns for users outside the US.

- ✦ Lawyers predict that with no existing case law, issues of jurisdictional control and responsibility will generate many critical legal issues in a variety of circumstances.
- ✦ There is potential for compromise of data stored in a cloud either by technical failure or security breaches and these do occur quite regularly. Large scale technical failure could potentially have a catastrophic impact on Cloud stored data. Cloud providers claim to have many back-ups to protect against such circumstances. This is nevertheless a very new area of technology and exact details tend to be vague (see <http://evidence.com/security>).
- ✦ Concerns are raised about the wording of contracts with Cloud suppliers. These include questions about the responsibility for privacy breaches and loss of data by technical failure or data theft. There are also critical but unanswered questions about contract termination (or breach) of a Cloud contract concerning responsibility, jurisdiction control, cost, and data retrieval method. Long-term costs of storage must also be considered. In the case of evidence a range of retention times are required.
- ✦ In order to upload large volumes of data, such as that produced by BWV systems to a cloud provider, a significant upgrade to the agency's bandwidth provided by its Internet Service Provider (ISP) is often required. This will result in significant increases to on-going costs.
- ✦ Similarly, the available band-width on an agency's network (particularly its Wide Area Network (WAN)) may be insufficient to upload large volumes of data from divisions or stations that are connected via WAN. Upgrading WAN's can be very costly.
- ✦ There are significant implications of administering a cloud service provided storage solution for this type of use. Accounts must be created, privileges assigned and accounts disabled when users leave or are terminated. This also applies to communities outside of the agency, for example prosecutors, independent complaints reviewers etc. Account administration is a critical requirement and is resource intensive. Without it, auditing and access control are reduced and these can result in serious consequences.

Given these considerations, EPS decided not to move forward with the Taser product or with further Cloud Storage evaluation during the pilot.<sup>147</sup>

## **DEMS 2 Testing and Findings**

DEMS software is the Central Management Software (CMS) used by Reveal Media for the RS3-SX. The test of this software was completed using a stand-alone computer. The operating System installed for the test was Microsoft Windows XP with Service Pack 3.

DEMS software contained 3 applications AUTOUPLOADER, RS CAMERA INTERFACE and DEMS CLIENT. All three applications are explained in detail in the DEMS USER MANUAL V2.0.2.<sup>148</sup>

The following table captures the data management advantages and disadvantages of the DEMS 2 CMS as noted during preliminary testing.

The findings for the DEMS software were that although the application delivered some requirements such as the ability to add notes and tag video for future reference it was limited by those issues identified in the above Table D. Due to the poor performance on the EPS network and the lack of resilience in its operation, the software was not used any further than the initial testing phase. Reveal Media indicated that a later release of the software would have resolved these issues but due to project timelines EPS developed an alternate solution.

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<sup>147</sup> During controlled testing, EPS Tactics Training Unit (TTU) also raised safety concerns related to the position of the Flex camera against the temple and the possibility of the connecting wire being used as a weapon against members. TTUs report recommended against operational use of this device.

<sup>148</sup> This manual no longer appears available on the Reveal media website. The site offers a description of the current Version DEMS3: <http://revealmedia.com/dems-digital-evidence-management-system>

**TABLE D: DEMS 2 CMS PERFORMANCE DURING PRELIMINARY TESTING**

<b>Item</b>	<b>Advantages</b>	<b>Disadvantages</b>
Video upload process	Pre-upload ability to add notes and tag footage as evidential or non-evidential	No means of alerting if the upload process should fail
Auto upload	The auto upload application recognized the camera and could automatically upload video to the appropriate user file location.	The auto upload application was not able to recognize the camera within Windows XP. Upload required pressing the refresh button. This was resolved with Windows 7.  There was no means to prevent a user inadvertently closing the auto upload application
Upload and playback time	None	Upload times to network storage and playback were very slow. Uploading and playback without the use of the DEMS software was found to be acceptable.
File location	None	Initial software would only permit saving to a default folder on the network. Through discussion with Reveal Media they resolved this issue and provided update permitting network folders to be used.
Time and date	None	No network time and date synchronization was available. No compensation for leap year.
Active directory	The software worked with Active Directory reducing the administrative requirements of creating and maintaining users.	None

## **Panasonic Arbitrator Testing and Findings**

The Panasonic BWV Arbitrator Software became available after the BWV devices were selected by EPS. The project tested this software as a possible resolution to the network issues experienced with the DEMS software. The BWV Team found that the Arbitrator software contained numerous features that were seen to offer potential benefit, but experienced similar issues with the upload and playback delays. As a result, this product was not used for the EPS BWV pilot project.

## **EPS Alternate Script solution**

EPS used Microsoft Windows without the manufacturer's software (Reveal Media's DEMS and Panasonic Arbitrator Software). Manually moving the video files from the device to the destination folder and then testing playback was successful and the delays were resolved. At that juncture, the EPS project team decided that a scripting tool would be investigated to automate the functional requirements during the project. Automation Anywhere was selected as the solution. It was able to address both the functional requirements and the scale of the deployment. The functional requirements were:

- Ability to detect multiple BWV devices by USB address
- Scheduled upload every two hours
- Ability to compare content on the BWV device with that placed within the uploaded destination
- With successful confirmation of data at its final destination, erase the content on the BWV Device

The EPS project team found that the implementation of Automation Anywhere was efficient and resolved the issues experienced by the manufacturers BWV central management software applications.

Windows native security was utilized to provide access control for uploaded files. This meant that folder structures had to be manually created with the correct permissions applied in order for uploads to occur and security to be correctly applied. As a result, user and device set up was less efficient.

For the purposes of the EPS pilot project, this process was manageable; however a large scale implementation would require automated processes in order to succeed. A reliable, well-designed and implemented Central Management System is therefore critical to a large scale deployment of BWV.

The functional requirements provided for Automation Anywhere script development were:

## **AUTOMATION ANYWHERE SCRIPT FUNCTIONAL REQUIREMENTS**

1	Every two hours, the script is to scan for removable devices (Body Worn Video Units).
2	Based on the device's name, a Windows sub-folder (using the BWV device name) is created within the previously created parent folder located on the body worn video file storage server on the network
3	Copy all files located on the "Device: \DCIM\100Media\*" to the newly created folder (associated to the BWV device) within the "parent folder"
4	If the source file does not exist on the destination folder, the script will proceed with the file transfer process
5	If the source file exists on the destination folder, the script will cancel the transfer process.
6	Upon a successful file transfer from the device to the associated BWV device folder on the network storage device, an email process is spawned. The e-mail confirms that the videos from the BWV Device were successfully transferred to the "defined folder".
7	The script then runs a comparison between the filename on the BWV device with that placed within the uploaded destination. Due to the limitations of automation anywhere, only the filename was able to be compared. It is recommended that for deployment outside of a pilot project, additional meta-data is compared to ensure accuracy of the transfer.
8	With successful confirmation of data uploaded at its final destination, delete content on the local BWV Device

### **Video Playback**

Officers require the ability to playback recorded video. To do so requires the appropriate player, or 'codec' to be installed on designated computers. In the case of RS3-SX the player used was Windows Media Player.

EPS found that playback of video through the network from a remote location over the WAN introduced network bandwidth and latency considerations. Centrally storing the video at one site and accessing it from another can cause problems for the officer and other network users.



Because of this, EPS designed the storage solution as decentralized as opposed to centralized. Local storage devices therefore being at the same location as the officers meant that bandwidth limitations and latency were only felt by administrators associated with accessing content from particular sites.

