



Crime Scene Unit
Standard Operating Procedures
Crime Scene and Multimedia Division

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1. Introduction

The guidelines outlined in this manual are designed to provide general standard operating procedures (SOPs) for Crime Scene Unit (CSU) employees tasked with processing crime scenes. These SOPs ensure that the unit's crime scene processing services meet recognized forensic standards and methods that are most widely utilized by the forensic community.

CSU recognizes that each crime scene presents a variety of unique circumstances. The methods and procedures are described at times in a general sense and do not reflect all the variations and combinations of services which are provided by the Crime Scene Unit of the Houston Forensic Science Center (HFSC).

All Crime Scene Investigators (CSI) shall follow the HFSC Quality Manual and division procedures relevant to **crime scene processing**. CSU personnel are expected to have the experience and knowledge required for them to select the appropriate approach. The CSI must be flexible and use professional judgement to apply procedures appropriately. Exigent circumstances may require CSIs to deviate from the SOP. An exigent circumstance is one that requires an immediate action. Examples include but are not limited to: inclement weather that may compromise evidence and situations where there is a threat to the CSIs' personal safety. CSIs should notify management prior to deviating from the section SOP or the Quality Manual whenever possible. If it is not possible to notify management in advance, the CSI must notify them as soon as practical. The exigent circumstance, along with management's acknowledgement, shall be documented in the case record. Refer to Section 8.2.2 of the Quality Manual for more information.

This document is not intended to define every step that must be completed in every crime scene investigation. Additionally, it is not intended to substitute for the training required for processing crime scenes and developing the knowledge and flexibility required to investigate the many variations in crime scenes. Throughout the investigation of the scene, the CSI should be flexible and diligent in applying their knowledge, skills, and abilities as needed.

Crime Scene Investigators shall also keep confidential any and all information obtained or created during any examination activity, except as required by law. Information shall be released only on a need-to-know/right-to-know basis.

Regardless of the circumstances present at the scene, all work conducted by CSU members tasked with processing crime scenes will be performed in accordance with applicable ISO/IEC 17025 standards as well as any applicable supplemental standards established by the company's accrediting body.

For purposes of this manual, the term Crime Scene Investigator (or CSI) will also encompass the position of Crime Scene Supervisor when the supervisor is performing crime scene investigations. Any reference to "Supervisor" also encompasses the positions of Deputy Director and Director of the Crime Scene Unit.

2. Response to Calls for Service

The Crime Scene Unit maintains operations 24 hours a day, 7 days a week, 365 days a year. The unit maintains a minimum staffing level to ensure a timely crime scene response. A minimum staffing level has been established to ensure proper crime scene protocols are followed without sacrificing crime scene integrity.

2.1. Scope

The Crime Scene Unit is responsible for supporting law enforcement investigations in the processing of major crime scenes that include, but is not limited to: homicides, juvenile deaths, suspicious death investigations, officer-involved shootings, in-custody deaths, and sexual assaults. Scenes should be worked with an investigator or requesting agency liaison present.

2.2. Procedure

Requests for CSU services are received and reviewed by section management. If a CSI receives a request for service from someone other than CSU management, it should be forwarded to section management. Section management then assigns cases to CSIs on an informal rotating basis. Prior to leaving HFSC to process a scene, the CSI should write the scene information, including the vehicle they are taking to the scene, the agency case number, the scene location and the names of the responding CSIs on the white board near the main door.

Upon return from the call, the CSI shall enter the case information into the shared CSU Call Log.

2.3. Scene Responsibility

Upon arrival at the scene, the CSI shall brief with the officer or investigator on scene to obtain preliminary information on what occurred and any actions by a subject, victim, witness or first responder that may affect the scene. CSIs shall also confirm the agency case number and should exchange contact information.

- The CSI should obtain enough information from the officer to have an understanding of the situation and be able to **effectively** process the scene.
- The CSI should assess the adequacy of scene security and the perimeter. If needed, the CSI should request additional resources to secure and/or extend the scene and perimeter.
- The CSI should assess and if needed, establish or change the scene entry/exit point. If possible, avoid locations that may have been used by the suspect(s).
- The CSI should assess scene integrity to determine if the scene has been altered, compromised, or contaminated. Documentation shall include what was changed and who provided this information.
- The CSI should assess the need for and request any additional CSI personnel.
- The CSI should only process the crime scene when it is safe to enter and with proper consent or signed search warrant. It is the responsibility of law enforcement personnel to advise when this criterion is met. The CSI shall document the name of the individual from whom verbal, and/or implied consent is obtained.
 - The CSI and any necessary personnel will conduct an initial walkthrough,



- ensuring appropriate PPE is worn.
- It is the responsibility of the CSI to make requests of officers, or other applicable personnel, that would enable the CSI to properly or better preserve, protect, or process a scene.
 - This could include asking officers to stop traffic, turn on or off lights to facilitate photography, or **halting civilians from cleaning or otherwise altering the scene.**
- **HFSC** CSIs have knowledge, skills, and abilities of crime scene processing that may not be known to the law enforcement officer investigating the scene. The CSI has the responsibility to thoroughly assess the scene and perform all forensic work required to sufficiently investigate and process the crime scene. This may go above and beyond and include processes not included in the initial request of the law enforcement officer or investigator.
- **The CSI should develop an overall plan for processing the scene. If applicable, the plan should consider environmental or situational conditions that may require deviation from protocol.**
- **The CSI is responsible** for designating a trash disposal location, a safe equipment staging area and/or a temporary evidence storage location if needed.

2.4. Crime Zone Perimeter

The CSI is responsible for setting up the "Crime Zone" with red barrier tape **or, if one has already been established, ensuring it is adequate.** This zone denotes areas that may contain DNA evidence and may **need to be** extended beyond the initial perimeter established by responding officers.

A Personal Protective Equipment (PPE) staging area shall be established just outside the red barrier tape. A kit with PPE is available in each vehicle. The kit includes laminated signs advising that PPE is required for all personnel entering this zone.

All CSU personnel entering this zone shall **properly** wear PPE including, but not limited to: particle masks, shoe covers, and gloves.

The CSI should offer PPE to any individual prior to **that person** entering the crime scene. When known, every attempt should be made to capture the name(s) of any individual(s) inside the red tape perimeter who are not wearing the appropriate PPE and their names should be included in the CSI's case record/report.

2.5. Safety

CSIs must exercise due caution when performing their duties to prevent injury, illness, or exposure to potentially hazardous materials/conditions. **Applicable** safety protocols outlined in the HFSC Health and Safety Manual **must** be followed.

CSIs shall use appropriate PPE when necessary to prevent/limit exposure to potentially hazardous materials (chemicals and/or biological). PPE shall be changed as necessary to prevent



evidence contamination.

CSIs should wear an appropriate traffic vest when exposed to traffic hazards.

Used sharps shall be disposed of in sharps disposal containers. Used sharps shall not be discarded with regular trash and shall be stored in a puncture-resistant container for transport to CSU or other facility with approved sharps-disposal containers.

2.6. Personal Protective Equipment

If body fluids are present at a scene, the CSI is responsible for utilizing proper protective equipment to protect themselves from exposure to any infectious materials or body fluids.

Shoe covers, and gloves will be removed upon exiting the scene. Personnel are encouraged to use maximum protection which may include eye-shields, hairnets, and/or full suit barriers in addition to the required PPE (mask, gloves and shoe covers).

Biohazardous or contaminated personal protective equipment will be removed and placed in a biohazard bag prior to leaving the scene. The bag will be placed in appropriate biohazard container for proper disposal.

Occupational exposure to blood or other potentially infectious materials must be limited and controlled, as any exposure could result in transmission of bloodborne pathogens, which could lead to disease or death.

All personnel assigned to the Crime Scene Unit are responsible for being familiar with the HFSC Health and Safety Manual and any other policies and procedures that pertain to bloodborne pathogens. Each employee is responsible for controlling his or her own exposure and preventing the spread of bloodborne pathogens.

Each crime scene vehicle is stocked with the necessary personal protective equipment to be used when processing crime scenes where blood or other body fluids are thought to be present, and to prevent cross-contamination.

In order to minimize exposure to bloodborne communicable diseases, CSIs should use universal precautions and assume that all contact with blood or body fluids may result in the transmission of a bloodborne disease.

2.7. Preventing Evidence Contamination

Employees must exercise due care and caution when performing their duties to prevent the possible contamination of evidence.

Disposable nitrile gloves shall be worn when collecting or touching any item that is to be examined and/or collected as evidence. See Section 10 for further information regarding the collection of DNA evidence.



When processing a crime scene, the following recommended practices should be implemented to limit/prevent the possibility of evidence contamination:

- Limit access to the crime scene, **including removing any citizens or non-essential police personnel.**
- Use designated entrance/exit points.
- Use appropriate PPE when in close proximity to potential evidence.
- Do not touch your face or other unprotected body areas before handling potential evidence.
- Do not sneeze, cough or talk excessively when in close proximity to potential evidence unless a mask is worn.
- Do not smoke, eat, or drink when in close proximity to potential evidence.
- Avoid excessive handling of potential evidence and, **when collecting physical evidence, handle it in a way that minimizes the chances of interfering with potential DNA, latent prints, and/or other forensic analyses.**
- Change gloves after handling equipment, evidence markers, etc., and before collecting evidence.
- Utilize clean or single-use collection tools and equipment.
- Place evidence collected at the crime scene into a secure package or container upon collection.
- Use a biohazard bag for biological trash.

2.8. Evidence Packaging and Transportation

CSIs collecting or handling contaminated materials, wet or dry with blood or other bodily fluids, are responsible for taking all safety precautions to ensure they are not exposed to bloodborne pathogens. It is the responsibility of the CSI to ensure that no one else is exposed to the contaminated material(s).

Packages of evidence collected containing contaminated items shall be clearly labeled. The outer container must clearly indicate that a biohazard is inside. This can be accomplished by using a biohazard sticker or prominently marking the package with the word(s) "Biohazard" or "Visible Blood." Wet contaminated materials collected at crime scenes will be placed in a leak-proof package, transported to CSU and placed in the appropriate storage location.

2.9. Release of the Crime Scene

A final walk-through of the crime scene should be completed with the investigator or assigned liaison. Photographs should be taken of any damage caused by CSIs during the recovery of evidence. This may include, but is not limited to: cutting into drywall, removal of carpet or linoleum.

All persons involved in the scene should meet to discuss the scene processing to ensure all necessary processing and collection has been completed. CSIs shall ensure all trash and other work product debris are collected, including disposable and plastic evidence markers, and that no equipment has been left behind.



The final release of the crime scene is the responsibility of the assigned law enforcement investigator or liaison.

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3. Equipment

3.1. Individual Equipment

CSIs are issued an individual camera kit containing a camera and related equipment. CSIs are responsible for maintenance, custody, and control of their camera kit.

CSIs are provided with a container in which to keep supplies for latent print processing. CSIs are responsible for keeping the kit stocked and the supplies kept in bags or similar containers to minimize contamination from fingerprint powders. All secondary containers (powder, distilled water, etc.) shall be appropriately labeled.

CSIs shall take reasonable measures to prevent excessive wear, tear, and/or damage to all equipment, and are responsible for the care and custody of all items assigned to them. Any lost, stolen, or damaged equipment must be reported to a supervisor as soon as practical.

3.2. HFSC Equipment

HFSC provides other equipment for use at scenes, including the equipment listed in this section. Personnel shall use only HFSC-issued or authorized equipment for casework. CSU management is responsible for issuing and authorizing equipment.

3.3. Performance Checks

Digital SLR cameras and video cameras shall be periodically checked for correct functionality, including focus, exposure, and color capture. This is done by monitoring photographs and video captured by the CSI.

The CSI will spot check digital images prior to leaving the scene to ensure they were captured on the memory card. This check must be recorded in the notes.

Any malfunctions shall be documented in the case notes and reported to a CSU supervisor as soon as practical.

All length measuring devices must be checked against the NIST traceable ruler and approved prior to initial use. The NIST traceable ruler shall be inspected on an annual basis for damage and shall be calibrated by an approved vendor once every accreditation cycle.

3.4. Electrostatic Dust Print Lifter (EDPL)

The EDPL is a device that creates a static charge on a lifting film (mylar) causing a dust impression to transfer from the substrate it is deposited on to the film. The result is a collectable transfer of the impression to the lifting film.

The device will work on both porous (non-metallic) and non-porous substrates but works best on dry dust impressions present on relatively clean surfaces. This technique is not successful with wet transfers or dry transfers that become wet or damp prior to lifting.



- Comparison quality photographs shall be taken of any visible impressions prior to any lifting attempt.
- Place a clean lifting film over the impression. The black side of the film faces the impression and the silver side of the film faces up, towards the CSI. The film must be larger than the impression to ensure a full transfer.
- Mark the orientation of the film, if necessary, either by direction or relationship to the object.
- Place the metal grounding plate next to the mylar.
- Place the two prongs on the bottom of the unit on the grounding plate and the prong at the top of the unit on the mylar.
- Turn on the unit and, if air bubbles are present, **gently** use the rubber roller to smooth them out.
- Turn off the power and remove the unit.
- Turn the film over and evaluate the lift. If nothing is visible, the lift must be examined in a dark room using oblique lighting to evaluate the success of the lift.
- Subsequent lifts may be performed if the first lift was unsuccessful. This is typically due to a large quantity of transferred material. Second or third lifts may yield a “cleaner” impression as interfering background material may have been reduced during the first lift.
- A successful lift must be secured inside a dust-free container to prevent movement or destruction of the lift during transport to the laboratory. Comparison quality photographs shall be taken of all successful lifts. **Refer to sections 8 and/or 9 for further information on comparison quality photography procedures.**
 - The images shall be recorded on a Digital Video Disk (DVD) and submitted to the HPD Property Room.
- An unsuccessful lift (one that does not retain any detail) does not need to be photographed or maintained.
- Mylar shall not be re-used. Mylar with successful lifts shall be discarded and not submitted as evidence after photography is completed.

EDPL Cautions

Not all dry impressions can be successfully lifted using the EDPL. Attempts to lift dust prints on dirty backgrounds may cause both the dust print and dirty background to lift together. Subsequent lifts on separate sheets should be attempted as they may be more successful.

Never slide the lifting film on the surface with the impression.

If using a rubber roller to eliminate air bubbles, do so gently to avoid shifting or excessive pressure that could damage the impression.

As a precaution, the EDPL should not be operated by persons with a pacemaker.

Documentation

- Mark the lift film before removing it from the surface to allow for the orientation of the



impression to be re-created.

- Label the silver side of the lift with the following identifying information.
 - Case number, location, date/time, orientation, unique identifier.
- Subsequent lifts from the same impression must be labeled to distinguish which was first, second, etc. if all lifts are being retained.
- Case notes shall include information regarding the quantity and description of located and lifted impressions and the date/time of collection.

3.5. Metal Detector

The metal detector is used to aid the CSI in the detection and location of metal objects that may have evidentiary value. It may be used on any surface but is most useful when the evidence item is buried or at an obscure level, such as in sandy, grassy, overgrown, or wooded areas. The metal detector operates using audible tones to alert the user to the possible presence of a metallic object within the area under the coil.

A performance check shall be conducted prior to use and documented in the case notes.

- A cartridge case, attached to a piece of wood, which is located in the carrying case, should be utilized for the check.
- Another large, fixed, metal object may also be used **in lieu of the cartridge case, but the object used must be documented in the case notes.**
- An alert tone heard while the coil is above the known metallic object is a satisfactory performance check.

Decide on a search pattern prior to starting the search. Scan the coil at a rate of approximately one to two feet per second. The coil is moved in a slow, side-to-side motion and should be kept one to two inches from the ground or search area.

Detection of a metal object will be indicated by an audible signal, which will increase in volume as the coil nears the object.

If an item of evidentiary value is located, it shall be marked with an evidence marker, flag or cone, and included in any sketch, measuring, photographs, etc.

3.6. Alternate Light Source

CSU is equipped with an Alternate Light Source unit (ALS) which contains a white light and multiple additional wavelengths of light. This light source can be used to search for evidence such as body fluids, trace evidence, or view latent prints that are developed with cyanoacrylate and enhanced with dye stains.

To ensure the optimal visualization is obtained, more than one wavelength must be used if negative results of the search/viewing with the initial wavelength are obtained.

When using the ALS, the correct color of goggles should be used with certain wavelengths. At a minimum, the recommended color must be used for the initial viewing, but other colors may be



used to ensure optimal visualization. Below is a guide of manufacturer-recommended goggles/filters:

- 365 nm (ultraviolet)UV or yellow
- 390 nm UV or yellow
- 415 nm Yellow
- 445 nm Yellow
- 455 nm Yellow or orange
- 475 nm Orange
- CSS (short-pass) Orange
- 495 nm Orange
- 515 nm Orange
- 535 nm Red
- 555 nm Red
- 575 nm Red
- 600 nm UV

The light source examination is done by illuminating the surface with the light in the 350nm to 650nm range and viewing the surface through a barrier filter. This barrier filter effectively blocks the light being emitted by the light source and allows the luminescence to be viewed.

A barrier filter must be used on the camera lens when photographing areas of fluorescence. More Information on photographing with the ALS is located in Section 8 of this manual.

ALS Cautions

- All persons in the room during use of the ALS shall wear protective goggles.
- The direct beam of light should never be exposed to the eyes.
- Never look directly into the aperture emitting the light beam.
- The operator should be aware of the possibility of a reflected beam off a mirrored or shiny surface reaching the eye.
- Prior to using the ALS, a performance check must be performed to ensure the equipment is working properly. A known fluorescing sample is available with each ALS. Operate **the ALS as follows:**
 - Turn on the power switch and ensure the fans are working.
 - Wear the proper goggles.
 - Turn on the lamp switch.
 - Darken the room.
 - Direct the ALS beam, tuned to CSS wavelength, at the sample.
 - The sample must fluoresce, indicating a positive result.
 - The area around the sample (which has not been treated) must not fluoresce, indicating a negative result.
 - The results of the performance check must be recorded on the case notes form.



The ALS is considered critical equipment, which may have a significant impact on the results of the examination. Each ALS is uniquely identified and this identifier shall be reflected in the notes.

3.7. FARO

The FARO Focus 3D laser scanners (FARO), tripods, and laptop computers are housed in CSU and only authorized CSU employees may operate the equipment.

The FARO may be used at any crime scene that requires a diagram to be completed or as requested by a CSU Supervisor.

The procedure for setting up the FARO is located with each scanning unit. The instructions for computer rendering are in the electronic user's manual.

The Scanning Process

The CSI shall scan all pertinent areas of the scene which will be used to create an accurate computer rendered drawing of the scene at a later date.

Close up photographs should be taken of items within the scene that the CSI determines would benefit from higher resolution color in the mode/panoramas. The CSI shall measure one door frame or other item of a standard size after scanning is complete. This documents the measurement for performance check measures when the scans are rendered. Outdoor scenes may utilize a sidewalk or other linear, common man-made structure.

The CSI shall create a rough sketch for reference. Measurements are not typically included in this sketch.

Upon completion of scans, any personnel not authorized to render the data using FARO software shall turn over the original project scan data (raw data) to a person who is authorized to do so.

The FARO is considered critical equipment, which may have a significant impact on the results of the examination. Each scanner is uniquely identified and the identifier shall be documented in the notes.

Final Computer Rendering (Final Diagram)

Only personnel authorized to render the data will create the final diagram. A DVD containing the final diagram will be created and submitted as an evidence item.

If the FARO is used on a scene for an agency other than HPD, this DVD shall be turned over to the agency with a chain of custody.

4. Evidence Handling Procedures

Evidence collected by Crime Scene Investigators is properly marked for identification, stored under proper seal, protected from loss, cross-contamination and/or deleterious change. Crime Scene Investigators should work with the lead investigator to determine what items need to be collected.

4.1. Evidence Collection and Packaging

Prior to collection, all physical evidence located at a crime scene shall be documented appropriately with notes and photographs, and sketches and video when required. Sketches are not required at locations such as a hospital, an interview room, Vehicle Examination Building (VEB), etc.

Evidence shall be uniquely identified to avoid confusion regarding the identity and original location of items. Evidence marker numbers and letters may be used to uniquely identify items. If evidence markers are not used, the case notes must contain enough identifying information to ensure like items, such as cartridge cases, are not confused with one another. This information can include a detailed description of the item, exact location, etc.

Prior to leaving the scene, identifying information must also be present on the packaging. At a minimum, this shall include the case number and the evidence marker number or, in the absence of such, the item description.

Containers or collection instruments used to collect evidence shall be clean to prevent contamination. Single use/disposable supplies such as plastic tweezers, scalpels, etc. are kept in clean containers until ready for use. Equipment shall be used in such a way as to prevent any cross-contamination. Single use/disposable equipment shall not be re-used and shall be discarded in the appropriate manner.

If evidence is placed in a temporary container for transport, this container must be marked for identification and sealed in a manner that prevents the evidence from escaping the container. This may be accomplished by using binder clips on bags and paper clips or clasps on envelopes. If evidence from more than one crime scene is placed in the same vehicle for transport, each package containing evidence must bear a unique identifier that designates to which case the evidence belongs. Evidence shall be removed from the vehicle upon return to HFSC from a scene or scenes.

A chain of custody is a record that provides a comprehensive, documented history of each evidence transfer over which the unit has control. Items received from or transferred to non-HFSC personnel will be documented on the chain of custody form, up to the point where electronic entry and tracking takes over. See Section 5.2. for further information on chain of custody.

Evidence that may be subject to further examination, such as tool marks, bloodstain patterns, ballistics or any specifically identifying features, should be packaged in such a manner to prevent deleterious change to the evidence. Physical evidence shall be handled as little as possible and



held in such a way that is not common and minimizes the chances of interfering with potential DNA, latent prints and/or any other forensic analysis.

Any evidence collected that contains the possibility or presence of blood, body fluids, or any other biological hazard will be marked with the appropriate biohazard warning in such a manner that is easily identifiable, both prior to leaving the scene and on the final packaging. This may be accomplished by using a sticker or a black or red marker to identify the biohazard. If a marker is used, it must be prominently written for easy identification. See section 2.8.2.1 for additional details.

It may be necessary to place wet biological evidence into plastic packaging for transportation purposes; however, it should not be completely sealed to allow airflow, and shall be removed from the plastic as soon as possible and placed into a drying cabinet.

Items that contain moisture (blood, body fluids, etc.) shall be thoroughly dried, then packaged in paper or other packaging that is otherwise permeable by air to prevent/reduce the growth of bacteria. See Section 10 of this manual for further information on biological evidence collection.

Any evidence collected that presents a possibility of physical danger (knives, needles, other items with sharp edges, etc.) shall be packaged in the appropriate rigid container and clearly marked **as such**.

Liquids

Liquid foodstuffs collected as evidence, such as milk from a bottle, or other substances that may be suspected to contain alcohol or other contaminants, should be placed in a glass container. The glass container should then be packaged inside another sturdy container to minimize the chance of breakage and to contain the liquid in case of a glass break. Liquids that are subject to spoiling shall be submitted to the HPD Property Room immediately. **Property Room personnel shall be advised that the evidence needs to be refrigerated.** The outer packaging shall be marked with orientation arrows to indicate the proper orientation of the glass container **and that the contents need to be refrigerated.** The case investigator, if not already aware, shall be notified of any perishable items that have been submitted as evidence and are available for testing.

Firearms

Firearms shall not be packaged in a loaded condition. If a firearm is in such a condition that prevents it from being made safe, the CSI shall contact a member of the firearms unit during regular business hours. Outside of regular business hours, the CSI shall place the firearm in the locker on the 1st floor of 1200 Travis St. Complete a submission form and place it in the locker with the firearm. If no forms are available, send an e-mail to the manager and supervisor of the firearms division and copy the appropriate CSU Supervisor.

Firearms evidence that does not contain visible blood should have "NVB" (No Visible Blood) prominently displayed on the packaging. This may be in the form of an inked stamp or handwritten.



Currency

Currency collected shall be documented on the currency worksheet. Prior to leaving the scene location, the CSI collecting the currency will enter their information in the "on scene count performed by" section of the worksheet.

All clothing, purses, backpacks, wallets, or other containers reasonably expected to contain currency shall be checked prior to leaving the scene or the VEB.

Counting and documenting at the scene shall be witnessed by a second person, either another CSI or law enforcement officer. This information is entered in the "on scene verification performed by" section of the worksheet.

The counting of money collected from vehicles at the VEB shall be witnessed by a second person unless no other HPD or HFSC employee is available (such as weekends or night shift), and the amount is under \$100. In this situation the CSI shall document "no verifier available" on the "on scene verification" line of the currency worksheet.

If the amount is over \$100, the CSI shall leave the money secured in the vehicle until a witness is available. If this goes past the end of a CSI's shift, the CSI shall e-mail all supervisors of the circumstances, and include the email in the case record. If possible, the CSI should complete all other processing of the vehicle.

Documentation and packaging of currency at CSU or the HPD Property Room shall be witnessed by another HFSC or HPD employee. The "count at time of packaging" section of the currency worksheet shall be completed and verified by a second person, confirming the currency amount from the scene is the same that is being packaged and submitted, unless the money is taken directly to the HPD Property Room. In this case, the receipt supplied by Property Room personnel may substitute for the "count at time of packaging" signature. When this occurs, "Refer to Property Voucher" must be written in the verification line of the currency worksheet.

If the money count verification differs, the money shall be re-counted. If the amount is still different, an HFSC supervisor shall be contacted.

Currency in the amount over \$100 shall be submitted to the HPD Property Room by the end of the CSI's shift, unless other arrangements have been made and approved by a CSU supervisor.

Mobile Cellular Devices

Mobile devices should be powered off when collected, so that they do not connect with surrounding networks during transportation. Allowing the device to receive network or wireless signals can result in a change to the data contained on the memory of the device or allow remote wiping.



Securing and Packaging Evidence

Evidence shall be secured in an approved short-term evidence storage location whenever items are not being actively processed. Evidence in the process of examination may be left unattended for a short period of time. This would typically include time needed for telephone calls or restroom breaks. The examiner shall take reasonable precautions to secure the evidence, such as covering the exam area may be covered with clean paper and/or a “Do not touch” sign. Case information including the case **number and name of the CSI** is written on this or another piece of paper.

CSIs shall thoroughly and accurately document evidence under their control by use of notes, sketches and/or photographs. Descriptions of evidence may include:

- Type of item.
- Color and/or size of item.
- Manufacturer’s markings or serial numbers.
- Noticeable damage to the item.
- Stains and/or unusual stains.
- Unusual markings.

If the original collection package/container cannot be used for submission (usually due to the presence of biological material on the package), the CSI will re-package an item of evidence into a new container. The original collection container/package must also be submitted with the evidence. This may be a separate item or included with the evidence item. If it is included with the evidence item(s), this must be reflected in the case notes.

An item of evidence should not be placed in more than 2 containers. For example, a cartridge case may be placed in a coin envelope then into a larger manila envelope. No further packaging should be used.

Interior packaging, such as coin envelopes, shall contain the agency case number and a brief description of the contents. If the contents contain a biological hazard such as blood, both the interior and exterior container must be marked as biohazard. All interior packages should be secured so the contents cannot escape. Swab box flaps should not be taped.

Final packaging shall be an appropriate container that is properly sealed. A container is properly sealed only if its contents cannot readily escape and only if entering the container results in obvious damage/alteration to the container or its seal. The seal on the evidence package must contain the date and initials or signature of the person sealing the container, written over the container and the seal.

The exterior of the container shall contain at minimum, the following information, written legibly:

- Case number.
- Evidence marker number (if applicable).



- Description of item(s).
- CSI's name.
- "CSU" either stamped or handwritten.

4.2. Authorized Temporary Storage

HFSC storage lockers, cages, and evidence drying cabinets are authorized temporary evidence storage locations. Items will be secured in these locations for processing when the direct submission of evidence to the HPD Property Room is not feasible.

All evidence that is not submitted to the Property Room will be secured in an authorized temporary storage location at the end of an employee's work shift. An integrity tag shall be used to secure each locker and drying cabinet. The tag number shall be recorded in the examiner's case notes.

The cages designated for items to be transferred to Firearms and/or Latent Print personnel does not need to be secured with an integrity tag.

The log secured to each cabinet and locker shall also be completed. Supervisor approval is required prior to a CSI removing an integrity tag from a secure evidence location, if the evidence was not submitted by that CSI. Any CSI, other than the submitting CSI or supervisor, who removes an integrity tag for any reason shall e-mail the submitting CSI and the supervisors, detailing any actions taken with the evidence. This e-mail shall be included in the case record. A copy of the log documenting the initial entry and the final removal shall be included in the case record. Evidence temporarily removed by the submitting CSI for processing, photography, etc. is documented in the examiner's case notes.

4.3. Outside Agency Requests

Evidence collected while performing a service for an agency other than Houston Police Department shall not be submitted to HPD's Property Room. The evidence shall be returned to the agency's representative either at the scene or after the CSI has completed processing or documentation at the laboratory.

The evidence shall be properly documented and packaged for transfer prior to returning it to the requesting agency. All photographs and video recording(s) shall be transferred to another media such as a CD, DVD or thumb drive. This media shall be packaged and sealed as an evidence item and is included in any chain of custody transfer.

5. Documentation

Each crime scene investigation is unique and, as such, the recording of scene information and processing techniques utilized at crime scenes are essential functions performed by Crime Scene Investigators. Crime scene documentation provides a detailed record of observations which aids in report writing and testimony, as well as allowing for an independent review by other experts. Crime scene notes shall provide a thorough and comprehensive written account of observations, actions, and analyses performed at the scene.

5.1. Scene and Examination Notes

Note-taking shall be maintained throughout the scene investigation. Photographs are not a substitution for crime scene notes. CSIs shall not rely on their photographs to write their case notes or report at a later time. Notes shall contain relevant scene information, processing requests, or evidence collection requirements provided by the investigator in charge of the scene. Any non-standard or technical abbreviations shall contain a definition at the first use in the case notes.

CSIs will utilize only approved forms for:

- Recording case information obtained at a crime scene.
- Recording crime scene observations.
- Documentation of scene activity.
- Documentation of evidence collection techniques or processes utilized.
- Documentation of the evidence collected.
- Graph paper and pencil are approved only for the documentation of crime scene sketches.

Before leaving the scene, crime scene notes shall contain the following information:

- Case number.
- Name of lead investigator.
- Names of other relevant personnel such as first responding officer or Medical Examiner's Office Investigator.
- Type of case.
- Victim's name as provided to the CSI (if applicable and available).
- Date and time of arrival on scene.
- Exact location of crime scene(s).
- Information obtained from the investigator about the scene.
- Date and time of evidence collection (if applicable).
- Description and location of evidence (if applicable).
- Items/locations processed for latent print and/or DNA (if applicable).
- Date and time of crime scene investigation completion.

Documentation must be sufficiently detailed such that in the absence of the examiner, another competent examiner could evaluate what was done and interpret the data. All information in the report must be supported by case documentation. This may include notes, photographs, VEB paperwork or other documentation in the case record.