### **BWV Software Pre-Installation Checklist**

<b>BWV SOFTWARE PRE-INSTALLATION CHECKLIST</b>	
1	Verify all network connections (Any device with an IP address)
2	Verify ports are open and firewall rules are addressed where applicable
3	Test bandwidth availability at the site and between sites
4	Ensure hardware requirements are met
5	Ensure software requirements are met
6	Confirm with vendor which software release is most proven
7	Download applicable software releases
8	Install latest Microsoft updates, video and/or network drivers as identified by the manufacturer
9	Install database(s) as required
10	Ensure all applicable redundancy, resilience and back-up/restore steps are considered and implemented as per agency policy or standards
11	Prepare and activate appropriate software licenses
12	Test software releases prior to rollout
13	Prepare a password list for all hardware and software (secure the document accordingly)
14	Ensure default passwords are changed, avoid generic passwords
15	Ensure that permissions and privileges are correctly assigned
16	Ensure user and group management processes are developed and documented

## **Findings and Conclusions: Data management Software**

- ✦ Data management software available from BWV manufacturers at the outset of the EPS pilot was not able to meet EPS requirements for secure and efficient management of video.
- ✦ The implementation of Automation Anywhere within the Windows operating system was efficient and resolved most of the issues experienced by the manufacturers BWV software.
- ✦ A reliable, well-designed central data management system will be critical to a large-scale deployment of BWV

## **Security Considerations**

The same Information Security policies and standards implemented for the EPS network applied to the BWV infrastructure. Folders for each officer were created within the windows environment with “Read Only” permission for the officer. The “Read Only” aspect was decided upon to maintain continuity of evidence and provide log files for future reference. Project System Administrators were provided with “Read” and “Write” permissions. All activities were logged using Windows Event Logging to ensure that file activities were tracked. Windows Active Directory (AD) logins and AD Security group were used for authentication, and access to the storage SAN/Server.

A formal request process was implemented for anyone making a request to access, modify or delete content. Adopting Information Security standards and controlling access to the video itself was done to support continuity of evidence, and reduce the risk of lost or modified video. Applying these permissions and processes may not prevent file deletion and therefore backup will be an important consideration.

Manufacturer identified ports were opened, and firewall rules were addressed to permit BWV data traffic to traverse the network as required.

Antivirus and Malware scanning applications are required to be running on all EPS network hosts including those hosts used for BWV implementation. Antimalware applications can sometimes affect performance however the performance of the EPS BWV solution was not impacted.

At EPS facilities, when the device was docked and the officer left the room the devices remained accessible to other personnel who held a building access card. EPS uses ‘security clearance’ processes prior to employing staff or contractors and providing physical access to its facilities.

The RS3-SX did not contain internal storage and instead made use of a removable Secure Digital (SD) Card for storage of recordings on the device. When EPS enquired about the security of this solution, the manufacturer stated that an encrypted SD Card could be used. Due to the cost of the encrypted SD Card along with the added dependency of the DEMS software this alternative was not used for the project.

A proprietary control device was required to configure the RS3-SX settings. This was most helpful in establishing standards for recording rates, defining pre-event recording, and setting date and time. It was also possible to enter the regimental number of the assigned user, as well as enter that number onto the SD card of that device. While imperfect as a security measure, doing so did reduce risk of accidental or deliberate device or SD card exchanges. To ensure that settings remained constant throughout the pilot members of the BWV team controlled configuration.

### **Findings and Conclusions: Security Issues**

- ✦ Continuity of evidence is critical in order to meet requirements set by most courts. It is therefore critical that appropriate measures are implemented and documented for this purpose.
- ✦ Integrated, internal device storage is preferred as opposed to removable media such as a SD card.
- ✦ Auditing and reporting capabilities are highly desirable in a central management software solution.
- ✦ Information security standards and best practices should be applied to BWV implementations

## Device Management: Hardware (RS3-SX)

With the conclusion of the performance testing, EPS applied the following settings for the RS3-SX devices:

<b>Configurations Menu Settings</b>	
Resolution	848x480/60FPS
Pre-recording	Off
Mic Volume	7
Audio alarms	On
White balance	Auto
Language	English
Date & Time set up	Current
Date & Time stamp	On
Format	No
Auto LCD Off	30 Sec.
Unit ID set up	REG. NO.
Default Setting	No
Recorder off mode	Slider Only
Firmware version	As default

## Labelling

The BWV Device and pouch were physically labelled with the officer regimental number to ensure the same device was always assigned to the correct member. As noted when discussing [Security Considerations](#), the Unit ID and SD card within the device were changed to the user's regimental number ensuring video files were transferred to the correct folder and that neither

device nor cards could not be swapped among pilot participants. A master list was kept listing the devices by serial number and regimental assignment to track users and record any re-assignments. If devices are shared amongst officers, this level of inventory management will be much more difficult to achieve.<sup>149</sup>

## **Hardware Requirements**

Hardware selection was based upon the manufacturer's recommendations. Facilitating the implementation of the Reveal Media RS3-SX required the hardware shown in Table E, which also provides the location and purpose of each item.

## **Device Deployment Considerations**

The EPS BWV Pilot used a single user assignment for BWV devices. The advantages of Single User deployment include:

- Ease of tracking the last user of the device
- Reduction in the risk of one user having access to the video recorded by another user
- Responsibility for the device remains with the assignee
- Reduction in the administration of the management software
- Increased fault-reporting
- Easier inventory control

The advantage of a Shared BWV device is primarily reduced initial capital investment cost. The disadvantages include:

- An additional layer of complexity in ensuring officers are properly assigned to devices, including managing upload and recharging between shifts.
- Ensuring the software and video files reflect assignments accordingly
- Increased damage or loss to devices
- Subsequent increased costs and impact associated to repair/replacement
- Reduction in fault-reporting (faulty devices are left unused and un-reported)
- Reduced inventory control
- Reduced 'sense of ownership'

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<sup>149</sup> See also [Device Deployment Considerations](#).

**TABLE E: BWV HARDWARE REQUIREMENTS**

<b>Item</b>	<b>Manufacturer</b>	<b>Model</b>	<b>Location</b>	<b>Purpose</b>
BWV device	Reveal Media	RS3-SX	HQ Guard station Community stations	Location of recording devices at EPS HQ. These were assigned and returned to the guard location each shift Location of the recording devices at other police stations devices overseen by unit sergeants.
Battery charger	Reveal Media	RMC3BCH	Docking stations	RS3 battery charger. Deployed to each docking station and batteries issued to officers when needed.
Car mount	Reveal Media	RMCMFU	Docking stations	RS3 car mount with Klickfast Attachment
BWV pouch	Reveal Media	RMC3LP	On the device	Klickfast pouch for RS3 to connect to car mount and popper clip.
Klickfast popper clip	Reveal Media	RMMKFP1	Issued to officer	Klickfast mount with popper to attach to uniform
Switch	Cisco	Catalyst 2960	Network Room	Network communication from computers to SAN/Server
USB hub	Belkin	F5U237v1	Docking Station	Communication from BWV device to computer
BWV computer	Lenovo	MT-M 2992-A3U	Docking Station	Transfer Data from BWV Device to SAN/Server Storage
Playback Computer	Lenovo	Various	Report Writing Area	To permit officers to playback video
Administration Computer	Lenovo	M-M 2992-A3U	Administrators	Remote administration of the BWV solution
Video cards	Lenovo	Radeon HD7350 512MB	All Computers	Video Cards were installed to meet the manufacturer's specifications. The project found that a minimum specified performance rating for a video card can introduce an underperformance in playback. Video Cards with their own firmware and drivers required updating.
SAN/server	Pivot 3	VHB2-12B02-02W25-12	Data Centre	Storage for video for Project Duration. Then transferred to Network Attached Storage.
Network Attached Storage (NAS)	QNAP	TS-469L	Data Centre	Long Term Storage. Will be maintained at Data Center until video requests dissipate. Anticipated to be one year after project completion. NAS will then be permanently stored with Property Exhibit Unit.
Network DVD burner	Rimage	5410N	Data Centre	Optical media burner used for video requests
Uninterrupted power supply (UPS)	TrippLite	SU3000RTXR3U	Data Centre	UPS for SAN/Server backup power

### **Findings and Conclusions: Device Management**

- ✚ Recording devices issued specifically to each member will result in higher capital and lower operating costs. Shared devices will have the opposite effect.
- ✚ Whichever approach is decided, staff resources will be required to support and manage the operation of devices.