Examination and crime scene notes may not be rewritten without documented supervisor approval. The original page(s) must be preserved either in electronic format or in the case file. Observations should not be made on scrap or other unapproved papers and then transferred to the examination or crime scene notes. If this occurs, these papers (or an electronic image) shall be retained as part of the case file.

Case notes shall be written in a clear and legible fashion and in such a manner that anyone would be able to review the notes and understand what was done throughout the investigation at the scene, VEB, and/or **when performing additional processing** in the laboratory at HFSC. Any information that is added to the notes after the original date of service must be dated and initialed.

As each crime scene is unique, the requirements or needs for documenting conditions at a scene may be extensive. The following are recommendations that could be noted at a crime scene; however, this list does not cover all crime scene investigations.

- Appearance of suspect(s) and/or victim(s).
 - Clothing (including stains or defects).
 - Injuries.
 - Visible marks, scars, or tattoos.
- Environmental conditions.
 - Weather, high winds, temperature, etc.
- Lighting.
 - Indoor/outdoor, on/off, day/night.
- Potential entrance/exit points.
- Furnishings and appliances.
 - Moved, on/off, missing, etc.
- Personal items.
 - Moved, missing, damaged.
- Unusual odors.
- Wall surfaces, carpet areas, furniture or flooring exhibiting recent cleaning.
- Signs of passive activities.
 - Dishes in sink, meal preparation, etc.
- Signs of aggressive activities.
 - Items broken, damaged, knocked over, out of place.
- Indication of time.
 - Mail, caller ID, phone messages, relative temperature of items.
- Firearms.
 - Loaded, unloaded, hammer position.
- Transient evidence.
 - Melting ice, drying liquids.
- Circumstances that require departure from normal scene processing procedure.
 - Scene safety, environmental factors, traffic.



5.2. Chain of Custody

Crime Scene Investigators have the unique assignment of processing crime scenes and taking custody of evidence. This collection process establishes the chain of custody. This chain of custody requires that from the moment the evidence is collected, every transfer of the evidence shall be documented and provable that no unauthorized individual could have accessed that evidence. These transactions and every succeeding transaction between the collection of the evidence and its appearance in court shall be completely documented. Documentation includes the identity of the evidence handlers, duration of evidence custody, and the location of evidence during temporary storage.

Chain of custody is established through a process that includes the use of:

- Taking notes, including documenting collection location, date and time collected or received, and description of the item
- Documenting the storage location(s)
- Packaging of the evidence
- Sealing of the evidence
- Disposition of the evidence

The paper Chain of Custody form is used to document the transfer of evidence to/from an HFSC employee to/from a non-HFSC employee, as well as to/from employees within HFSC that does not occur at the same place as the evidence collection. [See section 4.2 for transfers to/from evidence storage locations.](#)

Evidence transfer that occurs between CSIs who are at the same scene at the same time does not need to be documented on the Chain of Custody form, as this information shall be documented in the notes. Each transfer documented on the Chain of Custody form must contain the original signature of the person transferring custody and the signature of the person receiving the evidence. The Chain of Custody form is used up to the point of electronic entry and tracking. Copies made of the Chain of Custody form must be marked as "Copy."

5.3. Report Writing

Reports shall be prepared for all casework completed. The CSU standardized wording format will be followed for all reports and will be free of hearsay and/or unsupported conclusions. There are some unique situations/scenarios that are not listed in the standardized wording format. The CSI should consult with a supervisor to develop wording that best fits the situation.

Descriptions and other observations will be made in clearly understood language avoiding esoteric terms or slang, [whether common or industry related](#). Non-standard abbreviations will not be used in the report unless [the abbreviations are](#) defined in the report.

In addition to information required for report entry into LIMS, reports must also include:

- The date(s) of all examinations/inspections performed, including any follow-up processing or photography.
- Identifying information of items collected (evidence marker or descriptive information)



- Results of examinations, searches, and/or presumptive tests performed
- Dates of evidence submission
- A statement denoting “All measurements are approximate” when measurements are included in the report

5.4. Case Records

A case record (either hard copy or electronic) shall contain the following documentation (applicable to the type of scene processed):

- Final report
- All crime scene notes
- All rough sketches
- Final diagram
- Forms and/or paperwork used to support, or document casework requested or performed
- VEB paperwork
- NOCC (Narcotics Operations Control Center) paperwork
- Applicable cover pages
- Applicable case file divider pages
- RMS report
- HPD Property Room receipts
- E-mails or other records of correspondence regarding case information
- Chain of custody forms
- Temporary evidence storage location logs
- Datworks e-mail confirmation of uploaded images
- CD or DVD of photographs and/or video and/or final diagram

Unless authorized by a supervisor, the case record will not include:

- Copies of papers, cards, identification, etc. when the original is being submitted as evidence
- Copies of reports written by HPD or other law enforcement officers
- Copies of latent print cards
- Photocopies of CDs or DVDs
- Unnecessary Google or other maps (locations such as hospitals, police stations, etc.)

5.5. Case Record Reviews

All casework shall be administratively reviewed and all casework performed by trainees shall also be technically reviewed. **A minimum of 50%** of casework performed by examiners conducting independent casework shall be technically reviewed. Guidelines for administrative and technical reviews are in the HFSC Quality Manual.

Preliminary evidence lists created by CSIs and sent to the investigator after completion of a scene are not subject to review prior to being released to the investigator. This list is reviewed with the entire case record during the AR/TR process. **If changes are made to the evidence list during the**



AR/TR process, the revised list will be made available to the investigator as part of the final report. The revised list shall also be e-mailed to the investigator.

All technical reviewers shall have been **authorized** and have sufficient knowledge of crime scene investigations to ensure the case records reflect that unit procedures are being followed and correct processes and methods were used. Administrative and technical reviews may also be used in part to monitor personnel for satisfactory performance and as a means of identifying training needs.

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6. Crime Scene Sketches, Measurements, and Diagrams Completed by CSIs

The crime scene sketch/diagram is a record of the size and distance relationships of the crime scene and physical evidence. All relevant items in the scene should be measured and recorded.

Measurements included in the report will indicate that all measurements are approximate. **Most scenes can be sketched, measured and diagrammed by CSIs. However, HFSC has the capability of measuring and diagramming scenes using FARO as described in section 3.7.**

6.1. Sketches

A rough sketch shall be completed at every scene unless approved by a supervisor. This does not apply to locations including, but not limited to, the VEB, hospital rooms, interview rooms or other locations where a person or item is being processed for evidence.

A rough sketch is a hand-drawn document depicting a view of a scene or structure. It is considered part of the field notes and is created contemporaneously with the investigation. The sketch may or may not contain measurements on the same page. It is meant to complement other forms of case documentation. It should show evidence to be recovered, major structures present in the crime scene and other relevant structures or items in or near the crime scene.

A sketch is often drawn from a “birds-eye” or “overhead” perspective. Scenes which present evidence at various heights may be sketched using a side-view or elevation sketch. For interior scenes, indications should be made for openings in walls, doorways, windows, etc. as well as any point of entry/exit.

The rough sketch shall contain the following information:

- Agency case number.
- North indicator.
- Drawn by: name and employee number.
- “Not to scale” or “all measurements are approximate” indicator.
- Scene location or address.
- Date of the incident.
- Legend for notations such as security cameras, green cones, evidence markers, etc.
- Reference point(s) used for measurements.

6.2. Measuring Techniques

There are several techniques for taking measurements at a crime scene. The CSI should use the technique(s) listed below that would be best suited for the scene. All techniques are based upon the determination of fixed or known starting points. The fixed points should be permanent if possible. This will allow the crime scene to be reconstructed at a later time if needed.

Rectangular coordinates

- This method is best used for indoor scenes and smaller outdoor scenes that have a well-defined area.
- This method uses two adjacent walls/items as fixed reference points from which distances are measured at right angles.



- This may not “fix” larger items in the scene as measurements are to the center mass of the item.
- Measurements from two separate fixed points are taken to each end or center mass of the item of evidence.
- The reference points must be fixed and documented in the sketch.
- The two measurements are recorded as coordinates for each item of evidence measured.

Triangulation

- This method is best suited for larger outdoor scenes.
- This method uses straight-line measurements from two fixed objects/points to the evidence to create a triangle.
- Multiple measurements can be taken to different points on the item to “fix” the item in the scene.
- Two fixed reference points are identified and documented in the diagram.
- The distances between the two reference points and the distance from each reference point to the individual items of evidence are recorded.

Baseline

- This method is similar to the rectangular coordinates method and is suited for outdoor scenes that do not have landmarks. It begins with a datum point: a location from which the baseline will extend.
- The datum point can be set by triangulating it to a set of nearby landmarks.
- Once the datum point is set, the baseline is extended along a cardinal direction (north, south, east, or west) as far as necessary.
- A 100-foot tape measure may be utilized as the baseline.
- Measurements are taken from the datum point down the baseline and then from the baseline at a right angle to the item of evidence.

6.3. Final Diagram

Although the final diagram is not to scale, it should represent as proportionately as possible the spatial relationship between items in the diagram. A final diagram shall be completed for every scene where a rough sketch is completed, unless authorized by a supervisor. The final diagram is computer generated utilizing software provided by HPD.

The final diagram must include the following:

- Agency case number.
- Date and type of incident.
- Address/location of the scene depicted on the diagram.
- Name of the person completing the diagram.
- A statement indicating the drawing is “Not to Scale”.
- Legend or key to identify objects and/or reference points.
- Directional arrow.
- Measurements, either on the diagram or a separate sheet.
- HFSC logo.



- ANAB accreditation statement.
- Date diagram was completed.

The diagram shall be the file format of the current approved diagram software, written to a CD and placed in the case record. A .pdf file of the diagram shall also be saved to the CD.

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7. Photography and Videography

Crime scene photography is one of the most important duties that the CSI performs. No matter how well a CSI can verbally describe a crime scene, visual communications are substantiated and verified by concise and accurate photographs of both the scene and the evidence as it was found. However, photographs are not to be considered a replacement but rather a supplement to handwritten notes of observations made in the laboratory or on a scene.

7.1. General Information

Unless exigent circumstances exist, Crime Scene Investigators will photograph all aspects of a crime scene prior to the collection and preservation of physical evidence. This shall be accomplished by using only equipment **that has been approved and authorized by CSU management**. Exigent circumstances must be approved and documented in the case record.

CSIs shall ensure their camera equipment is maintained and in proper working order, and that they maintain access to that equipment at all times while on duty. A CSU supervisor shall be notified of malfunctioning or damaged equipment as soon as is practical and the **occurrence** shall be documented in the case notes.

If equipment malfunctions while in use at the scene, and no other substitute equipment is available at the scene, the CSI shall contact a supervisor or another CSI on duty to have replacement equipment brought to the CSI.

Digital cameras provided to CSIs are equipped with a viewing screen. Personnel should utilize this screen to ensure the image taken is properly exposed, in focus, and depicts what the photographer intended. Images not meeting these criteria shall be retaken until the desired image is achieved. Digital images taken in the course of scene or evidence documentation shall not be deleted.

All general crime scene images should be taken in the .jpg format with the minimum resolution settings for Nikon cameras at:

- Image quality: Fine
- Image size: Medium

Image quality for Canon cameras is set at "Large."

Comparative quality photographs (**such as** fingerprint, shoe and/or tire impressions) shall be taken in an uncompressed image format, such as RAW or TIFF. Comparison quality photographs are those that will be used by examiners for comparisons. They are high quality, close up images taken in an uncompressed file format. RAW + JPG or TIFF + JPG format should be used as JPG does not require a file conversion to view the images. Refer to Sections 8 and 9 of this manual for more information on comparative quality photographs.

CSIs shall spot check photographs taken of the scene prior to departure to ensure that all photographs captured have saved properly to the memory card and documentation of this check shall be recorded in the notes.



The date and time on the camera shall be checked upon initial receipt of a camera and adjusted accordingly at each daylight savings time change.

7.2. Case Identification

The HFSC photography cover sheet should be taken as the first photograph for the case and again when a significant location change is made.

When photographing a live person, a cover sheet or any other form (such as a driver's license) with the person's name, should be photographed prior to capturing images of the individual.

7.3. Image Composition

Photography of the scene and evidence is one of the first duties performed at a scene. This form of documentation generally occurs after the note-taking process has begun. Crime scene photographs and video recordings should depict a true and accurate representation of what was observed and processed.

When documenting a crime scene through photography and videography, the camera operator should consider the following:

- Progression
A logical progression of images allows the viewer to understand the location and relationship of the area/items within the crime scene.
- Composition
The images should be properly framed to ensure that the intended result is achieved, and extraneous equipment and/or personnel are not captured in the scene.
- Exposure
The images should be properly exposed to ensure that the clarity and detail of the images are adequate.

7.4. Progression of Photographs

Generally, the first set of photographs consists of overall photographs. These should establish the location of the crime scene. Include the exterior and front of the structure, including the address or other identifier.

Intermediate or mid-range photographs document the relative location between items of interest within the scene. A representation of the items with greater detail than documented in the overall/long-range views.

Close-up photographs document in detail each individual piece of evidence.

Photographs of the scene should include documentation of the following:

- The location of the crime scene.
- Street signs, address numbers, or other geographical information.
- The exterior of the scene.
- The interior of the scene.



- The point of entry and/or exit.
- The areas of disturbance within the scene.
- Any potential evidence located within the scene.

Photographs should be taken from various vantage points (compass directions, point of entry, witness/suspect/victim perspective, etc.). Photographs should overlap slightly to orient the viewer to their location within the crime scene and the relationship to other photographs. Items within the crime scene should not be moved prior to being photographed. If an item is moved from its original position, it shall not be placed back into the scene. It shall be photographed in its current location and documented in the crime scene notes.

7.5. Long Exposure Photography

Long exposure photography is used for taking photographs at night or in very low light situations such as when using an Alternate Light Source (ALS) and/or the reaction of certain reagents and/or chemicals. These are single exposure images captured by using ambient or available light. They are used to capture detail at dark scenes or to document sources of light that were on or off at a crime scene.

Long exposure photography requires the use of a tripod, copy stand, or other stabilization device to avoid camera shake.

- The camera should be set to Manual or Aperture Priority mode.
- The F-stop should be set to F-8 or F-11 for an acceptable depth of field.
- In Aperture Priority, the user will select the desired F-stop.
- In Manual, the user will select the F-stop and the shutter speed.
- Use the timer or remote control to activate the shutter to avoid camera shake.
- For exposures that require a time longer than the pre-programmed settings (usually 30 seconds), use the Bulb setting.
- A pop of the flash or soft sweeping strokes with a flashlight (avoid creating hotspots) may be used to help illuminate the scene or highlight extremely shadowed areas, such as under a car.
- The photographer should stay behind the camera to avoid being captured in the image.
- A shadow of the photographer and/or the tripod may be minimized by adding a small amount of extra light to the shadow.

7.6. Alternate Light Source Photography

See section 7.5 for camera setup instructions. A camera filter of corresponding color to the goggles must be used on the camera. When photographing a stain on an item, a small amount of white light should be added to the image to help visualize the item. The item should also be photographed in regular light with a marker indicating the area of interest.

7.7. Inclement Weather

Employees shall take care to protect their camera during inclement weather. CSIs can utilize an umbrella or plastic bag with a hole cut for the lens to protect equipment. Damage to equipment caused by a CSIs failure to make an effort to protect equipment may result in disciplinary action.



Long exposure photography can be used to photograph scenes during rain. A long exposure and no flash will help reduce the appearance of raindrops in the image.