### **Data Management: Storage**

#### **Decentralized versus Central Storage**

A decentralized solution is when the BWV device and its storage are located at the same site and on the same network segment. This approach minimizes network bandwidth impact and addresses limited bandwidth that may exist on a WAN between sites. It's also considered a preferred means of mitigating impacts due to network outages between sites.

The EPS project implemented a decentralized storage solution:

- BWV Devices uploaded content to storage located at the same site
- Network access was available to access content from a remote site for responding to video requests and administration (centrally managed)

With abundant bandwidth, resilience and redundancy in a network, a centralized solution can be a viable option. Advantages of a centralized solution include a single managed source for storage and reduced costs from an administrative resource and hardware/software perspective. With storage centralized however, in the event of a network outage, access to the video along with upload processes will become unavailable. This could result in the loss of data and needs to be considered prior to a decision being taken as it applies to the data storage solution.

## **Storage Method**

EPS used VSTAC Storage Area Network (SAN) servers manufactured by Dell and resold with proprietary software by Pivot 3. The servers use a Linux operating system with VMware (ESXI) for hosting Windows in a virtual environment. Virtualization can assist in disaster recovery by providing an expedited means of restoration.

The benefit of the Pivot 3 product was its ability to be configured for RAID 6x. The 6x was a Pivot 3 proprietary aspect to their software. When used in an array (requiring a minimum of 3 appliances), a full appliance (in this case 24 Terabytes of storage) could be lost without incurring a resultant loss of data. EPS implemented this in order to provide very robust resilience. The Pivot 3 SAN/Servers also had the added benefit of permitting hot swapping of hard drives and power supplies.

## **Network Attached Storage (NAS)**

A NAS manufactured by QNAP was purchased to permit the EPS project to attain closure. Once the project concluded, the NAS is used to offload the content from the SAN/Server and at a juncture when video requests had dissipated, then physically storing the content media with the EPS Property Exhibit Unit. This approach would allow the SAN/Servers to be repurposed for other use. The NAS was configured with RAID for hard disk redundancy.

## **Retrieval and Disclosure: Requesting Copies of Video**






EPS chose Optical media as the method for providing officers with the requested video. The type of DVD used was rated to retain content for more than 30 years. Network DVD burners from Rimage were used for this purpose. The BWV pilot procedures for requesting BWV files followed existing policy and procedures used for CCTV requests. Any request required approval from a Staff Sergeant or senior officer and was then placed into the Information Technology ticketing system (Help Desk), creating a record of the request and assigning to the appropriate personnel for completion. Choosing to use established procedures reduced the introduction of additional technology and consolidated requests for different Help Desk requests under one standard process.

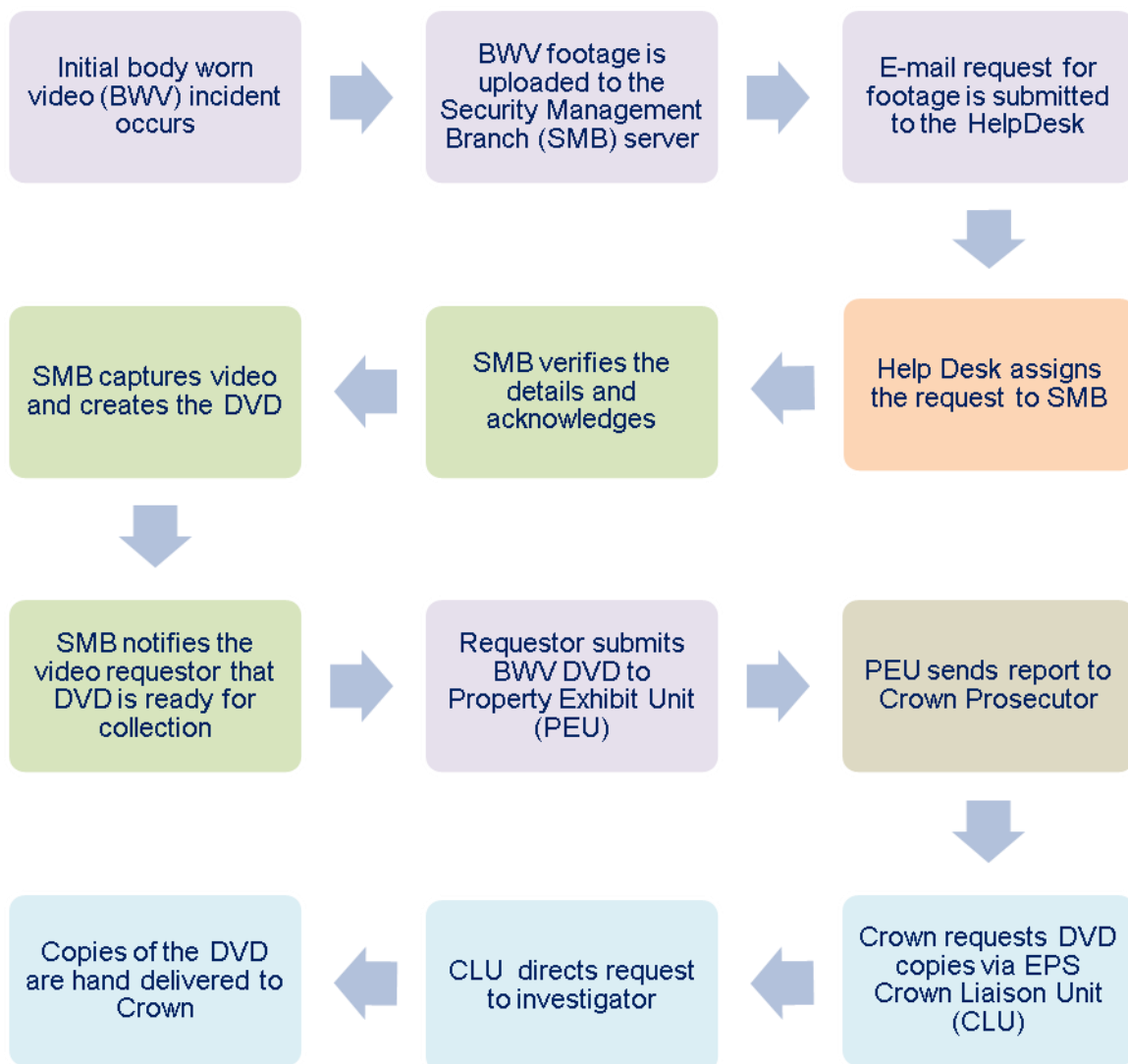
The following flow chart represents the steps used from the video request through to its delivery:



## Body Worn Video Data Management Process

Colours represent group of EPS personnel/resources involved

-  Sworn Members using BWV devices
-  Security Management Branch
-  Help Desk (request assignment process)
-  Property Exhibit Unit
-  Crown Liaison Unit



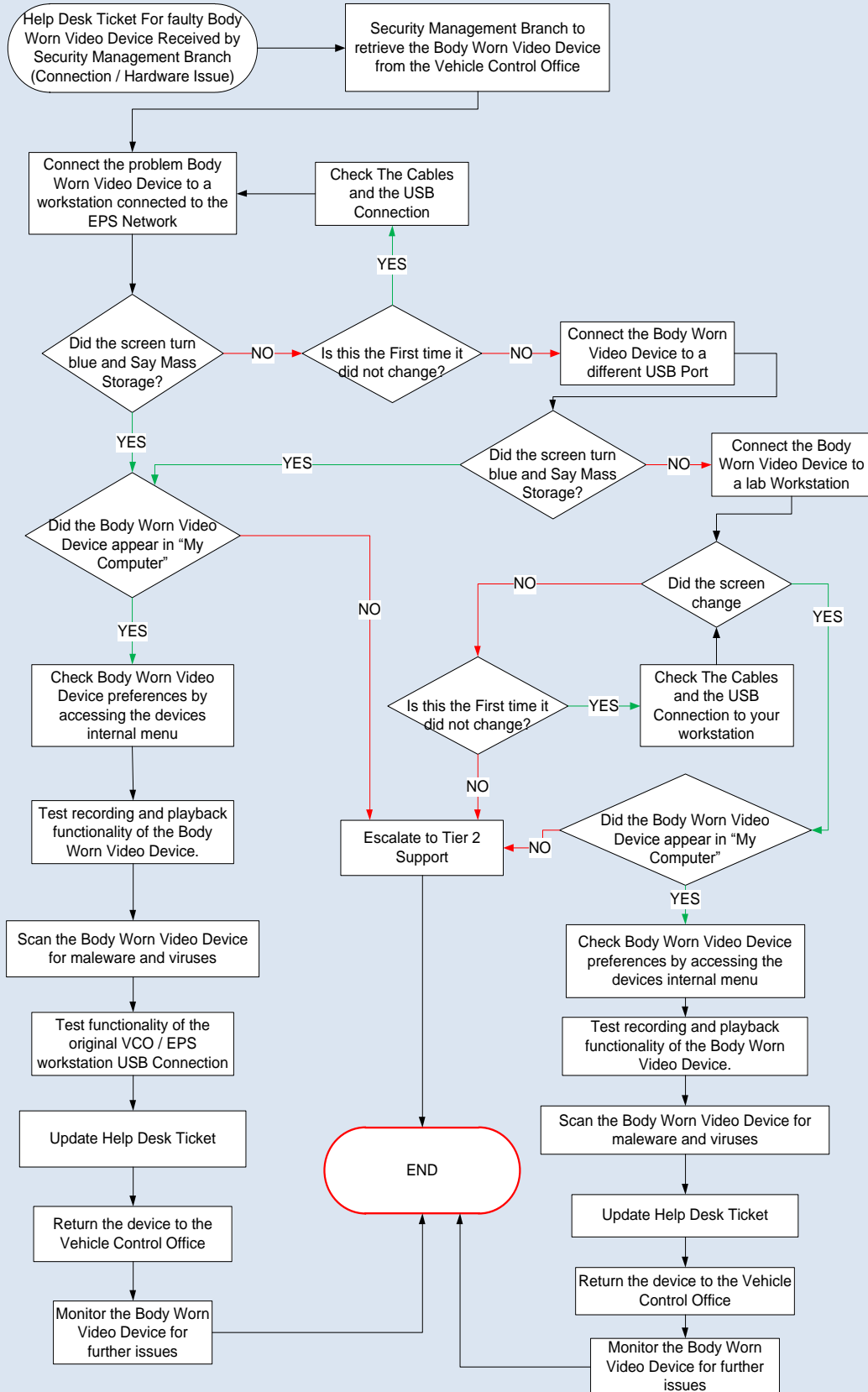
### **Findings and Conclusions: Data Management Storage**

- ✦ Consideration needs to be applied to designing storage in a centralized versus decentralized architecture. Network topology, bandwidth and redundancy are important factors.
- ✦ Storage resilience, back-up, recovery and scalability also have to be considered and planned according to the requirements of an implementation.
- ✦ Retrieval and retrieval processes for stored video data are critical aspects for consideration to any implementation.

### **Service and Maintenance**

To provide the officers with a support process for the technology, the officer was able to contact the EPS Help Desk submitting a ticket for assistance. For the technical support staff, the following troubleshooting flow chart was established:

## BODY WORN VIDEO PROBLEM DEVICE TROUBLESHOOTING STEPS TIER 1 SUPPORT



## **Power: Commercial, Emergency, Uninterrupted Power Supply (UPS)**

Power as part of the BWV System Design is an important issue and the EPS project gave this appropriate thought and planning. Power Impact compensations required consideration of possible power sags, blackouts, spikes, surges, and noise. EPS used Uninterrupted Power Supplies (UPS) to address these aspects.

Building UPS was used for the SAN/Server equipment. The UPS was connected to one of the two power supplies. The second power supply was connected to a standalone network UPS and emergency power. This was done to address power bumps when transitioning to emergency power. With this approach, when the building UPS failed, the SAN was maintained in a running state by the emergency generator and the standalone network UPS.

The value in using a network UPS rather than a standard UPS was in its built in features. It had the added value of being able to monitor for loss of power, temperature and humidity and send alerts when required. A feature which was not used during the EPS pilot but seen as a long term benefit was the ability of the network UPS to gently shut down the SAN after a defined period should commercial or emergency power not be restored.

Standalone UPS was also implemented for computers connected to USB hubs where building UPS was not available. This provided resilience against power outages affecting uploads from BWV devices.

## **Resources**

The project required the following resources:

- Director of Security – To oversee the project
- Technical Security Advisor – To manage the technical aspects and human resources of the project
- Research Analyst/Project Coordinator – To manage the operational aspects, research and communication with other agencies and report writing
- Systems Analyst level 2 – To address more complex technology issues such as the Automation Anywhere script
- Systems Analyst level 1 – For the BWV Solution technical administration
- Telecom Rooms (for network switches)
- Docking Stations
- Office space for uploading stations
- Data Centre's to house SAN appliances

## Conclusions and Recommendations

The following observations, conclusions and recommendations are offered:

- ✦ Controlling access to all aspects of the BWV solution is recommended, ideally docking stations, network closets and data centers should all have access control in place. Using internal storage as opposed to removable media for the BWV device will reduce the opportunity of loss or compromise of the recorded data.
- ✦ The recommended means of securing the data is to have the video uploaded from the device to a storage area network (SAN) appliance/s that is secured using information security standards/best practices. The process should monitor for a new connection and upload the video content. It should then compare the data to the original (which remained on the device) and once validated, delete the video on the device. Only a limited number of administrators should have privileged access to the SAN and related BWV applications and files.
- ✦ Using servers to retain both unrequested and requested video for a defined period is also recommended. Requested video should be transferred to separate media for longer term storage.
- ✦ Implementation of a decentralized storage solution will mitigate network bandwidth issues/outages. Only use a centralized recording solution if the network is robust enough to address these aspects or if the issues/outages are deemed acceptable.
- ✦ Ensure power is considered from a risk perspective and addressed accordingly
- ✦ Lossless video compression has advantages of reduced file size with no loss of content. When choosing a video and audio compression type, lossless is recommended.
- ✦ Cloud Storage can be a viable option. However measuring and accepting the risks, as well as comparing the human resource and costs will assist in determining if this is the best path forward.
- ✦ Spare equipment is essential in maintaining the operation of the BWV solution. EPS recommends spare equipment inventory of 5%. If any of the hardware or software components are not readily available for local purchase, additional spares should be considered.

- ✦ Most courts will not be equipped to playback non-industry standard (or proprietary) video formats (codecs). Making use of an industry standard video format that has been in place for an extended duration (at least 5 years) is recommended.
- ✦ Training will be an ongoing requirement. Ensure procedures with instructions, flowcharts and quick reference guides are considered in addressing both the operational and support requirements of the solution.
- ✦ Human resources in supporting a BWV program will need to be considered. EPS recommends considering the following:
  - Staff to review video from a risk, privacy or other requirements
  - Staff to manage the assignment, distribution and collection of devices
  - Support Staff for the technology
  - Installation
  - Administration
  - Training
  - Management Staff to oversee and report on operations
  - Evidence Management
  - Disclosure staff to prepare the video for disclosure
  - Editing
  - Pre-trial review – jurisdictions with pre-charge approval
  - Ancillary costs – transcripts/redactions

The following are additional issues to consider in the implementation of a BWV program:

## ADDITIONAL CONSIDERATIONS IN IMPLEMENTING BWV

Item	Intent
Physical mounting locations on officer	Ensure camera field of view is not being obscured and security of the device
Ensure the device maintains a minimum IP54 rating for Ingress Protection and good Impact Tolerance	Ability of camera to perform in wet, dusty conditions. Ability to be dropped without damage
Physical Device connections are often a noted failure point.	Eliminate if at all possible the use of proprietary wiring. Ensure replacements can be sourced locally
Feature Comparisons	Manufacturers will offer a feature rich product. Comparing these features focussing on the operational goal will assist in choosing one solution
Small form factor with consideration of what the officer is already carrying	Officers are expected to carry a significant amount of weight each day. Choosing a technology with this in mind will assist with the officer's acceptance of the technology.
The addition of a display will permit playback in the field	Circumstance will dictate the amount of use of this feature. When required, its best to have it available.
The addition of a display will permit playback in the field	Circumstance will dictate the amount of use of this feature. When required, its best to have it available.
Battery capacity and replace ability	A battery solution to address unforeseen circumstance and long shifts should be considered.
BWV Device storage	On board video storage must be sufficient to cover the expected use.
Labels should be durable and easily identifiable	Labels tend to peel. Special labelling material will reduce the frequency of the replacement
Computer Operating System	Ensure the operating system currently in use by the agency is supported by the vendor.
Active Directory	Integration with AD is recommended from a standardization approach as well as security and reduced user administration





***APPENDIX F: REPORT ON THE (CBRNE) EMERGENCY  
PREPAREDNESS EXERCISE 2012***

## **Body Worn Video Involvement in Tri-Service CBRNE Exercise**

**AUGUST 26 2012**

Mary Stratton,  
Research Analyst/BWV Pilot Project Coordinator  
[Mary.stratton@edmontonpolice.ca](mailto:Mary.stratton@edmontonpolice.ca)

### **CBRNE Exercise Description**

On Sunday, August 26, 2012 the Edmonton Police Service, Edmonton Fire Rescue and Alberta Health Services took part in the fourth annual training exercise specific to Chemical, Biological, Radiological, Nuclear and Explosive (CBRNE) related events. As part of the city's emergency preparedness program, these services responded to a staged event, involving mass casualties and decontamination of civilians, following the criminal release of a chemical agent on the LRT.

Around 80 volunteers made up of tri-service employees and members of the public, took part as passengers on the affected LRT car. The exercise goal was to begin decontamination within 15 minutes. This year, decontamination began in 11 minutes and the entire exercise was completed within an hour. This was the first time such an exercise had been completed in Canada.

The federal model of multi-agency response is employed for these events.<sup>150</sup> As well, this incident followed "Guidelines for Mass Casualty Decontamination During a HAZMAT/weapon of Mass destruction Incident" as published by the U.S Army (2008).

### **Body Worn Video (BWV) Involvement**

The Exercise was filmed by EPS Corporate Communications and some of the event was also filmed and broadcast by mainstream media. As part of the BWV pilot project, some participants wore BWV units as follows:

- Seven Reveal RS3-SX cameras: four mounted in shoulder harnesses (volunteer victims including researcher); three on radio clips (two EPS, one EMS).
- Four Taser Axon Flex: three on victim volunteers, including the researcher (two Oakley's and one head mount) ; one on EPS DEOPS (Oakley's).

It was not possible to mount either unit on the Fire Department equipment worn for this operation. A special mount would need to be developed for fire-resistant gear and for HAZMAT gear.

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<sup>150</sup> This summary of the exercise is compiled from the EPS summary <http://epsnet/ResourcesReferences/Videos/2012/August/MassDecon.aspx> and materials and verbal communications with EPS CBRNE coordinator Steve Martens-Poole. The U.s Army Guidelines are on file with the BWV project printed records.

## **BWV Performance**

The BWV video from the CBRNE provided multiple perspectives and vantage points on the exercise providing insights for all emergency services.<sup>151</sup>

### *The Reveal RS3-SX*

Overall the RS3 performed well during the exercise. The following observations are made based on review of the video:

- Although vertical field of view problems were present, the horizontal frame of view (120 degrees) was very good, capturing a helpful degree of context.
- Audio and picture clarity were excellent.
- The cameras were not affected by spraying equivalent to a medium intensity rain shower.
- One camera was placed in a Ziploc bag, reattached to the volunteer and continued to record throughout the decontamination process, providing usable video.
- RS3 units, chest-mounted on both radio straps and shoulder harnesses, performed well during the exercise, however, the shoulder harness provided greater stability for the recording.

### *Taser Axon Flex*

The Flex BWV unit (head-mounted camera (with choice of mounts), battery pack and connecting wire) is more operationally complex than the RS3. Users including the researcher became confused about which light (green or red, flashing or non-flashing) was the record versus buffering position. As a result very little footage was captured on the Flex units. Further testing is required to draw many conclusions about the Flex video. A small amount available for review (a camera placed on an EMS participant) suggests the following:

- The narrower horizontal field of view (75 degrees) greatly reduced understanding of the overall context of action.
- The sound and clarity of video are less sharp than with the RS3.
- There is considerable wobble in the video (greater even than the radio strap mount for the RS3).
- There are indications that the head-mounted position does not necessarily focus on the action.

## **Observations on the CBRNE Exercise**

Video from each BWV unit was reviewed and analysed. Detailed observations are recorded in a separate data report. This analysis was used to develop a BWV Video Review Instrument to be used in analysing and reporting on video from the operational phase of the BWV pilot project.

The researcher's review of the video, coupled with her participation, also allowed the distillation of some feedback on the exercise. The following observational summary is offered for consideration:

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<sup>151</sup> Copies of the BWV footage have been provided to the EPS Coordinator for his review. Any additional use of this footage will be cleared with Corporate Communications.

## 1. Delivery of instructions to ‘victims.

One of the most observed comments from the volunteer victims was that instructions from emergency services were hard to hear and/or understand. The BWV video highlights a number of issues related to this:

- The Hazmat masks worn by EPS first responders muffled their voices and also interfered with their ability to hear victims’ questions.
- The Fire Department official providing decontamination instructions was also difficult to hear.
- Ability to hear varied depending on the location of the victim.
- Instructions to “pick up the ID Con Kit over by the cruiser” were not understood by the victims and resulted in a lot of shouted questions about “What?”, “Which cruiser?” “Where?” The Instructor did not respond to these questions and confusion followed. This was increased by the fact that instructions on how to use the kit were sealed inside an inner bag. Almost all victims ended up carrying these bags containing contaminated clothing with them instead of leaving them to be decontaminated.