7.8. Uploading Images

Images for HPD cases are uploaded to the digital imaging storage system (Dataworks) which is maintained by HPD. Images should be uploaded by the end of the CSI's work shift.

Uncompressed file format images (RAW or TIFF) are not uploaded to Dataworks. These images are written to a CD or DVD and submitted as an evidence item to the HPD Property Room. See section 4.3 regarding images taken for non-HPD cases.

Dataworks is an image management program that allows digital images to be imported, stored, and retrieved. The image itself cannot be altered. In order to preserve and maintain original image integrity and chain of custody of digital images, all captured images shall be imported prior to any other application of image handling, enhancement, processing, analysis or reproduction. Memory cards should be formatted once all image uploading and CD/DVD writing is complete. Memory cards shall be replaced after approximately one year of use.

7.9. Videography

All homicide investigations, officer-involved shooting scenes, and any other scene as requested by an investigator or CSU management, shall be video recorded by Crime Scene Investigators using only equipment that has been approved and authorized by CSU management. All video recordings should start with the HFSC cover sheet. The video shall include the address, business name or other identifying feature.

Videography does not replace photographs. Videos are typically recorded after the placement of evidence markers. Circumstances such as lighting or weather may necessitate the video being recorded before evidence markers are placed or after evidence is collected. Any deviation shall be documented in the case notes. When possible, CSIs shall ensure that sufficient lighting is available to provide acceptable quality for the recording of the video. When the lighting is not sufficient to allow the CSI to appropriately record the scene, the CSI will use all supplemental lighting available. If the scene is not sufficiently lit and additional lighting cannot be brought to the scene, the supervisor will be advised, and the CSI will document the case record.

Video recording is used to supplement scene documentation and should be conducted in a manner similar to still photography. General video images should be captured without sound, unless specific narration is requested. Care should be given to avoid personal commentary or the capturing of unintended sound. General crime scene videography should include the scene and surrounding areas, the victim, and relevant physical evidence. The videographer should walk slowly through the scene, stopping to slowly pan vertically and horizontally where appropriate. At the discretion of the CSI, close-up video of each item of evidence may not be recorded, as long as the item is visible at some point during the video recording.

8. Footwear and Tire Track Evidence

Proper crime scene investigation techniques include a cautious approach while searching for footwear and tire track evidence. A CSI must think of how the suspect may have entered and exited the scene, as many surfaces may have been driven, walked, or stepped on. For purposes of this chapter, the term “impression” shall also cover “imprint” evidence unless specifically stated otherwise.

8.1. General Information

Footwear and tire tracks may contain individual or class characteristics. Individual characteristics can be identified to a specific object or person. Class characteristics are common to several objects or people.

Footwear and tire marks can be either impression or imprint evidence. Impressions are viewed as three-dimensional, such as shoeprints in mud or snow. Imprints are viewed as two-dimensional, such as prints in dust or transferred in another medium such as blood or grease.

A variety of documentation and collection methods exist for these evidence types. The CSI will determine the most appropriate means of documentation and collection. These include but are not limited to: gel lifts, casts, electrostatic dust print lifts (EDPL) and photography.

All impression evidence that is photographed shall be done as comparison quality photographs prior to any processing or collection attempts. If the item that contains the impression can be wholly collected or collected in part, collection of the item should be considered after proper photographs have been taken.

8.2. Footwear

Areas that can be searched for footwear evidence:

- Impressions in soil and/or dirt. These may be present with visible light or may need to be visualized using oblique lighting techniques.
- Impressions from water or rain; these need to be photographed quickly before evaporation begins.
- Freshly waxed floors or furniture
- Vegetation or wide leaves
- Tiled, carpeted, or linoleum floors
- Countertops
- Forced points of entry, such as a doors or window sills

Footwear impressions may not be readily visible under various lighting techniques and may need enhancement with powder or chemicals.

Comparison quality photographs must be taken before and after enhancement and prior to any collection attempts.



8.3. Photography

Photographs shall be taken of the footwear impressions to show relation to the scene and other items of evidence before altering with photograph markers or attempting to collect the evidence. Overall photographs should be taken again after the placement of markers to show the relation of the evidence to the scene and/or depict a trail. This also includes two-dimensional prints on a flat surface such as a door or countertop.

After overall and mid-range photographs have been completed, comparative quality photographs shall be captured.

- A tripod or similar camera stabilization device shall be used for all close-up images.
- All comparative quality images shall be digitally captured using the RAW +JPG or TIFF +JPG setting on the camera.
- Depth of field should be set at F-8 or F-11.
- ISO 100 should be used.
- The camera lens should be set at 35mm focal length.
- Utilize a 300mm L-shaped scale to outline the impressions to be photographed.
- The scale must be on the same plane as the impression. Exercise care when removing soil, snow, etc. around a three-dimensional impression.
- Ensure that a direction indicator (compass or hand-written) is visible in the image to allow proper orientation of the image within the scene.

The following information should be visible in **the first** image captured:

- Agency case number
- Photographer's name or initials
- Photo marker (placard or another identifier). The paper containing this information may be placed in a small plastic bag during inclement weather to prevent the information from becoming illegible. **This information must be annotated on a copy of the image if not captured in the first image.**
- Ensure the camera is positioned so that the entire impression, scale, and essential information are fully visible and fill the image frame.
- Ensure the image plane of the camera is parallel to the plane of the impression. An angle finder can be utilized for this purpose. Obtain the angle of the impression as well as the angle of the image plane.
- The impression should be evenly shaded. The photographer should avoid patches of sun and shade or full sun and take measures to account for these conditions. A flashlight can be used to determine the correct angle and height for the flash.
- Utilize the sync cord with the off-camera flash. This flash provides even lighting across the impression.
- Take a minimum of three (3) photographs, with the flash at a low angle, approximately 3-4 feet away and at approximately 45 degrees from three different sides of the impression. Typically, the deeper the impression, the greater (higher) the angle of the flash. The **shallower** the impression, the lower angle of the flash.

Two dimensional impressions are photographed the same as three-dimensional impressions,



however, the flash is held at an extremely low angle or with the flash pointing straight down.

Three different angles of light are not needed; the angle of light used should be the one that produces the optimal image.

Photographing shoe prints lifted with the EDPL

- Work in a darkened room with the overhead lights off, if possible. This helps eliminate the reflection of the lights on the mylar.
- ISO 100 should be used.
- Start with F-11 and a 6 second shutter speed.
- Slowly pan a flashlight up and down from the top of the mylar film to the bottom of the dust print.

The JPG images are uploaded to Dataworks. The comparison quality images +JPG will be written to a DVD and placed in the case record. A second copy of the DVD shall be submitted to the HPD Property room as an evidence item.

8.4. Tire Tracks

When photographing tire tracks (impression or imprint), the same procedure is used as that of footwear. Unlike a footwear impression, tire marks are considerably longer and must be captured in multiple images. The average 14-inch automobile tire has a circumference of about 8 feet.

If the tracks from both sides of the vehicle are present at the scene, take the track width measurement. If the entire mark is fewer than 8 feet in length, photograph the entire mark. If the mark is greater than 8 feet, photograph the best 8-foot section of the mark.

- For larger tires, the minimum length photographed should be increased.
- For smaller tires, such as scooters or trailers, the minimum length should be decreased.

The 300mm L-shaped scale or other scale of measure that is at least the width of the track and tape measure shall be used when photographing tire tracks, unless the length of the track is such that it can be fully captured in one image. In such case, the tape measure does not need to be used. The tape measure is placed alongside the tire mark to measure length. The other scale of measure is placed across the track to measure width. Do not place any portion of the scale on or over the impression before it has been photographed. The L scale and the tape measure shall be fully visible in the image. **A tripod or similar camera stabilization device shall be used.**

- **All comparative quality images shall be digitally captured using the RAW + JPG or TIFF + JPG setting on the camera**
- **Depth of field should be set at F-8 or F-11**
- **ISO 100 should be used**
- **The camera lens should be set at 35mm focal length**
- **The following information should be visible in the first image:**



- Agency case number
- Photographer's name or initials
- Photo marker (placard or another identifier)
- This information must be annotated on a copy of the image if not in the first image
- Fill the frame as much as possible with the tire track and scale

Photograph the tire track in approximately 12-16-inch sections until the entire track is captured.

For three-dimensional impressions, take at least three images with various flash angles for each section. When taking the next image, overlap the end of the first segment by about 3-4 inches. For example, the first segment of shots is 0-13 inches. The second segment is 11-24 inches, and so on. Do not move the tape measure until the entire track is photographed.

Two-dimensional impressions are photographed the same way as three-dimensional impressions, except the flash is held at an extremely low angle or with the flash pointing straight down. The angle of light used should be the one that produces the optimal image.

8.5. Casting Materials

All three-dimensional impressions should be cast if there is clarity in the impression and the surface is conducive to casting. Casts are beneficial, as they provide a lifelike molding of the original impression. They can reproduce microscopic characteristics, and, in deep impressions, they can reproduce characteristics on the side of the outsole and mid-sole of footwear. Casts can also support photographs with a tangible, three-dimensional piece of physical evidence.

Plaster Casts

- If the impression is in soft, fine, or loose dirt, the impression may be firmed up by spraying pump hair spray gently, evenly and indirectly over the impression.
- Follow the manufacturer's instructions to prepare the casting compound.
- A frame may be used to help position and retain the casting compound.
- When casting on hard surfaces, place an item such as a wooden spatula or cardboard under the cast to assist with lifting after the cast is dry.
- Target an area near the impression to begin pouring; do not pour directly onto the impression to avoid disturbing fine detail.
- Pour the casting compound in a smooth continual motion.
- Continue pouring onto the target area until the mixture covers the entire impression area. Do not stop and restart pouring as this can cause imperfections in the cast.
- Do not touch or move the cast until it is fully dry. Consult the manufacturer's instructions for estimated drying times.
- Record the required case information on the back of the cast with a permanent marker.
 - Case number
 - Date of cast
 - CSI's name
 - Impression number (if more than one cast is made)



- Address
 - Do not attempt to clean dirt or debris from the impression side of the cast.
 - Allow the cast to dry for at least 48 hours prior to packaging.
 - Package the cast in such a way to protect it from damage.

Underwater Impressions

Impressions that are within pooled water, puddles, or under any form of standing water may still be cast. Excess water may be removed, taking care not to disturb the impression.

- A metal casting form may be placed around the impression.
- Lightly sprinkle unmixed casting material over the underwater impression until covered by about an inch of the casting material. The material should settle at the bottom of the water-filled impression.
- Allow to set for at least 60 minutes.
- Allow the cast to dry for at least 48 hours.
- Record the information listed above on the back of the cast
- Package the cast in such a way as to protect it from damage.

Flexible Casting Material

Silicone based rubber casting material is useful in the collection and preservation of three-dimensional marks, such as tool marks, from a crime scene. This material can also be used to lift latent prints developed on irregular surfaces.

- Comparison quality photographs shall be taken of all latent prints or tool marks prior to casting.
- Brown casting material is recommended for the reproduction of tool mark impressions.
- White or clear casting material is recommended for lifting latent prints that have been developed with black-colored powders.
- The CSI may need to prepare a label for the cast, as it is not practical to write on the hardened silicone rubber. Casts of latent prints will be affixed to a latent print card with tape and the card will be completed with the relevant information.
- Casts are submitted with the same protocol as latent prints.

Gel Lifts

Gel lifts can be used for the collection of impression evidence consisting of loose material on flat, smooth surfaces, such as a dust impression, as well as to lift imprints developed by latent print processing powder techniques. They may also be used to lift developed or visible imprints from irregular surfaces such as door knobs or slightly textured surfaces.

- Gel lifts should be used at room temperature.
- The protective cover over a gel lift should be removed and the lift be allowed to rest for approximately five minutes prior to use.
- The lift is then applied to the surface and may be rolled with a fingerprint roller to smooth out any air bubbles.



- The lift should be allowed to rest for approximately five minutes.
- When removed from the surface, the original plastic cover is reapplied to the gel lift. The roller may be used to smooth the cover back over the lift. Ensure no air bubbles exist between the cover and the lift.
- The following information shall be recorded on the back of each gel lift:
 - Case number
 - Date
 - CSI's name
 - Impression number if more than one gel lift is collected
 - Address
 - Sketch if needed to show location (such as on a door)
 - Directional arrow, if applicable

When writing on a gel lift, take care to write in a corner or other part of the gel lift that does not coincide with the impression on the front, to avoid any indentation from the pen showing through on the impression.

8.6. Footwear Standards (Elimination Prints)

Some scenes where footwear evidence has been collected **may** require the collection of elimination shoeprints from victims, suspect(s), witnesses(s) and/or other individuals associated with the scene. Collection of the shoes is preferred, but not always reasonable, especially with witnesses or first responders. Several methods exist to collect elimination footwear impressions. Regardless of the method used, the footwear should always be photographed with a scale to assist the footwear examiner in discerning the evidence from the eliminations.

Two-dimensional Standards

- Coat the bottom of the shoe with the shine sponge or silicone spray.
- The shoe sole is then applied to a white sheet of paper. Apply the tread pattern with an even, firm application.
- Visually verify that the entire tread design has been transferred to the receiving surface.
- Apply black magnetic powder to the transferred impression.
- Place the paper in a paper or plastic bag, manila envelope or folder.
- Mark each standard with the case information
 - Case number
 - Date
 - Name and employee number of person making the transfer
 - Name of the person who owns/wore the shoes

Three-dimensional Standards

The use of a commercially purchased foam-type product, such as Bio-foam, can be used to obtain a three-dimensional standard. The wearer of the shoe steps into the foam and then lifts the foot out. If not already in a pre-packaged container, the foam is placed in a sturdy container that cannot be crushed.

- Mark each container with the case information



- Case number
- Date
- Name and employee number of the CSI
- Name of the person wearing the shoes

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9. Latent Print Processing

9.1. General Information

The technical basis for fingerprint identification is based on the following two premises:

- Friction ridge skin is formed on the palmar surfaces of the hands and the plantar surfaces of the feet during fetal development and will remain permanent throughout the life of the individual, except through damage by scarring or certain diseases.
- No area of friction skin on the hands or feet of any one person is the same on the hands or feet of any other person.

When the friction skin area of the palmar or plantar regions of the body is touched to a receiving surface, a reproduction of the ridges of the friction skin may be left behind on that surface.

9.2. Categories of Latent Impressions

Friction ridge impressions can be divided into three categories:

- Latent – invisible prints made by the transfer of perspiration and other secretions from the skin to a surface. Latent prints require development by physical or chemical methods. Use of the Alternate Light Source or side-lighting the target area with white light is often used to locate prints that may otherwise remain undetected.
- Plastic – visible prints made by a friction ridge impression in soft, pliable surfaces such as putty, modeling clay, etc.
- Patent – visible prints made by the transfer of a foreign material such as blood, paint, or ink, on the skin to a surface.

9.3. Scene Considerations

Surfaces shall be evaluated to determine if latent print processing, DNA swabbing, or both is appropriate. Prior contact of an item or surface by other personnel such as EMS or police officers does not negate subsequent latent print processing.

The CSI shall consider areas or items that may have been touched by the suspect(s) during the commission of the crime. This includes but is not limited to surfaces that were touched, moved, handled, damaged, etc. to commit the crime.

9.4. Powder Processing

Fingerprint dusting powders adhere to the traces of moisture and oils that are left on an object when it is touched by friction skin. Powders work best on non-porous surfaces since the moisture and oils remain on the surface and adhere better to prints that are recently deposited and/or have a greater amount of residue. Powders also adhere to deposits on items processed with cyanoacrylate vapors and are useful in making prints visible after fuming.

Hard, smooth non-porous surfaces may be dusted with fingerprint powders and any prints found may be lifted with tape and placed on latent print cards. Powders are usually used alone when processing crime scenes but are often used after cyanoacrylate fuming in the laboratory. Powders are not recommended for use on porous materials, but magnetic powder may be used in certain circumstances when collection of the item is not practical.



Dusting and lifting is not recommended as the initial processing technique for surfaces contaminated with blood, grease, oil or similar materials.

There are two categories of fingerprint powders: conventional powders that are applied with a brush and magnetic powders have fine iron filings mixed with the powder and are applied with a magnetic wand.

Select the appropriate powder for the surface. Consideration should be given to the color and type of surface to ensure good powder adherence and contrast. Powders should be checked periodically for clumping which is due to excess moisture and contamination. Unsuitable powder should be discarded.

Select the appropriate brush (Feather, magnetic, or fiberglass). Each brush should be used for only one type or color of powder. Dirty brushes do not work well and should be cleaned or replaced.

The following are recommended guidelines for latent print powders:

- Work from a portion of conventional powder in a shallow container.
- Touch only the ends of the brush bristles to the powder. The excess powder should be shaken or tapped off.
- When using a fiberglass brush, use a smooth twirling motion to apply the powder. A smooth brushing motion, like a paintbrush, may also be used.
- The fiberglass brush does not need to be loaded for each application; Powder can be added as needed.
- Excess powder should be removed from the evidence prior to lifting to prevent “fish-eye” artifacts in the latent print. This can be accomplished by using a feather or fiberglass brush to lightly brush the powder off the surface or use a puff of air.

The following are recommended guidelines for magnetic powders:

- Proper use of the magnetic wand and powders is similar to the dusting procedure for conventional powders.
- When the magnetic wand is inserted into the magnetic powder, the powder will be picked up with the tip of the wand; the powder forms a bristle-less brush.
- Only the powder should touch the surface being processed. A light, smooth stroking motion is used to guide the wand over the area to be processed. Effort should be made not to leave large gaps between the brush strokes (often creating a zig-zag effect). The powder is released from the tip of the wand by pulling up on the end of the rod.
- Remove excess powder from the work area by passing the wand over the area without actually touching the surface. A fiberglass or feather brush may also be used to clean excess powder from the print.
- While using powders, the user should watch to see how the powder is reacting to the surface.
- If no powder residue is visible on the surface, or if it is coating the surface too heavily, another powder should be tried.



- Magnetic powder shall not be used on cellular telephones, computers, tablets or any other digital multi-media device.
- Caution should be used when using magnetic powder on credit/debit cards, or any other card with a magnetic strip, as the magnet in the wand may interfere with data stored on the card. The officer or investigator should be consulted before this procedure is used.
- Various lighting techniques should be employed to ensure that all prints are visualized. This may include the use of oblique lighting, direct lighting, turning off overhead lights, etc. Often a certain angle of the light will show a print not previously visible.

Clean Powders

- Clean powders and brushes may be used to process a surface that may subsequently be swabbed for contact DNA, in areas where no friction ridge detail is developed.
- The powder must be used with a new fiberglass brush or a magnetic wand that has been cleaned with a disinfectant or antimicrobial cleaner.
- The powder must not have previously come into contact with another unclean brush or any other surface.
- A mask shall be worn when processing for latent prints that may be subsequently swabbed for possible contact DNA.

Fluorescent Powders

- Fluorescent powders are designed to work in conjunction with an ALS. They may be in powder, or magnetic powder form.
- Regular fluorescent powder is applied with a feather duster in very miniscule amounts.
- The application of powder should be so light on the surface that it cannot be seen in regular room light.
- Any ridge detail developed with fluorescent powder shall be photographed following the comparative quality photography protocol.

9.5. Small Particle Reagent (SPR)

SPR is a suspension of molybdenum disulfide (powder) particles in a detergent solution. SPR is a physical development technique where these small particles adhere to the fatty substances left in fingerprint residue. SPR is most well-known for its ability to develop latent prints on wet surfaces, such as vehicles wet with rain or dew or immersed underwater.

Spray Method

- Shake the solution thoroughly before use. Fill another bottle with water **from the supply of water located in the CSU vehicle or any other clean water source (such as tap or distilled).**
- Test spray the solution away from any evidence to ensure the nozzle is clear.
- Spray the SPR solution on the area to be searched for latent prints.
- Shake the bottle between sprays as the particles tend to settle rapidly.
- Using the other bottle with clean water, rinse the treated area and watch for the separation of water from an area with latent prints.
- Place lifting tape over the wet surface and **utilize a squeegee to remove excess water**



from underneath the tape.

- Alternatively, the area can be allowed to dry and conventional lifting techniques used to recover the print.

Additional Information

This technique is useful if there are oily prints on a wet surface. SPR is less effective on items that have dried after being wet. SPR is incompatible with porous surfaces and items that disintegrate in water solutions.

9.6. Lifting Techniques

Latent prints developed with powders are usually recovered using adhesive lift tape. Other mediums, such as "Diff-Lift", poly (stretchable) tape, gel lifters, or flexible casting material may also be utilized, depending on the powder used and the surface. These mediums should be used on curved, round and/or textured surfaces. Prior to lifting, the surface area should be cleaned of any loose powder or other debris to avoid interference with the friction ridge detail.

Adhesive tape

- Place the edge of the tape adjacent to the target area. Using light pressure and a smooth, deliberate movement, apply the tape to the target area.
- Care should be exercised to minimize the development of air bubbles. A piece of **cork or an eraser** may also be used to smooth the tape over the surface.
- Multiple prints in close proximity to each other may be collected on the same lift.
- Remove the tape from the target area and place it onto a latent lift card.
- In some instances, multiple lifts of the same print may be needed to achieve the best detail and clarity. If multiple lifts of the same area are taken, the lifts should be labeled "Duplicate lift 1 of 2" "Duplicate lift 2 of 2, etc."

9.7. Plastic and Patent Prints

These prints shall be photographed using comparative photography techniques, before any recovery attempts are initiated. If possible, recover the entire item or portion of the item containing the print. Flexible casts or gel lifts may also be utilized to attempt a recovery.

9.8. Latent Print Cards

Before clearing the scene, the following, at minimum, shall be completed:

- The case number shall be written on at least one latent print card AND the outside of the envelope.
- Sketch and description of item/location from which the print was lifted should be written on every card. Place an "X" on the sketch to indicate from where the print was lifted.
- Up or other orientation arrow should be on each card.
- No letter or numeric designation shall be written on the side of the card containing the latent lift.
- Envelope shall be secured in such a manner to prevent loss, damage, or change to the contents.



Before submission to the HPD Property Room, all cards shall be completed with all required information **listed on the cards**. Adhesive labels may be used to record the case information that is normally recorded by hand. The same information that is required on the card must be on the label.

“CSI” in red ink should be written or stamped on the envelope.

Latent lifts which may contain blood or another biohazardous fluid must be marked **with “biohazard” or “visible blood”**. This may be handwritten or a sticker may be used if it does not cover any part of the lift tape. The envelope shall also be marked as biohazard.

9.9. Photography

Latent prints should be photographed whenever the surface does not typically lend itself to successful lifting or if the CSI has any doubt that the lift will be successful. This can be a textured surface such as a wall or a door.

If applicable, photograph the overall scene with markers for the fingerprints in place to orient the prints to the item on which they are located or to the scene itself (such as on a wall or doorframe). Latent prints developed on surfaces that will not be collected, such as a wall, shall be labeled with a letter designation prior to photography.

- A tripod or other stabilization device shall be used.
- All comparative quality images shall be digitally captured using the RAW + JPG or TIFF + JPG setting on the camera.
- Aperture should be set at F-8 or F-11.
- ISO 100 should be used.
- If practical, use a macro lens, extension tube(s) or other macro device(s).
- The following information should be visible in the first image:
 - **Agency case number.**
 - **Photographer’s name or initials.**
 - **Item description and orientation, if applicable.**
 - **This information must be annotated on a copy of the image if not in the first image.**
- Ensure the image plane of the camera is parallel to the plane of the impression. An angle finder can be utilized for this purpose. Obtain the angle of the impression as well as the angle of the image plane.
- Place a scale of measure near the friction ridge detail of interest, leaving a small gap between the scale and the ridges.
- Take overall photographs of the item with the scales in place.
- **Fill the frame as much as possible with the latent print and scale.**
- Different angles of flash or no flash at all may be necessary to properly expose the image.



10. Biological Evidence

DNA is found in all the nucleated cells of the body. This includes cells found in blood, saliva, semen, vaginal secretions, skin, perspiration, ears, nasal secretions, bone, and hair. Oftentimes, a DNA profile can be obtained from less than one nanogram of a DNA sample. That is equivalent to fewer than 150 cells, which can be found in a bloodstain the size of a head of a pin. This means that DNA profiles can be obtained from a variety of types of evidence and that the potential presence of DNA should be evaluated based upon the normal use of an item, even if there is no visible stain. An example of this is a drinking glass, where DNA may be recovered from the rim that comes into contact with the mouth or a hat where DNA may be recovered from the interior band that comes into contact with the wearer's head.

10.1. Safety and Contamination Precautions

Safety Precautions

Always assume the presence of blood and other biological evidence when handling evidence. Notify a supervisor immediately if you suspect you have been exposed to blood or bodily fluids. Treat all human blood and bodily fluids as if known to be infectious.

Contamination Precautions

Because of the extreme sensitivity of DNA testing, care and caution shall be used to prevent carryover and cross contamination. Precautions include:

- Clean nitrile gloves shall be worn when collecting or handling biological evidence.
- CSIs shall wear a suitable mask when working near DNA-bearing evidence, e.g., evidence with known/suspected biological material that may be subjected to DNA testing.
- Gloves shall be changed whenever the wearer may have introduced their own or other DNA to the area (coughing, sneezing, touching hair, pens, etc.).
 - DNA on gloves is a common source of contamination.
 - Gloves shall be changed when collecting items that may contain
 - DNA, such as clothing.
- It is not required that gloves be changed while using swabs to collect evidence (such as possible blood on a wall or a door), as long as no evidence items are handled.
- CSIs without a mask shall refrain from being near DNA-bearing evidence, or whenever such material is being collected, processed, or packaged.
- When possible, the collection of DNA/biological evidence should be completed near the onset of the evidence collection portion of the examination to prevent unnecessary contamination.
- Sterile, clean, or disposable collection and packaging instruments shall be used for each item of DNA/biological evidence collected.
- Disposable collection equipment shall be properly discarded after use.
- Whenever possible, collect and/or process evidence associated with victims separately from evidence associated with other subjects.
- Ensure packaging material, such as the flaps on the swab box, or the inside of a paper bag does not come into contact with bare hands or gloves that may have other sources



- of DNA on them.
- Package evidence to avoid direct contact between specimens or the diffusion of liquids or aerosols.
- Wet items should be hung on plastic hangers and shall be placed in the drying cabinets.

10.2. Searching for Biological Fluid

Bloodstains at a recently committed crime scene will usually be obvious and easy to see, such as pools of blood, a trail of blood drops, smeared blood, and cast-off spatter on walls. Other areas to search where the presence of blood is not so obvious are sink traps, underneath furniture, carpets, baseboards and behind doors.

Bloodstains on dark colored objects such as wood floors, furniture, or clothing may be difficult to visualize. Oblique lighting or the use of an Alternate Light Source (ALS) may be used to visualize or enhance the appearance of bloodstains. Blood will appear as dark stains when using an ALS.

10.3. Semen, Saliva and Urine Stains

These stains will show a varying degree of fluorescence with different wavelengths of light depending on the background. Semen stains typically are more fluorescent than urine and saliva stains and will be smaller and more concentrated. Semen stains may be crusty and somewhat stiff and may also be detected using visual techniques.

Urine and saliva stains are generally larger and will have a faint fluorescence with slightly more fluorescent edges. **Fluorescing areas of interest on items that are collected by CSIs should be circled with a Sharpie or other type of permanent marker.**

10.4. Collection of Biological Material

Advances in DNA technology have made testing very sensitive; thus, evidence collection techniques need to be performed in such a manner as to prevent contamination of the evidence prior to laboratory analysis. The following biological evidence collection methods should be considered. Prior handling of an item by fire, EMS or police personnel does not negate subsequent DNA swabbing.

Collect the entire item on which the evidence is located. This is the preferred method for clothing or other items made of fabric that can be easily collected and packaged, such as a hat.

Collect a cutting of the stain/material. This is a reasonable course of action when dealing with large furniture, vehicle upholstery, area rugs, carpeting, etc. If processing under a search warrant, destruction of property in the course of collection of these items is covered by the court order. If the search is performed under consent, then the investigator shall be notified of potential damage prior to the evidence collection.

Collect a swab(s) of the stain/evidence. Moisten a sterile cotton swab using only enough sterile water to collect the sample (usually one drop.) Do not over-saturate the swab, as this will dilute the sample. Roll the moistened tip of the swab through the sample until it appears saturated or



until the entire sample has been transferred to the swab. Concentrate the sample on the tip of the swab. Swabs from the same sample are packaged together. Place the swabs into a cardboard swab box, then in a paper envelope.

If the biological evidence is dried, it can be scraped with a sterile scalpel onto a piece of filter paper, folded into a bundle or "pharmacist fold" and secured in an envelope.

Special instructions for biological evidence collection:

- Wet biological evidence or wet articles shall be dried prior to being placed into final packaging.
- It may be necessary to place wet evidence into plastic packaging for transportation purposes; however, it shall not be completely sealed and shall be removed from the plastic as soon as possible and placed in a drying cabinet.
- When applicable, visible trace evidence should be collected from these items before they are packaged and transported.
- Items saturated with decomposition fluid will be allowed to dry for as long as practical, packaged and submitted to the HPD Property Room to be stored as frozen. Item should be examined for any trace evidence, if needed, before packaging.
- Ensure the Property Room personnel know to freeze the item(s).
- Items that are typically placed in plastic containers for safety reasons (such as knives) that are contaminated with a biological fluid shall be packaged in rigid porous containers, such as a box.
- The box can be wrapped in paper to prevent flakes from escaping through openings.
- The package shall be labeled with the appropriate warnings (sharps, biohazard, etc.).

Condoms

Any contents of the condom can be emptied into a specimen cup or other plastic container with a lid. The condom itself shall be placed into a separate plastic container with a lid. The containers shall be placed in a paper bag or envelope.

The outer container shall be marked "Store Frozen." When submitting to the HPD Property Room, ensure the Property Room personnel know to freeze the items.

Bloodstain Sampling

- A minimum of one swab sample should be taken from each observable pattern at the scene.
- For lengthy blood trails, a minimum of three swab samples should be taken (beginning, middle, and end of the trail).
- When a trail has large gaps, it may be necessary to take additional swab samples of additional pattern areas due to the possibility of multiple bleeders.
- If a pattern displays another pattern or stain that does not appear to belong to the original pattern, the entire area shall be documented in case notes and photographs, and samples taken from relevant areas.
- **If a swab sample of possible blood is collected from an item of clothing, the area from**



which the sample was taken should be circled with a Sharpie or other permanent marker.

10.5. Known DNA Samples (Buccal Swabs)

Buccal swabs are collected at the directive of the law enforcement officer and consent or a search warrant must be obtained. The donor's name and date of birth are documented in the case notes and written report.

Use appropriate PPE when handling and/or collecting known DNA samples. Using two sterile cotton swabs, rub the inside of the subject's cheek for approximately 15 seconds.