## 2. Extended Waiting Period.

After victims were evacuated from the LRT car, EPS members provided very limited initial instructions. A period of six minutes followed this when victims were not given any instruction at all.

- Volunteers are heard commenting on this delay. In particular, that appeals for assistance with distressed victims were not responded to quickly.
- First EPS responders did not fully explain what was happening.
- Volunteers commented that in a real event, victims would have become panicky during this period.
- The problem was increased when the Fire Department eventually begun instructing the victims by telling them not touch each other – they had been doing so for the previous ten minutes. The volunteers are captured giving an agitated (acting response) to this news – in a real situation it was felt it would have resulted in a lot of panic and aggression.

## 3. Spraying of Penned Victims.

As the Fire Department set up for decontamination, a misdirected hose sprayed the penned victims. Video review established that this was not intended, but was unfortunate because:

- Children who were not supposed to be included in the decontamination part of the event got wet.
- Cameras that were supposed to be secured before decontamination were sprayed.
- Emergency personnel got wet.

However, comments are recorded suggesting that in a real incident, spraying the waiting victims would be an effective tactic in getting compliance with undressing.

### **Suggestions for Future Practice**

Researcher observations and comments from volunteer ‘victims’ suggest that as a first-time exercise the CBRNE event went well. Volunteers followed their acting scripts quite well, but could not be expected to truly mimic the apprehension and panic that would be present at a real-life critical event. Comments and discussion among the volunteers indicated that in a real-life incident, the issues summarized above would have led to heightened agitation, panic and non-compliance. Based on the analysis of BWV video and the issues documented above, the following suggestions are offered for future consideration:

- First responders to the scene deliver the complete instructions about the decontamination process and what to expect. Police are as likely as Fire to arrive first on scene and so should be fully briefed on the response and decontamination process.
- First responders should not allow ‘dead time’ to occur while awaiting further emergency response and the start of decontamination. Reassurances, explanations and instructions should be constantly repeated.
- Improving the quality of equipment involved in making instructions heard is needed. This applies to the HAZMAT masks and the megaphones used by the emergency responders.
- The language level used to explain the decontamination process should be reviewed for comprehensibility by civilians. For example “ID Con Kits”, might be better termed “clothes bags” or something similar.
- The internal organization and placement of instructions related to the use of the “ID Con Kits should be reviewed.

### **Conclusion**

Participating in the CBRNE Exercise was very helpful to the development of the EPS BWV pilot. It allowed testing of the BWV units in a dynamic environment, both in terms of the quality of video acquired and the effectiveness of on-the-spot training in the use of the units. As a result of participation it has been possible to:

- Develop a video analysis protocol for the main pilot.
- Improve the training developed for use of the Taser Axon Flex.
- Demonstrate the analytical value of the video to reviewing training and dynamic incidents.



## ***APPENDIX G: EPS BWV PILOT PROCEDURES***

## **Body Worn Video Pilot Project**

### **Operational Procedures for BWV Employment**

#### **Purpose**

Body-worn Video Recording Systems (BWV) are intended to equip police officers with a personal video system that will capture an audio/visual record of events as they occur within the viewing area of the camera. This pilot project will systematically assess the usefulness and effectiveness of using body-worn recording devices. These Operational Procedures are intended to provide direction to members using BWV devices during the pilot and will be reviewed and developed by the BWV Group as part of the project to take account of:

- (1) consultation with relevant internal and external stakeholders,
- (2) the effectiveness and appropriateness of the procedures to the use of BWV in the EPS context, and
- (3) any changes in legislation and related EPS working policy and practices.

#### **Operational Procedures**

BWV will be used in accordance with existing EPS policies. Part 7-B-6 of Policy and procedure manual specifically addresses the use of BWV. Members using BWV devices should be familiar with this policy.

##### **(A) Assignment of BWV equipment:**

- (1) Each member selected to participate in the BWV pilot project will be assigned a specific BWV unit, which will be booked out at the beginning of the member's shift and returned at the end of that shift. This process will be location specific according to training materials provided.

##### **(B) Routine Checking and Maintenance of Equipment:**

Members who have been assigned a BWV camera are responsible for checking the following at the beginning of each shift:

- (1) that previous recordings are deleted. If recordings are not deleted, report this to a ~~supervisor~~ Help Desk (Ext 3490) and do not take out that camera,
- (2) that the date and time stamp is accurate by comparing with date and time on EPS BlackBerry and noting any difference,
- (3) that the camera recording function is working, and
- (4) that the batteries are fully charged and a spare battery is provided.

##### **(C) Assistance with Technical Difficulties:**

If technical difficulties occur with the BWV equipment, contact the Help Desk (Ext 3490) and report the problem.

During office hours only you may also contact Dr. Mary Stratton, at 780-391-5579; [mary.stratton@edmontonpolice.ca](mailto:mary.stratton@edmontonpolice.ca),



**(D) When to Activate BWV Recording:**

- (1) Upon activating the recording, providing it is safe to do so, members shall verbally state the date, time, location, nature of the incident, and to those present that the incident is now being recorded.
- (2) While the recording is activated, members should, whenever possible, continue to state for the recording elements of the situation that may not be readily visible (such as activity on the peripheral of the incident; smells such as alcohol or drugs).
- (3) As a general guideline, providing it is safe to do so, members should activate BWV recording in the following contexts:
  - a. when arriving at the scene of a crime or incident if the camera is not already activated,
  - b. when coming upon an incident, or potential incident, during the course of proactive and routine patrol
  - c. when the decision is made to conduct a traffic stop,
  - d. immediately when responding to a call for assistance from another member,
  - e. during an initially non-investigative incident if circumstances suggest that the incident may become investigative or the subject of a complaint against other persons or police, and/or
  - f. at the time of accepting a call from dispatch if the member believes recording the response to be of potential importance.

**(E) When to Deactivate BWV Recording:**

- (1) As a general guideline, the BWV recording should be deactivated in any of the following circumstances:
  - a. a specific investigative incident or charge is completed,
  - b. a specific call, or any other incident initially thought to be investigative is determined not to be a matter of further record,
  - c. continuing to record could endanger the safety of any person,
  - d. the subject is taken into an EPS facility (such as Detainee Management Unit) which is recorded by Closed Circuit Television (CCTV) systems, and
  - e. legal privilege is involved.
- (2) Prior to deactivating the recording, members shall, providing it is safe to do so, state the time, place, and reason for deactivation.
- (3) If incident details are not recorded at activation and deactivation, or if the member thinks there may have been technical problems with the recording, as soon as it is practicable, these details shall be entered in the member's notebook as would be the case if no BWV was present.
- (4) The decision to deactivate BWV recording must necessarily retain an element of discretion related to each context and all such decisions are to be justifiable. This can be done by

stating the reason for deactivation prior to ending the recording and/or by entering the reason into the member's notebook. Reasons for deactivation should also be included in any related reports.

- (5) If the camera is reactivated during the same incident, the reason for reactivation should be stated on the recording and/or in the member's notebook and in any related reports.
- (6) Justification is also needed for any accidental deactivation of the camera, by recorded statement upon reactivation, and/or by making a record of this reason in the member's notebook and any subsequent related reports.