Buccal swabs shall be packaged separately from evidence swabs. Buccal swabs from more than one individual shall be packaged separately. Place the swabs in a cardboard swab box, label, and package appropriately.

10.6. Touch/Contact DNA Samples

Areas that are suspected to contain DNA but have no visible staining can be swabbed for possible contact DNA. These could be suspected touch DNA on handled items, such as a steering wheel, grip of a gun, or saliva/mouth-associated items such as the rims of drinking glasses, bottle mouths, etc.

- Moisten one sterile cotton swab with a small amount of sterile water (usually one drop). Avoid over-saturating the swab.
- Rub the moistened tip of the swab on the item, being cautious of areas that may be processed for latent fingerprints.
- Follow the same path with a dry swab.
- Package the swabs together in a cardboard swab box, label, and package appropriately.

11. Presumptive Tests

Presumptive tests are used to determine the **possible** presence of a suspected substance such as blood or semen. The Crime Scene Investigator will use their discretion when determining the need for presumptive tests. The CSI shall follow all universal precautions when working with suspected bodily fluids. The test should only be used when sufficient sample exists for testing and collection. If the stain appears to be diluted, the CSI shall collect the item or sample for further laboratory testing.

11.1. Phenolphthalein

The phenolphthalein reagent is used to **presumptively determine if a substance** is blood. The reagent reacts with the heme component in blood resulting in a color change to pink. Positive and negative control tests are conducted before testing the suspected blood. Record all lot numbers in the case notes. Control tests serve as an assessment to detect any deterioration **of chemicals present in the reagent**.

For a Positive Control:

- Moisten a sterile cotton swab with either distilled water or Solution A in the blue-capped bottle.
- Rub the swab on a known bloodstain.
- Apply 2-3 drops of Solution B (Phenolphthalein) in the red-capped bottle to the swab. Wait a few seconds to ensure there is no color change.
- Apply 2-3 drops of Solution C (Hydrogen Peroxide) in the yellow-capped bottle to the swab.
- A bright pink color change within a few seconds indicates the presence of blood and a satisfactory positive control test.

For a Negative Control:

- Moisten a sterile cotton swab with distilled water.
- Apply Solutions B and C (described above) to the swab.
- No color change indicates a satisfactory negative control test.

Procedure for Testing

- If the stain is dry, moisten a sterile cotton swab with distilled water. If the stain is wet, there is no need to moisten the swab.
- Roll the swab in the area of suspected blood.
- Follow the procedure listed above.

Interpretation

- Positive result: A pink color change within a few seconds.
- Inconclusive: A very slow or undeterminable color change.
- Negative: no color reaction.

Case Notes

- Phenolphthalein is a presumptive test and substances other than human blood may yield a positive reaction. These include most animal blood, some metal ions, bleach, some



dyes and other compounds.

- Do not collect or re-use the swab used to obtain the control test sample.
- No conclusions shall be made as to the donor of the blood.
- Blood is not always a red or reddish-brown colored stain. Due to the environment, it may be a different color such as black or green and **this** should be taken into consideration.
- This is only a presumptive test. Confirmation requires further testing.

Collection

If a positive presumptive test result is obtained, the CSI shall collect a separate sample from the same stain or another stain in close proximity.

All bottles that comprise the phenolphthalein kit shall be labeled with:

- The name of the solution.
- The preparation or expiration date.
- Lot number.
- Hazard warnings, where necessary.

Phenolphthalein chemicals are purchased as individual chemicals, so no preparer's name or concentration is necessary for labeling.

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12. Trace Evidence

Trace evidence transcends a variety of evidence genres and can include, but is not limited to: hairs, fibers, soil, dust, glass, paint and polymers, biological material, lubricants, building materials, tapes and adhesives, plant material, geological material, fire debris, and unknown substances. While the name “trace” implies a small amount, trace evidence may range in size from easily visible to microscopic.

12.1. General Collection Guidelines

- Appropriate PPE shall be utilized when collecting trace evidence to minimize the potential for contamination.
- Always keep known standards separated from samples and/or the materials to be searched.
- A visual examination of the evidence item should be conducted prior to moving the article or obtaining any collection from the article.
- Trace evidence can be collected using a number of methods, depending on the circumstances.
- Items of evidence that are to be examined for trace evidence shall be packaged separately and appropriately to protect the trace evidence.
- An item to be examined for trace evidence must be placed on clean butcher paper. This paper must also be collected after the examination and evidence collection is complete.

It is not the intent or **even possible** to collect every particle of trace evidence (e.g. hair, fibers, etc.) adhering to an object, but rather to collect a representative sample of the trace evidence. Every attempt should be made to collect any particles, hairs, etc. which are visible to the naked eye.

However, when a significant sample exists, and it is not reasonable to collect every particle, a sufficient representative sample will suffice.

12.2. Trace Collection Techniques

A variety of methods may be used to collect potential trace evidence. The selection of a particular method will depend upon variables such as the evidence type and the collection surface.

Particle Pick

Particle pick is the use of gloved fingers or equipment such as tweezers, forceps or a similar collection tool to pick small particles off an object.

Particle picking is the collection of specific particles found either with the naked eye or low power magnification. This technique is generally used for the collection of loose hairs, fibers, paint, glass, vegetation, etc.

Adhesive Tape Lifts

Adhesive tape lifting is useful when collecting trace evidence that is not readily visible and is the recommended technique for recovering potential trace evidence from surfaces such as



upholstery, clothing, and carpet.

This method is not recommended for surfaces that will strongly adhere to the tape lift adhesive (e.g. paper products, cardboard, etc.). Clear fingerprint tape should be used for the collection of hairs and fibers.

The tape may be used as a strip, or folded around the hand in a circle, with the adhesive side out. After the evidence is collected onto the tape, the tape is placed into a clean plastic bag with the sticky side(s) of the tape against the plastic.

The tape should not be wadded up or folded with the sticky sides together and more than one piece of tape can be used on the same item and placed in the same bag.

Scraping

Scraping utilizes a spatula, wooden dowel rod or other scraping tool to scrape an article in an attempt to loosen particulate debris and catch it as it falls onto clean paper.

This method is useful to collect soil and debris. Scrapings should be stored in clean paper or in clean vials if the soil is dry.

12.3. Hair and Fiber Reference (Known) Samples

Reference (known) samples are necessary to perform comparisons to potential trace evidence samples collected at crime scenes. When obtaining reference samples, a sufficient amount of material should be collected. A description of the reference sample, such as source, location, color, condition, etc. should be recorded in the case notes.

Head Hair Samples

- Collect approximately 25 hairs from 5 different areas of the scalp: center, front, back, and both sides.
- Hairs must be pulled by firmly grasping the hair near the root and pulling it quickly. Hairs that are cut are not appropriate standards.
- Loose or shedding hair may be collected by combing the entire head and conducted over a clean piece of paper or envelope to collect dislodged hairs.
- Loose hairs may also be collected by using tweezers.
- Hairs shall be securely packaged to prevent loss or contamination.

Pubic Hair Samples

- Collect approximately 25 hairs from different areas of the pubic region.
- Hairs must be pulled by firmly grasping the hair near the root and pulling it quickly.
- Loose or shedding hair may be collected by combing through the pubic hair of the subject and conducted over a clean piece of paper or envelope to collect dislodged hairs.
- Loose hair may also be collected using clean tweezers.
- Hairs shall be securely packaged to prevent loss or contamination.



Fiber Standards

Fiber comparisons can be performed on both natural and synthetic fibers. A potential fiber source may have one or more different kinds and colors of fibers present, and the differences may only be apparent using microscopic or instrumental techniques.

It is important to obtain a fiber standard that adequately represents all of the fiber types present in the potential source.

When possible, collect the entire item. If the entire item, such as a vehicle or furniture, cannot be recovered, use the following method to collect a known fiber sample:

- Cut a representative sample from various areas of the object.
- Collect samples that are visually different (e.g. different colored areas, faded areas due to sunlight, areas or sections that show signs of wear, etc.). Ensure the backing material is also recovered.

12.4. Paint

Paint comparisons are performed on a variety of paint types including, but not limited to, automotive paints, architectural paints, spray paints, etc. A potential paint source, such as a vehicle, may have one or more different kinds and colors of paint present, and the differences may only be apparent using microscopic or instrumental techniques. Therefore, it is important to obtain paint standards that adequately represent all the paint types present on a potential source.

Substantial variations in paint thickness and layer sequences on an object can occur. This is particularly true for vehicle paint where curves, corners and edges may have been subject to previous damage, sanding, or overpainting. If appropriate, known paint samples should be collected from these areas. When contact between two painted surfaces is indicated, the possibility of cross-transfer must be considered. Collect both objects or paint standards from both surfaces.

The CSI should consider the possibility that the physical match between paint chips to the source may also be relevant, when determining how to collect paint standards. When possible, collect the entire item.

If paint transfer is located on another painted surface, such as an automobile body, collect a paint standard from an area close to, but not within, the area of damage. When processing a vehicle or scene and a request is made for physical match comparison, collect all the damaged vehicle body components with paint transfer, rather than attempting to remove paint samples and standards.

To collect a sample or standard, use a clean razor blade, scalpel, or knife to gently pry, carve or chip the paint from the surface down to the foundation or substrate. If possible, do not remove the paint by scraping as all paint layers may not be represented and/or the layer structure may be destroyed.



Collect a sample approximately 1"x1" from a particularly damaged area, when possible. Collect paint standards near each damaged area in the same manner.

A description of the paint standard or sample must be recorded in the case notes, including from where it was collected.

12.5. Soil and Pollen

Soil can assist the investigator in associating certain persons or objects with specific places. Soil, dirt, and dust are common elements at almost every crime scene. Samples of soil collected from clothing, skin, hair, shoes or car of a victim may prove useful in linking the victim with the location where the crime occurred. The same would be true of any suspects thought to be associated with a crime. Mud found on a stolen vehicle or a vehicle used in a crime could link the vehicle with the scene or place from which it was stolen. Dirt found associated with other objects or types of conveyances (i.e. airplane, bicycle, motorcycle, etc.) thought to be associated with a crime may also yield pollen evidence useful in linking those items with a specific crime or specific geographical location. Examples of where these types of soil, dirt or dust samples should be collected are numerous. Professional judgement and awareness of what type of data one might hope to recover from soil/pollen samples should be a primary guide for collection. In addition, steps must be taken to ensure the samples do not become contaminated.

Soil Sample Collection

- Known samples – collect a few tablespoons of soil. Allow to dry and place in a sealed glass container.
- Clothing – allow soil to dry and package in a separate paper bag or other porous container.
- Implements should be placed in paper bags or another porous container. Paper may be used to wrap around any dried mud and taped down to prevent loss.
- Vehicles – search tires and wheel wells. Carefully remove any clumps in a manner that would prevent crushing.
- Residences – samples should be collected near points of entry or shrubbery where a subject could hide. Samples should also be collected from pathways leading to the residence.

12.6. Gunpowder Residue

When a firearm is discharged, unburned and partially burned particles of gunpowder, gas, soot, metallic particles and vaporized metal are propelled out of the barrel along with the bullet toward the target. If the muzzle of the weapon is sufficiently close, these products will be deposited onto the target or surrounding area of the shooter. It is the distribution of gunpowder particles and other discharge residues around the bullet hole that permits an assessment of the distance from which a firearm was discharged.

Clothing from the victim should be carefully preserved to prevent damage or disruption to



powder residues deposited around the bullet or shot shell component holes. Avoid cutting or tearing clothing in the area of these holes. Clothing from a suspected shooter should be considered as an option for further testing. Each item of clothing should be packaged separately in paper. If it is necessary to fold an article of clothing, place a piece of paper over the article to prevent contact and reduce the possibility of transferring residues to other areas of the clothing.

Gunshot Residue (GSR) Kits

Gunshot residue collection procedures shall be performed in accordance with the manufacturer's instructions provided in the GSR kit. The kit should be utilized on a live subject as soon as possible and preferably within a four (4) hour window of the incident.

The Gunshot Residue Analysis form included in the GSR kit shall be completed.

- The original document is submitted with the kit and a copy is retained in the case record.
- The section "Write a brief description of the subject's activity..." shall not be completed by CSU personnel.
- When a subject's hands are not conducive for GSR collection (i.e. the subject washed his/her hands, covered in blood, etc.), the clothing may be collected as an alternative.
- The CSI shall confer with the investigator regarding clothing collection.

Gunshot residue can also be collected from items such as a car door. Each adhesive lift stub can be used for up to 100 pats or taps. The four (4) hour window is not required for material items.

Gunshot residue kits shall not be utilized on deceased persons within Harris County. A kit may be utilized on death investigation cases in other counties where a representative from the Medical Examiner's Office is not responding. However, this will only be done at the request or approval of a criminal justice official with the outside agency.

12.7. Ignitable Liquids and Ignitable Liquid Residue

Ignitable Liquids (ILs) and Ignitable Liquid Residue (ILRs) can be readily lost through normal evaporation if not packaged properly. Liquids should be transferred to a glass container with a secure lid. The container should be sealed across the lid with evidence tape and the bottle properly labeled. The container should then be placed into another ridged container, such as a box. The box should be marked with arrows to indicate the proper orientation of the glass container.

If only a small amount of liquid is present but there is reason to warrant transferring it to another container (e.g. DNA and/or LP requests on the original container), the glass jar may be sealed in an arson can or bag. The latter should then be placed inside a ridged container and marked with arrows indicating proper orientation. If an item appears to contain an ILR but there is not enough to transfer, the items should be sealed in an arson can or arson bag.

13. Firearms

Firearms are frequently encountered at crime scenes. CSIs should therefore understand the steps necessary to properly document and collect firearms-related evidence.

13.1. Safety

The first consideration is always safety. Firearm handling prior to DNA collection shall be as minimal as possible, while remaining safe. The following procedures assume some familiarity with firearms and their operation and are intended as a reminder and reference. These procedures are not to be the sole source of firearms safety and handling training.

13.2. Documentation

Document the location of the firearm with notes and photography. If the firearm has been moved prior to CSU's arrival, document this information in the case notes, and photograph the gun in its current location.

Items to document may include:

- Hammer position (cocked, not cocked).
- Position of safety.
- Position of slide/breech bolt (closed, locked open, jammed).
- Visible damage.
- Visible trace evidence (blood, tissue, hair).
- Magazine in or out, or not fully inserted.
- Cartridge, cartridge case, or nothing in the chamber.
- Cylinder position of revolvers should be marked on both sides of the top strap, using a permanent marker.
- The cylinder contents can be documented by photography or a cylinder diagram. Indicate the brand of cartridge or cartridge case in each chamber and whether it is fired or unfired.

13.3. DNA Swabs

All firearms shall be swabbed for contact DNA **and should be done** prior to collection. This may not include firearms belonging to officers. See section 13.8 for more information.

In most cases, the textured areas of a firearm, excluding the trigger, can be swabbed for contact DNA prior to making the gun safe. This will depend on the location, position and condition of the firearm. The CSI shall use their professional judgement to determine if DNA collection can be done safely.

The firearm shall be swabbed for contact DNA, even if it has been moved, unloaded, made safe and/or collected by an officer or other person. Cartridges in the magazine shall be swabbed for contact DNA prior to being ejected from the magazine.

- This process should be completed at HFSC if possible, rather than at the scene.
- **Handle the magazine in a manner to preserve any latent prints.**
- Utilize one wet followed by one dry swab for all visible areas of the cartridge while it is seated at the top of the magazine.



- Eject the cartridge and use the same two swabs for the next cartridge.
- Continue until all cartridges have been swabbed and removed from the magazine.
- The textured areas of the magazine, such as the bottom, may also be swabbed.
- The smooth areas should be preserved for latent print processing.
- A swab sample of any visible blood on a firearm shall be collected.
- The visible blood on the firearm shall be swabbed separately from contact DNA (if possible) and labeled as such.

13.4. Transport

If possible, firearms shall be “made safe” (unloaded) prior to transporting. If it is not possible or advisable to unload the firearm, it may be transported to the Firearms Division or secured in a locker on the 1st floor of 1200 Travis St.

- Zip-ties or other accepted mechanism shall be used to keep the cylinder or ejection port from closing.
- Secure the firearm in an appropriate container.
- Do not place anything in the barrel of the firearm or through the trigger guard.

Firearms and all components collected from underwater should be packaged in a watertight container, submerged in the same water from which the gun was collected. The firearm and components do not need to be swabbed for contact DNA. The container(s) shall be transported to the CSU laboratory. During regular business hours, contact the Firearms Section to take custody of the container(s). After business hours, secure in a locker on the 1st floor of 1200 Travis St.

13.5. Cartridges and Cartridge Cases

A cartridge is a unit of ammunition, consisting of the cartridge case, powder charge, and projectile (e.g. bullet, shot pellets, etc.). The cartridge case is what remains after the cartridge is fired.

Cartridge cases are generally described by the head stamp. This information is stamped on the head of the cartridge case and may include the manufacturer and caliber. Additional photographs of the headstamp shall not be taken in the lab, unless approved by a supervisor.

Location

- The location of the cartridge cases at a crime scene may have significant value and the locations shall be documented.
- Each cartridge case on a crime scene shall be marked with individual evidence marker numbers.
- Cartridge cases in vehicles do not require evidence markers unless there is more than one case in a similar location, such as the passenger seat.

Packaging

- Cartridge cases shall be packaged separately in coin envelopes or similar packaging.
- Each envelope shall contain the evidence marker number or identifying information regarding the location from which it was recovered.



13.6. Projectiles and Possible Bullet Holes

The location of any bullet holes shall be noted and photographed. Photograph any projectiles lodged in the hole.

Recovery should minimize the handling of the projectile. An important factor in projectile recovery at a crime scene is that further damage to the surface of the projectile may limit or prevent the comparison of the projectile to a particular firearm. Projectiles should not be grasped with metal tools if at all possible. When possible, remove the material from around the projectile until it is free. The substrate (wall, windowsill) can also be cut out with the projectile lodged inside and brought to HFSC for extraction. Care should be taken to preserve trace evidence that may be on the projectile from previous impacts (such as blood or hair).

Projectiles or other metal fragments with sharp edges should be packaged in a plastic bag (not sealed) and placed into a coin envelope (sealed). This envelope may then be placed in a larger envelope for submission to the HPD Property Room.

Labeling Bullet Holes

Labeling systems consist of numbering, lettering, and written descriptions. The purpose of labeling is to have a means for accounting for evidence and locating points along the projectile path, both in the sketch and photographs.

Label all bullet holes within reasonable reach. The labeling scheme shall be as follows:

- Letters are used for bullet holes.
- The first hole of the series shall have the first number of the series (if there is one) written after the letter.
- Subsequent holes that follow the same trajectory, such as the interior and exterior of a car door, will be subsequently numbered (A1, A2, A3, etc.).
- Bullet holes with an uncertain origin or trajectory shall be labeled with the next letter, and not of the subsequent number of the previous letter.
- The entry/exit path of windows, blinds, etc. do not need to be labeled on both sides. Only the entry side needs to have a letter marker.
- Any holes that cannot be reached due to height and/or location shall be photographed and documented in the case notes.
- If a hole is through and through, and the exit can be reached (such as entry into the outside wall of a second-floor apartment and exits into a bedroom,) then the interior hole will be labeled with the appropriate letter and the number 2.
- Notations for how each hole is labeled shall be included in the case notes.

All general photography, with and without labels, shall be completed before utilizing any trajectory rods.

Measurements



Appropriate measurements of the location of cartridge cases, projectiles, and bullet holes shall be taken, to place items within the scene and to assist with the creation of a final sketch.

13.7. Biohazard Labeling

The packaging of any firearms evidence contaminated with any biohazardous substance shall be marked with a biohazard sticker or handwritten.

The packaging of any firearms evidence that does not contain any visible biohazardous substance should be marked with the letters "NVB" (no visible blood) either handwritten or stamped.

13.8. Officer Involved Shootings

The following documentation is completed for officer-involved shootings where the officer fired his/her firearm:

- Photograph the officer(s) involved, noting any injuries, debris, signs of struggle, or any other abnormalities.
- Chart (document) all firearms and ammunition in the officer's possession. This includes make, model, serial number, accessories, etc.
- The CSI may unload the firearm or ask the officer to do so.
- Document and photograph the ammunition's information and position in the firearm and the magazine, including the number of cartridges in the magazine and the capacity of the magazine.
- When possible, utilize ammunition trays to contain cartridges for during the documentation process.
- Document any other weapons, to include less-than-lethal, that were utilized.
- The officer's firearm may be swabbed for contact DNA when warranted.
- The CSI shall swab the firearm when there is visible biological evidence, or the officer advises that the suspect may have touched the firearm.
- Unless otherwise instructed, return all component(s) to the officer.
- Any deviation due to the condition of the officer or weapon, or at the direction of the requesting agency, shall be documented in the case notes.

14. Drying Cabinets

Drying cabinets are temporary storage locations which allow wet evidence to be secure during the drying process. The air flowing through the cabinet is circulated through an activated HEPA filter. Wet evidence must be fully dried before packaging.

14.1. Maintenance and Use

Evidence placed in the drying cabinets shall be handled in the following manner:

- All personnel shall wear gloves while handling contaminated items.
- The cabinet shall be cleaned before and after each use to prevent cross-contamination of evidence using an approved disinfectant or an 80/20 bleach solution.
- Allow the solution to sit for approximately 60 seconds and then wipe the area clean and dry thoroughly.
- Place a clean piece of butcher paper at the bottom of the cabinet before adding evidence.
- Evidence from the same case can be placed in the same drying cabinet, unless the evidence is obtained from different subjects.
- Items in the drying cabinet shall be spread out in a manner that will facilitate rapid drying.
- The internal fan must be on and working correctly, as it assists in the drying process. The internal fan shall be “on” anytime evidence is in the drying cabinet.
- The drying cabinet is equipped with a low airflow alarm. If the alarm sounds, turn the unit off and wait one minute before re-starting. To ensure proper airflow, make sure all door twist handles are positioned properly.
- Any drying cabinet containing evidence shall be secured with an integrity tag.
- Document the placement and removal of items on the drying cabinet log, which is affixed to each cabinet.
- The CSI shall closely monitor the drying process of the items in the cabinet. When the items are dry, they will be removed and either placed in a locker or packaged and submitted to the HPD Property Room.
- Dry contaminated materials will be properly packaged and placed in a container properly marked with biohazard warnings, before being submitted to the HPD Property Room.
- Each cabinet is equipped with an alarm that indicates when the HEPA filter needs to be changed.
- Pre-filters in the door and interior top of the cabinet should be changed approximately once every 90 days.
- **If the drying cabinet is not functioning properly, hang an “out of order” sign on the door and inform a CSU supervisor.**

14.2. Other equipment

Only plastic hangers are used in the drying cabinets. If metal clips are used to facilitate the hanging of certain items, they shall be discarded after use.

Hangers shall be cleaned with approved disinfectant or a 20% bleach solution after each use. Any other non-disposable equipment used at a scene, such as placards or cones, that may have been contaminated with biological fluids, shall be cleaned and disinfected prior to re-use. Disinfectant



wipes or alcohol wipes may be used on camera or other equipment, when spraying or immersion is not practical.

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15. Processing Vehicles

During a criminal investigation, the CSI may be called upon to process a vehicle for physical evidence relating to a crime. This vehicle may or may not be the primary location of the crime and should be treated as a crime scene and given the same attention as a primary scene. The evidence inside a vehicle may yield information valuable to solving the investigation or identifying people involved with the offense. The type of evidence that should be searched for in a vehicle will be dependent on the type of crime being investigated and the involvement of the vehicle in the offense. It is important for the CSI to establish a specific and organized approach to processing a vehicle. The CSI shall attempt to contact the **requesting officer** to obtain relevant information to sufficiently and thoroughly process the vehicle. If no response is received by 48 hours after the CSI completes processing, the vehicle may be released.

15.1. Vehicles at the Scene

Confirm with the **investigating officer** if the vehicle needs to be processed at the scene or if processing will take place at the VEB.

For vehicles being towed, document and photograph how the vehicle was found, **including the condition and placement of the vehicle at the scene.**

Photograph and document the following:

- All four sides of the vehicle and the license plate.
- Any damage to the vehicle, including bullet holes, broken glass, and any damage caused by a collision. Damage caused by a collision directly related to the scene shall be photographed with a vertical scale of measure.
- Any debris from a collision or damage caused by the collision involving traffic controls, another vehicle, landscaping, etc.
- Any fluids, such as blood or engine fluids, on or around the vehicle or the ground.
- Items of possible evidentiary value in plain view inside the vehicle.

In some cases, the specific location of a vehicle may be of important evidentiary value. In these cases, specific measurements to place the vehicle at the scene should be collected.

To properly place a vehicle at a specific location, two sets of measurements, a north/south and an east/west measurement, should be taken from at least two points on the vehicle. These measurements should be taken from fixed and permanent areas of reference at the scene.

Any transient evidence or details regarding the condition of the vehicle should be noted, such as:

- Windows up or down.
- Exterior wet/dry/condensation present.
- Odors present in the vehicle.
- Position of the gearshift.
- Tire/wheel condition.
- Steering column intact/damaged.
- Lights on/off.



Secure and/or protect any evidence that may be lost or destroyed during transport. **This includes evidence on the vehicle itself, such as cartridge cases near the windshield wipers.** Tape may be used to secure shattered glass that is intact in the window frame. A tarp may be used to secure evidence inside the vehicle if all windows are down/broken, etc.

When vehicles are processed at the scene, follow the procedures listed in 15.2 as applicable to the type of processing needed and within the limits of legal authority.

15.2. Vehicle Examination Building (VEB)

The Vehicle Examination Building is controlled and staffed by City of Houston employees. Vehicles are towed to this location under the authority of HPD officers. HPD officers or detectives are responsible for securing a warrant or consent to search and providing information to HFSC regarding the processing desired.

Employees who are assigned to the VEB are responsible for ensuring all required paperwork for the vehicle search is present and available. These employees are also responsible for updating the VEB's vehicle log. This log contains the vehicles that are pending, ready for processing, and completed.

HFSC employees are responsible for retrieving and inspecting the paperwork for the vehicle they have been assigned to process. If the information regarding the processing of the vehicle is incomplete or unclear, it is the responsibility of the CSI to contact the requesting officer or detective for clarification. The CSI shall document any contact with the investigator and resulting conversations in the case notes.

15.3. Damage

Document in the case notes any interior or exterior damage to the vehicle. Exterior damage should be examined for potential paint transfer evidence. Glass or plastic from broken headlights or taillights, or other relevant automotive parts, **can** be collected and preserved for physical matches to vehicles or vehicle parts collected at associated scenes.

In cases of burned vehicles, collection of samples may be necessary to determine if any accelerants were utilized. These samples should be placed in the appropriate container and sealed.

15.4. Photography

Photographs at the VEB shall include photographs from all four sides of the vehicle, license plate, and any decals or custom accessories.

Overall, mid-range, and close-up photographs should be taken of any **relevant** damage to the vehicle, **including bullet holes with and without labels and scales of measure**, as well as evidence in, on, or **under** the vehicle.



The photographs of the interior of the vehicle include:

- All passenger areas.
- Trunk.
- Consoles.
- Glove compartment.
- Door pockets.

When applicable, other areas of note may include the gas tank door opening, under the hood, or the undercarriage.

For traffic collisions, include images of the interior safety devices such as air bags, seat belts, child seats, etc. to document their presence and condition.

Photographs shall be taken of any damage caused by CSIs during the recovery of evidence. This may include but is not limited to: removal of door panels or cutting of seats or carpet.

15.5. Evidence Collection

An organized and systematic approach needs to be established to search a vehicle. The vehicle may be searched and processed in any order that suits the CSI, as long as the search is systematic and meticulous and does not result in cross-contamination. A bright white light and an Alternate Light Source (ALS) should be used when searching for trace evidence or body fluids.

All areas of the vehicle that are relevant to the crime and included in the consent or warrant should be searched. Some investigations may require a whole and complete search. This may include, but is not limited to:

- Underneath the exterior of the vehicle.
- Under the hood.
- Inside the trunk.
- Underneath and alongside the seats.
- Inside compartments.
 - Glove box, interior door pockets, center console, ashtray, seatback pockets, etc.
- Underneath visors.

Exercise caution when searching poor visibility areas. A small mirror and flashlight may allow the CSI to search these areas and reduce the risk of exposure to hazardous materials.

Fragile Evidence

As with any scene processing, the CSI should give immediate attention to the most fragile evidence prior to completing a full search of the entire vehicle. Evidence may become fragile with the passing of time, exposure to elements or environmental factors, movement and improper handling. Trace lifts should be done upon initial entry into the vehicle, when applicable.

Possible Blood



Possible bloodstains located inside the vehicle should be documented and collected when applicable.

Bullet Holes

When photographing multiple bullet holes in a vehicle, it is necessary to document each bullet hole with a scale of measure and unique identifier. Stickers containing a letter and scale of measure may be used.

All general photography shall be completed before utilizing any trajectory rods. All holes, defects or other suspected impact marks should be documented.

The CSI may need to cut upholstery, door panels, or other vehicle components to retrieve projectiles that are known or thought to have entered the vehicle. These actions, and the result of the search, shall be documented in the case notes.

Sexual Assault Investigations

If a sexual assault is suspected to have occurred inside the vehicle, the interior may need to be examined with multiple wavelengths of light using an ALS, in order to detect any biological evidence. The presence of condoms, sexual implements, or clothing may be relevant and should be documented and collected.

DNA Collection

DNA collection from **items inside** a vehicle may include, but is not limited to: commonly touched surfaces in the vehicle, cigarette or cigar butts, drinking straws, cups, bottles, makeup, etc. Items may be collected from a vehicle for later DNA collection or latent print processing.

A DNA sample collection consists of two swabs. Swab the area of interest with one wet swab (moistened with distilled water), followed by a dry swab.

The recommended areas for collecting contact DNA samples are as follows:

- Interior door handle, arm rest, etc. with one sample per door.
- Exterior door handle, with one sample per door.
- Steering wheel/gear shift, one sample.
- Seat belt latches with one sample per seating area.
- The specific location of DNA sample collection (such as steering wheel, interior/exterior door handle, etc.) shall be documented in the case notes.

Vehicle airbags may also be collected for potential DNA.

Hit and Run

Hit and run investigations involving other vehicles or a stationary object may involve searching for paint chips or transfer, pieces of headlamps or plastic reflectors, mirrors, hubcaps, or other miscellaneous pieces of an automobile.



Hit and run investigations involving pedestrians may include searching a vehicle for bodily fluids, impression evidence, such as fabric impressions on the vehicle, and hair and fiber evidence including on the undercarriage.

Latent Print Processing

Typical latent print processing of a vehicle will include brush and powder processing, but any appropriate latent print processing technique, photography and/or lifting method may be applied to a vehicle and contents.

All surfaces of a vehicle and all objects in or on a vehicle should be considered for processing, but discretion of what surfaces to process and what techniques to employ are left to the Investigator and the CSI. DNA samples should be collected prior to latent print processing, unless clean powder procedures are utilized.