**(F) Special Contexts and Considerations for Recording or Not Recording:**

- (1) **Citizen Objection to Recording:** In some circumstances, officers may find that one party objects to the recording taking place, for example when there are allegations of domestic abuse [see (E)(3)]. It is recommended that officers continue to record when incidents are occurring or allegations of a criminal or investigative nature have been made. In such circumstances, the member should continue to record while explaining the reasons for doing so. These reasons might include:
  - a. that an incident has occurred requiring police to attend,
  - b. that the officer's continued presence might be required to prevent a breach of the peace or injury to any person,
  - c. the requirement to secure best evidence of any offences that have occurred, whether this is in writing or on video, and that the video evidence will be more accurate and of a higher quality and therefore in the interests of all parties,
  - d. that continuing to record would safeguard all parties, with a true and accurate recording of any significant statement made by either party and of the scene,
  - e. that the incident may reoccur in the immediate future, and/or
  - f. that continuing to record will safeguard the officer against any potential allegations from either party.
- (2) **Private Dwellings:** If a member attends a private dwelling for an incident that would normally be recorded in the member's notebook, the BWV should be activated and the explanations outlined in (E)(1) offered if necessary. However, members must be cognizant of the right to privacy and if possible avoid recording anything inside a private dwelling that is not related to an incident.
- (3) **Domestic Violence: Part 2, Chapter C, "Domestic Violence"** underlines that domestic violence is a major concern to the EPS. Reports of domestic violence shall be treated as a priority. BWV offers an opportunity to capture detailed evidence in these incidents. Every effort should be made to activate and keep activated BWV recording. Objections of any party present should be addressed by the responses outlined in (E)(1).

Children may however be present as witnesses or victims of the abuse. The identities of children need to be protected. If safe to do so, and possible in the circumstances, cameras should be directed away from children.

- (4) **Sexual Assault:** While BWV recordings may be a potential aid in recording important evidence, sensitivity must be employed by a first responder to a sexual assault incident, and

the BWV is to be used accordingly. If the complainant is a child or youth, follow relevant **Part 2, Chapter C** of the Policy and Procedure Manual.

- (5) **Young Offenders: Part 3, Chapter N** of the Policy and Procedure Manual ensures that young persons are treated fairly and that their rights, including their right to privacy, are protected, in particular the following additional obligations and procedures:

- Right to Counsel,
- Caution,
- Statements, and
- Notice to Parents.

BWV is to be used accordingly.

- (6) **Witness Victim and Informant Accounts:**

- a. A member using BWV may interact with victims or witnesses who are giving their first account of the crime. Any initial disclosure from victims and witnesses recorded by BWV must be treated as an evidential recording. Recording such encounters with the BWV has advantages in terms of accuracy and capturing exact words. However, this must be considered against the needs of the individual, with due sensitivity to the nature of the offence being reported, and any potential threat to the safety of the individual that might arise through disclosure.
- b. Such recordings do not replace the need for formal written statements from victims or witnesses, but they can be used as supporting evidence for the statements.
- c. When possible, if multiple witnesses wish to give their accounts to an officer with BWV, separate recordings will be made so that individual accounts can easily be separated.
- d. Witnesses may be permitted to review their recorded account prior to the making and signing of any written statement. Care must be taken to ensure that witnesses are not permitted to review any aspect of the recording other than their own initial account. Their statement should also refer to the viewing of the recording of their first account.

**(G) BWV Use During Special Duties**

A member on special events policing duty is conducting that duty according to EPS policies and standards regardless of the location of the duty. Members using BWV should, therefore, wear the device during special event policing duties.

**(H) EPS members must not record:**

- (1) entire duties or patrols, including their own duty activities or the activities of other members that are not incident or charge related,
- (2) activities in cells, as these are recorded by CCTV, and/or
- (3) activities of citizens who are not involved in an incident or charges (excepting when such individuals are unavoidably captured due to their proximity to an incident).

- (I) Misuse of BWV equipment and/or recordings may be regarded as misconduct and may be subject to disciplinary action in accordance with EPS procedures, up to and including**

dismissal. If appropriate, criminal proceedings may also be undertaken. Employees must immediately notify their supervisor, Human Resources Division, or the Technical Security Advisor of any violations or suspected violations of this policy on the part of themselves or others.

**(J) Uploading BWV Recordings from the Camera:**

- (1) At the end of each shift, cameras are to be returned for uploading/deletion of video, and battery recharging. This process will be location specific according to training materials provided. The one exception is the case of a serious incident as described in **(H)(3)**.
- (2) For questions about, or problems with the uploading process the Help Desk, at 780-421-3490; [Help.Desk@edmontonpolice.ca](mailto:Help.Desk@edmontonpolice.ca). During office hours only you may also contact Dr. Mary Stratton, at 780-391-5579; [mary.stratton@edmontonpolice.ca](mailto:mary.stratton@edmontonpolice.ca), and
- (3) When a BWV is present at an incident involving the discharge of a firearm, use of CEW, and/or force causing serious injury or death (as defined in **Part 1, Chapter B, “Investigative Protocol Following the Discharge of a Firearm or the Use of Force Causing Serious Injury or Death”**) the following protocol will be followed:
  - a. the camera(s) at the incident, will be seized by the Incident Commander,
  - b. as immediately as is practical, the Incident Commander will inform the Help Desk that a BWV camera has been seized relating to a Use of Force incident, and
  - c. the Incident Commander will retain the BWV camera(s) until a member of Security Management Branch is available to oversee and witness the upload of data from the camera(s).

**(K) Reviewing and Using Video as Part of Incident and Investigation Reporting:**

- (1) BWV can provide compelling evidence for police investigations, but must be considered as one part of the overall supporting evidence. Inevitably, certain aspects of incidents will occur out of camera view, or when BWV recording is deactivated. Some relevant audio may be obscured by other sound at the scene, technical or operator failure may occur, a camera may become misaligned or dislodged during an incident. All such occurrences shall be part of the incident report and any related reports.
- (2) In general, reporting procedures when BWV is part of the evidence should follow current policy found in **Part 7, Chapter A, “Occurrence Report Standard, Variations on Occurrence Report Standard Format, Submission of Occurrence Report, and Responsibilities”** which requires the existence of video to be stated.
- (3) where applicable, also print BWV on your IMAC Tracking Sheet, in the ‘Additional Information’ box.
- (4) For the purposes of completing a report, members who made the BWV recording and supervisors they require to review reports, can review video that they have personally recorded by:
  - a. using the review function of their BWV unit before the video is uploaded, and/or
  - b. using computers for which review functionality is provided.
- (5) It is recommended that members review relevant video prior to completing the report to ensure:

- a. the BWV has captured the entire incident and the recording is clear,
  - b. the video is adequately supported and if necessary supplemented by the member's notebook, and/or
  - c. inconsistencies between notes and videos are addressed. Video generally will provide the most reliable objective account, but may lack certain important details.
- (6) BWV recordings may be reviewed (when available) by the following people for the stated reasons:
- a. The individual authorized to use that specific BWV unit, to:
    - 1. make sure the BWV unit is working,
    - 2. to assist in the writing of notes or any formal report,
    - 3. to replay the incident to a subject involved in that incident, and/or
    - 4. to assist with further investigation.
  - b. A supervising officer who is required or requested to:
    - 1. provide an opinion to the investigating member concerning the reviewed incident or charge, and/or
    - 2. to assist with further investigation.
  - c. An authorized member of the BWV Pilot Team for the purpose of assessing:
    - 1. the technical quality of recordings,
    - 2. the efficiency and/or appropriateness of the use of BWV to meet the pilot objectives and/or the policing goals of EPS, and/or
    - 3. value or contribution to the project as a whole.
- (7) With the exceptions of the BWV unit user and authorized member of the BWV Pilot Team, requests for access to uploaded BWV files will be made via the Help Desk.
- (8) BWV recordings may only be used for police purposes and **may not** be reviewed, replayed, or copied, for any other purpose.