The vehicle information shall be listed on the first latent print card.

If more than one vehicle in the same case is processed by the same CSI, the latent print cards shall be placed into separate envelopes; one for each vehicle.

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16. Processing Persons

This protocol will cover the various processes, methods and procedures involved with processing victims, witnesses, and/or suspects. All evidence shall be collected and packaged in accordance with accepted procedures for each type of evidence. Proper procedure ensuring safety and protection from contamination and cross-contamination shall be followed. Processing people (suspects, victims, and witnesses) should be considered with any type of offense in which evidence to associate the person with other people, places, or things may be found. The collection of evidence from people should be undertaken as soon as possible, as the collections may consist of some trace evidence that is perishable and can be lost over time and with excessive movement.

Any processing of a person involving the breasts or genital area of a subject, or the removal of underclothing, shall be conducted with another HFSC or law enforcement personnel present.

16.1. Personal Protective Equipment

CSIs must utilize appropriate PPE when processing persons related to an investigation. The use of PPE reduces the risk of exposure to potentially hazardous substances as well as minimizing the potential for contamination.

16.2. Documentation

The processing of persons related to an investigation must be thoroughly documented using case notes, photographs, sketches and measurements, as applicable. The documentation should include a detailed description of a person's physical appearance, clothing, injuries, and any other distinguishing features.

Consideration should also be given to, but is not limited to:

- Injuries
- Tattoos
- Scars
- Identifying marks
- Jewelry
- clothing
- Stains

16.3. Photography

Photographs should be taken to document both the presence and absence of visible injuries, suspected bloodstains, condition of clothing, etc.

Photographing injuries

- Initial photographs of persons include images from all four sides of the person, at full length, to include the type and condition of clothing.
- Each full-length photograph includes the subject's entire body.
 - Subjects in hospital beds or otherwise unable to stand are photographed as thoroughly as possible in their bed, chair, etc.
- Photograph the person's face and shoulders (a driver's license-type photograph) for identification.



- Photograph both sides of the hands.
- Photograph the general area (mid-range) of the injuries without a scale to establish the location of the area of interest.
- Photograph the injury or area of interest close-up, both with and without a scale.
- All close-up injury photographs should be taken to ensure that the camera lens is perpendicular to the injury to avoid distortion.
- If unable to fully photograph a subject, the reason shall be documented in the case notes.

Patterned Impressions

- Impressions on clothing or skin should be photographed using comparison quality procedures.
- Any notable features of the impression shall be described in the case notes and specific relevant information should be included in the report.

Bite Marks

Bite marks should be swabbed prior to any processing in order to collect potential saliva or other DNA evidence that may be present on the wound. Bite marks shall be photographed with and without an "L" shaped scale (has an X and Y axis).

Penile Swabs

The following areas should be swabbed using two sterile swabs moistened with distilled water:

- Penis - swab the entire penis, skin creases, and area under the foreskin.
- Scrotum – swab the upper and front scrotum area

Pubic Hair Area

- Examination and collection shall be done while the subject is standing on clean butcher paper.
- The butcher paper shall be collected and packaged after hair examination and collection is complete.
- Examine the pubic hair for dried or moist secretions and foreign materials. Collect secretions dried on the pubic hair by cutting the matted hair.

16.4. Evidentiary Items

Biological Evidence

Examine the person and their clothing for any visible biological evidence, such as blood or other biological fluids.

Consider the possibility of potential touch DNA evidence on the person or their clothing.

If the person scratched another person, consideration should be given to collecting fingernail swabs. Fingernail swabs are collected using a sterile cotton swab moistened with distilled water.

Trace Evidence



Examine the person and their clothing for any visible trace evidence, such as hairs, fibers, glass, etc. Ensure proper consent or a warrant has been obtained prior to any evidence collection.

16.5. Deceased Persons Located out of Harris County Jurisdiction

Several areas of Houston, TX are within the jurisdiction of the City of Houston and the Houston Police Department but are not in Harris County. The Harris County Institute of Forensic Science (Medical Examiner's Office) will not respond to death investigations outside of Harris County. If a county does not have a Medical Examiner, they often operate on the Justice of the Peace (JP) system and dispatch an on-call JP Death Investigator for the scene investigation. These counties contract with a neighboring county's Medical Examiner's (ME) Office to perform autopsies. A JP/Judge must send the investigator to the scene and sign a release allowing the decedent to be transported to the contracted ME's office. This transport is often done by a contracted funeral home.

The CSI will coordinate with the HPD investigator on scene regarding when to contact the Death Investigator from the JP and if trace evidence will need to be collected from the decedent. When the death investigator arrives, the CSI will record their name, title, and the precinct they represent.

Initial written and photographic documentation of the decedent is conducted as part of standard processing protocol, without any maneuvering of the decedent.

CSIs shall obtain permission from the death investigator to maneuver the decedent for documentation and evidence collection. This is recorded in the case notes.

If trace evidence is collected, it should be done prior to any maneuvering of the decedent. The CSI is responsible for searching for and collecting any hairs, fibers or other relevant trace evidence on the decedent. Refer to section 12 for more information on trace evidence collection.

If trace evidence will not be collected, the CSI may continue photographic documentation of the body. This includes, but is not limited to:

- Front and back of the decedent.
- Anything relevant on the clothing such as bullet holes or blood spatter patterns, with and without a scale of measure.
- Front and back of both hands.
- Both eyes (held open if possible).
- Interior of the mouth.
- Insect activity.
- Wounds with and without a scale of measure.

Notes shall also include a description of clothing items, condition and any jewelry/accessories, the presence or absence of rigor mortis and livor mortis, and any insect activity.



The hands shall be bagged in all homicide and firearms investigations. A brown paper bag is placed over the hands and wrapped around the wrist area. The CSI shall not place their own hand in the bag to open it.

All property remains with the decedent unless the HPD investigator requests collection of an item or items. Permission shall be obtained from the death investigator prior to collection.

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17. Body Found in Water Investigation

Body in water death investigations can encompass any body of water, from a mop bucket to a bathtub or lake. Many of these incidents are presented as an accidental drowning and can result in critical evidence being overlooked.

General Information

When responding to an aquatic death call, the CSI should work closely with the investigator and consider these questions:

- Is it logical that the decedent was in the water?
- Do the decedent's and witness/reporting party's location, posture, and state make sense?
- Why is the decedent dead? Why didn't they survive being in the water?

If the victim is a child, the CSI and investigator should assess if the child is of sufficient age and has the physical capability to sit in the tub, sink, etc. unaided and/or pull themselves up out of the water. The CSI should examine the scene and see if it provides evidence that the body had been in the water.

- Does the scene demonstrate that the witness removed the body from the water (if applicable)?
 - For example, if the decedent was found in the bathtub, the investigator should ask if the decedent normally took baths, was this the normal bath time, is the tub set up in the way the decedent would normally take baths, etc.
- Document their clothing. If it is wet, where the clothing is wet, etc.
- Document the tub, surrounding areas, and position of drain cover or plug lever.
- If the decedent was submerged for more than 30 minutes, the CSI should examine the palms and/or soles of the feet for signs of skin wrinkling.
- If the decedent was pulled from the water, the CSI should examine for artifacts of drying, such as tache noir, corneal clouding or drying of the lips.
- CSI should also document any post-mortem changes, such as skin wrinkling, bloating, ocular changes and state of lividity.
- For bodies found in a tub or other container inside the house, patrol officers should be asked if the bathroom or any other areas were wet upon their arrival. Was the water still in the tub or container or was it drained/poured out?
- Do not assume DNA or other trace evidence will be lost or destroyed by submersion.

17.1. Other Documentation

Other information to be documented includes:

- Water depth, **if available**
- **Approximate air temperature**
- Note any changes to the environment by first responders, such as opening windows/doors, turning on heat, etc.
- Weather conditions.
- Hair clips or headbands around the scene.



- Sketch and measure the scene.
- Photograph the decedent's eyes as found, and with lids held open.
- Photograph the palms of the hands and soles of the feet.
- Photograph the decedent's body posture from several angles and take measurements.
- Photograph and document the area under where the body was when initially discovered.
- Document rigor mortis in the jaw, neck, arms and legs.
- Document what is wet, damp, and dry. Press a piece of filter paper or toilet paper on the item, then photograph the paper and describe the results.

Examine laundry areas, diaper pail and garbage cans and consider the following questions:

- Is there a diaper that appears soaked from water immersion?
- Are there damp towels with no history of anyone recently bathing?
- Does the garbage show that a child recently made a mess?

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18. Blood Enhancement

Chemical enhancement may be used at crime scenes to search for and/or enhance bloodstains. The search for blood evidence must be carefully evaluated and coordinated with examiners and/or the lead investigator to preclude destruction of potentially valuable evidence. Occasionally, it will be necessary to decide which of two or more procedures may produce the more valuable findings, i.e. the possibility of enhancing ridge detail to positively identify a suspect versus the potential value of serological findings.

18.1. Blue Star

Blue Star is a latent blood-visualizing agent that is based on Luminol. It is used to reveal bloodstain patterns on surfaces from which blood has been cleaned, or on which it is not readily visible.

A search for, and collection of, visible blood shall be conducted prior to the use of Blue Star. Blue Star should be the last process done on a scene or vehicle.

Blue Star may not be necessary in vehicles if visible blood has been located and collected. The requesting officer and a supervisor should be consulted prior to utilizing Blue Star in these instances.

Positive and negative control tests shall be conducted prior to use.

- A surface bearing a known blood source is used for the positive control. The area of the surface not bearing blood is used for the negative control.
- Apply the solution to both areas.
- A positive quality control check is one in which a positive result is achieved when the area bearing known blood displays an intense light blue chemiluminescence and the clean area has no chemiluminescent reaction.
- Documentation of the control test and the lot number shall be recorded in the case notes.

Blue Star is not a confirmatory test and should be used in conjunction with a presumptive test such as Phenolphthalein. A swab for presumptive testing shall only be used if the reaction area is large enough to permit a minimum of two separate samples. One sample will be used for presumptive testing and the other sample will be used for collection, if applicable.

A positive presumptive test result indicates the areas of interest shall be swabbed for further DNA testing.

Blue Star is effective on fresh, very old, or altered bloodstains, either pure or diluted. Blue Star does not alter DNA.

Care should be taken not to overly saturate the blood, as significant dilution can hinder DNA



analysis. **One 4-ounce application of Blue Star should process approximately 250 square feet.**

Blue Star reactions shall be photographed using procedures for long exposure photography.

Instructions for mixing Blue Star are located in Appendix B.

Lighting Conditions:

Blue Star produces a bright blue color that does not require total obscurity to be visible. However, at high dilutions, the visualization will be easier if the product is applied in total darkness.

Application Instructions:

- Spray lightly, ahead of you, at least two feet away from the target, in a side-to-side sweeping motion; not pointing toward the ground.
- When indoors, don't saturate walls and vertical surfaces to avoid excessive dripping.
- When outdoors, consider wind direction. Do not spray into the wind.

18.2. Leuco Crystal Violet

Leuco Crystal Violet (LCV) is suitable for developing stains such as latent prints, shoeprints, or other blood evidence on porous and non-porous items. LCV is a heme-reacting chemical that causes blood to become purple in color. Background discoloration can be non-existent if applied properly.

Comparative quality photographs shall be taken of any visible prints prior to use of LCV. Each impression shall be given a letter designation, which shall be visible in every photograph. The letter may be written on the scale, along with the case information.

A positive quality control test shall be performed prior to use.

- To test the solution, apply the LCV to a known blood control as directed below.
- A successful quality control check is one in which a positive test result is achieved. A positive test result will yield purple staining under white light
- Documentation of the control test and the lot numbers shall be recorded in the case notes.

LCV will only reveal latent prints on the blood-stained portions of an item. If the non-stained portions of the evidence are to be treated for latent prints, a procedure that develops latent prints based on the normal constituents of latent prints should be used.

Photograph any visible ridge or pattern detail and if needed, collect a sample of the bloodstain.

Instructions for mixing LCV are located in Appendix B.

Apply the LCV above or next to the bloodstain with a wash bottle or dropper, not directly on the bloodstain.

- Use the finest mist possible, as excess application may cause over development or



running of the print

- Non-porous item: Allow the print to develop to the desired color (approximately 5-10 seconds) and remove excess reagent by absorbing with a paper towel or pouring it off.
- Allow the item to dry and take comparative quality photographs of usable prints or patterns.

The preceding steps can be repeated to possibly improve the contrast.

When using in direct sunlight, developed prints should be photographed as soon as possible to avoid unwanted background development caused by photo-ionization.

LCV is an irritant and should only be used in a well-ventilated area.

Disposal

All mixed chemicals shall be properly disposed of after use. Mixed chemicals shall not be stored for use at a later time.

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APPENDIX A
CASE RECORD REVIEW CHECKLIST

- Is the report free from spelling and grammatical errors?
- Is the statement “all measurements are approximate” present in all reports listing measurements?
- Does the final diagram contain the date of the crime scene and the date completed?
- **Is the accreditation statement included in the diagram header?**
- Are the names and titles of other investigators, other CSIs, supervisors and subjects spelled correctly and consistently in the notes and report?
- Are the addresses listed in the report, notes, cover sheets and photo cover sheet correct and consistent?
- Are all items of evidence listed in the notes also on the RMS report, the Property Room receipt and in the report?
- Are forms used the current version?
- Are all transfers of evidence captures on the Chain of Custody (COC) form?
 - Is the COC signed by the correct people?
- Is the currency worksheet completed correctly?
 - Is the worksheet signed by the correct people?
- Case notes contain all relevant information including scene description, locations, evidence information, and information verbalized to the CSI by the investigator or other personnel.
- Written case record is free from obliterations and write-overs. Any errors have a single line strikeout and initials.
 - If additional information is added to the notes, is the date the information was added and the initials of the person responsible present?
- All data transfers from the rough sketch to the final sketch are accurate.
- Original field notes and correct forms are included, including VEB paperwork, request forms, e-mails, etc.
- Are all areas processed for latent prints in the notes and report (do they correlate) including areas that were processed but no lift cards collected?
- Processing methods are appropriate; any lot numbers and control test information are recorded
- Content in the report matches the case notes; all information in the report is in the notes.
- Photographs are properly exposed, and all aspects of the scene are accurately captured, including overall, mid-range and close-up.
- Video covers the entire scene and the quality is sufficient (not moving too fast or out of focus)
- Report contains all actions taken on scene, including negative results
- Every page in the case record has a case number, page number, and is traceable to the examiner.
- **Was a video recording completed for scenes on which it is required?**

APPENDIX B
INSTRUCTIONS FOR MIXING BLUE STAR and LCV

Instructions for mixing Blue Star

1. Open the spray bottle; add 125 ml (4 fl. oz) of distilled water.
2. Take a white tablet out of the white-top tube and close the tube immediately. Take a beige tablet out of the red-top tube and close the tube immediately. DO NOT switch caps. The white cap goes on the white-top tube and the red cap on the red-top tube.
3. Add the pair of tablets to the distilled water. If you need more working solution, use 125 ml (4 fl. oz) per pair of tablets.
4. Twist the head with its plunger onto the spray bottle firmly.
5. Allow about 1 or 2 minutes for complete dissolution and mixing of the chemicals, swirling gently with a circular motion of your hand. Do NOT shake the container upside down

Instructions for mixing LCV

1. Open the bottle marked Part 2 and add it to the contents of the bottle marked Part 1. Recap Part 1 and shake well for several minutes.
2. Add the contents of the bottle marked Part 3 to the Part 1 bottle. Recap Part 1 and shake well for an additional several minutes. The reagent is now ready for use.