**(L) Requesting DVD Copies of BWV:**

- (1) Digital copies of BWV will be requested via the Help Desk and subsequently stored and handled in accordance with **Part 5, Chapter E, "Closed Circuit Television Systems."**
- (2) BWV recordings will be retained on the EPS network until September 2015. After that date video will be stored on DVD and be available through request to Property and Exhibit Unit (PEU).
- (3) The reporting member will request digital when:
  - a. a charge is laid or expected to be laid, and/or

b. use of force was necessitated.

(M) Procedure for Crown Prosecutor Disclosure:

**Part 9, Chapter A, “Crown Prosecutor Disclosure,”** Provincial Standard OP 7.2, sets out the procedure for Crown Prosecutor disclosure, including the handling of recording media. This policy will be followed when dealing with BWV recordings:



## ***APPENDIX H: EPS BWV PILOT PUBLIC SURVEY SUMMARY***





The Edmonton Police Services (EPS) Body Worn Video Pilot Project began in Fall 2011 and will run until Fall 2014. It is the first in Canada to receive federal funding for a professionally designed assessment and evaluation of the concept of this technology in field use. It will review technical performance, legal considerations, and usefulness in practice to everyday policing and investigation processes. As part of the project a public opinion survey was conducted in July 2013. For further information contact: [mary.stratton@edmontonpolice.ca](mailto:mary.stratton@edmontonpolice.ca).

## Edmonton Police Service Body Worn Video Pilot Project Public Opinion Survey: Summary of Results (2014)

### MAIN FINDINGS

- **Positive attitudes about body worn video (BWV)** technology were expressed by a strong majority of the public surveyed.
- **Positive effects on evidence** and outcomes of related court cases were expected by most people.
- **A reduction in aggression** and rudeness, along with increased compliance were anticipated by the majority.
- **A minority thought BWV would aggravate situations** and cause increased aggression (9%) and rudeness (15%). For the same reason, around 4% thought the BWV might sometimes decrease compliance. Around another 4% felt the effect would vary with individuals.
- **Views on BWV and public interactions** with police were mixed. A slim majority believed BWV would affect citizens willingness to chat with police informally, and 63% of this group anticipated a negative effect. A further 13% were uncertain about this.
- **Few expressed privacy concerns** with almost half stating they would be pleased to have an accurate record of the event if personally captured on BWV. Only 8% expressed concerns about privacy and security of BWV handled by EPS.

### SURVEY METHOD

**EPS volunteers surveyed** members of the public at Churchill Square, West Edmonton Mall and Whyte Avenue. Body worn video (BWV) is being piloted in these three high traffic areas. The researchers were present at various days and times during July 2013 and attempted to engage a wide range of public, collecting a total of 329 surveys:

▪ West Edmonton Mall	143
▪ Churchill Square	103
▪ Whyte Avenue	83

### KNOWLEDGE OF BWV PILOT

**Twenty-eight percent of people** asked said they had heard about the EPS BWV project, mostly through the media:

▪ TV News	59%
▪ Other media	17%
▪ Seen them	6%
▪ Told about it	6%
▪ Not sure	8%
▪ Other	3%

### ANTICIPATED EFFECTS OF BWV

Survey participants were asked what kind of effect, if any, they thought police use of BWV technology might have.

- **Strength of evidence:** 94% thought BWV would have an effect on evidence. Of these, 97% thought BWV would create better evidence.
- Similarly, 88% expected BWV to contribute to the **ability of the courts to decide** a case, with almost everyone thinking video would be helpful.

- **Aggression and rudeness:** In keeping with well-publicized beliefs about the benefits of BWV, a slim majority surveyed thought it would reduce aggression (58%) and rudeness (51%). Others thought it would have no effect or were uncertain of the outcome.
- **Complaints:** 68% of the public surveyed said BWV would affect complaints about police, with 57% assuming a decrease. Some felt complaints could increase because people would feel the video would support their allegation. Others thought privacy concerns would generate complaints. One person summed up, “Genuine complaints will increase; others decrease.”
- **Public interactions with police :** Responses to questions about BWV effects on interactions with the public were complex.
  - *Considering community policing*, 82% considered BWV as potentially good or very good, while another 11% saw it as ‘fair,’ with only 3% regarding it as a negative influence.
  - *Thinking about being personally captured on BWV*, 48% stated they would be pleased to have an accurate record. Another 24%, while feeling a bit uncertain, would think it probably was for the best. Being uncomfortable and concerned was indicated by 8%, while the remainder would accept it as a police strategy, but wish they weren’t on it!
  - *BWV effect on chatting informally with police* was considered the most negative aspect with 31% expecting no effect while 63% of people anticipating an effect said it would decrease willingness to chat.
  - *Views about formal interactions with complainants and witnesses* were also mixed: 42% stated no effect, or they weren’t sure. Of the remainder, 69% expected BWV to increase willingness to give a statement.

## **VIEWS ON PRIVACY AND SECURITY**

**Most of the public surveyed did not have concerns** about privacy and BWV although researchers reported that a number did ask about security of the video. About 8% expressed specific concerns about surveillance and recordings and 8% (with some overlap) were concerned the video would be manipulated. These concerns were associated with a less positive attitude to use of BWV.

### **People Said**

*“Probably reduce aggression on part of police; but public aggressors who are drunk, it would have no effect. People would be shocked to know the abuse the police put up with!”*

*“It might make someone more angry and they would fight police for the video”*

*“Police have a difficult job and anything that can help them is worth a try at least.”*

*“More protection for police against abuse-in general it’s a good idea.”*

*“It could make you more vulnerable than you already are.”*

*“I’m appalled with the age of technology and what it can do.”*

*“It creates another barrier between police officers as people; they’re seen as institutionalized.”*

*“I’m a firm believer in cameras on Whyte. If you don’t have anything to hide, what’s the issue?”*

*“The effect will wear off – people will find a way around it.”*

*“If police have to tell someone they are wearing it then it’s pointless.”*

*“It’s a step in the right direction.”*

## **APPENDIX I: GLOSSARY OF ABBREVIATIONS**

### **GLOSSARY OF ABBREVIATIONS**

AD	Active Directory
BWC	Body worn camera
BWV	Body worn video technology
BWVAC	Body Worn Video Advisory Committee
CBRNE	Chemical, Biological, Radiation, Nuclear, Explosive
CCTV	Closed Circuit Television
CMS	Central Management Software
CPS	Calgary Police Service
CTR	Control Tactics Report
EPS	Edmonton Police Service
EPC	Edmonton Police Commission
FPS	Frames per second (also fps)
IDCU	Impaired Driving Countermeasures Unit
IP	Internet Protocol
ISP	Internet Service Provider
IVV	In-vehicle video systems
IACP	International Association of Chiefs of Police
LCD	Liquid Crystal Display
NAS	Network attached storage
PERF	Police Executive Research Forum
PSB	Professional Standards Branch
RAID	Redundant Array of Independent Disks
SAN	Storage Area Network Devices
SD	Secure Digital (card)
SMB	Security Management Branch (EPS)
TTU	Tactics Training Unit
UPS	Uninterrupted power supply
USB	Universal Serial Bus
WAN	Wide Area Network
WEM	West Edmonton Mall

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