



Queensland State Archives

Managing Digital Photographic Images
Guideline for Queensland Public Authorities

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Guideline for Managing Digital Photographic Images

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Information security

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1 Introduction

Queensland public authorities are collecting increasing amounts of information in digital image formats via digital photographs. As a result of the proliferation of digital photographic equipment in the past decade, digital photographic images now frequently record or add context to the actions and decisions of public authorities. This means that digital photographic images may need to be treated as public records and managed accordingly.

A public record is any form of recorded information, both received and created, that provides evidence of the decisions and actions of a public authority while carrying out its business activities.¹ The *Public Records Act 2002* covers all public records irrespective of the technology or medium used to generate the records.

Digital photographs are taken for many different purposes, using varying resolutions depending on individual requirements. In the Queensland public sector, digital photographic images are regularly used as records to identify authorised officers, record incidents, record or promote events, support building/infrastructure maintenance processes, support traffic regulation, and in the provision of evidence in Queensland courts.

1.1 Purpose

The purpose of this Guideline is to assist public authorities in meeting their recordkeeping and information management obligations under the *Public Records Act 2002* with respect to the management of digital photographic images.

Appropriately designed and implemented recordkeeping processes for managing digital photographic images will ensure that these public records are, and will continue to be, fit for their intended purpose while protecting the privacy of photographed individuals.

This Guideline aims to assist public authorities to:

- manage digital photographic records in compliance with the *Public Records Act 2002*² and the *Queensland Recordkeeping Metadata Standard and Guideline*³
- create 'full and accurate' public records in compliance with *Information Standard 40: Recordkeeping*⁴ (IS40)
- dispose of public records in accordance with *Information Standard 31: Retention and Disposal of Public Records*⁵ (IS31)
- ensure ongoing accessibility to digital photographic images that are public records, and that those records are managed in compliance with the *Right to Information Act 2009*⁶, and
- handle personal information in compliance with the *Information Privacy Act 2009*⁷.

¹ *What is a Public Record*,

<www.archives.qld.gov.au/publications/PublicRecordsBriefs/what_is_public_record_200409.pdf>

² *Public Records Act 2002*, <www.legislation.qld.gov.au/LEGISLTN/CURRENT/P/PublicRecA02.pdf>

³ *Queensland Recordkeeping Metadata Standard and Guideline*,

<www.archives.qld.gov.au/downloads/QRKMS.pdf>

⁴ *Information Standard 40: Recordkeeping*,

<www.archives.qld.gov.au/downloads/QGEAInformationStandard40v2.0.0.pdf>

⁵ *Information Standard 31: Retention and Disposal of Public Records*,

<www.qgcio.qld.gov.au/qgcio/architectureandstandards/informationstandards/current/Pages/Retention%20and%20Disposal%20of%20Public%20Records.aspx>

⁶ *Right to Information Act 2009*, <www.legislation.qld.gov.au/LEGISLTN/CURRENT/R/RightInfoA09.pdf>

⁷ *Information Privacy Act 2009*, <www.legislation.qld.gov.au/LEGISLTN/ACTS/2009/09AC014.pdf>

1.2 Audience

The intended audience for this Guideline includes staff responsible for records management within Queensland public authorities and managers responsible for business processes associated with the creation, capture, use, storage and disposal of digital photographic images.

1.3 Authority

Queensland State Archives is responsible for the provision of policy advice relating to a wide range of strategic recordkeeping and information management issues for Queensland public authorities. This Guideline forms part of a wider recordkeeping policy framework.

The State Archivist has issued this Guideline in accordance with section 25(1)(f) of the *Public Records Act 2002*, which enables the Archivist to make policies, standards, and guidelines about the making, keeping, preserving, managing and disposing of public records.

1.4 Scope

This Guideline is intended for Queensland public authorities, as defined in Schedule 2 of the *Public Records Act 2002*, and is customised to the Queensland legislative environment. While certain recordkeeping principles will have universal application, other Australian and international jurisdictions choosing to use this Guideline are advised to seek legal advice as to the appropriateness of this Guideline's recommendations within their own legislative context.

Not covered in this Guideline are factors such as specific technology applicable to special classes of images in a particular context, such as medical imagery, vector images, 3D images and moving images. Where this may apply, the public authority may wish to seek further information or clarification.

1.5 Definitions

A Glossary providing clarification and definitions of terms relating to digital photographic images used in this document is included as Appendix A: Glossary.

Records and information management specific terms are defined in Queensland State Archives' *Glossary of Archival and Recordkeeping Terms* available on Queensland State Archives' website.⁸

1.6 Acknowledgements

The development of this Guideline has been supported by the Queensland Government ICT Innovation Fund.⁹

The Department of the Premier and Cabinet coordinated the implementation of the Queensland Government Image Library in 2010. During the development of the library, a whole-of-Government survey was conducted by the Image Library project team in 2008. The report on the results of this Survey was used to inform this Guideline and provided a valuable source of information regarding management practices for digital photographic images within the Queensland Government.¹⁰

⁸ *Glossary of Archival and Recordkeeping Terms*, <www.archives.qld.gov.au/downloads/GlossaryOfArchivalRKTerms.pdf>

⁹ Whole-of-Government ICT Project Funding Program, <<http://qgcio.govnet.qld.gov.au/govnet/projectsandservices/funding/Pages/index.aspx>>

¹⁰ Queensland Government Image Library, <www.imagelibrary.qld.gov.au>

1.7 Related Resources

A toolkit of resources has been developed to accompany this Guideline comprising of:

- Public Records Brief – *Guideline for Managing Digital Photographic Images – An overview*
- Public Records Brief – *Managing Digital Photographic Images as Public Records*.

These resources contain targeted information on key messages contained throughout this Guideline.

The Queensland State Archives' *Guideline for Managing Closed Circuit Television (CCTV) Records*¹¹ provides advice for managing video recordings.

2 Legislative and Regulatory Requirements

The Queensland Government legislative framework defines the recordkeeping obligations of public authorities. When digital photographic images document or add context regarding the business activities of public authorities, they become public records. Public authorities must meet all legislative and regulatory requirements relating to the management of digital photographic images which are public records.

In Queensland, specific aspects of photographic images covered by legislative instruments include, but are not limited to, those detailed in Appendix B: Legislation specific to digital photographic images. Note that certain digital photographic images may be subject to further specifications as detailed in additional legislative instruments specific to your public authority¹², as well as the *Copyright Act 1968* (Cth).

Since legislation can change frequently, it is the public authority's responsibility to identify any legislation in addition to the *Public Records Act 2002*, *Information Privacy Act 2009* and the *Right to Information Act 2009* that may apply to the public records captured by photographic equipment.

A summary of the key recordkeeping considerations identified throughout this Guideline is provided as a checklist in Appendix C: Digital Images Recordkeeping Checklist.

2.1 Public Records Act 2002

Public records are the corporate memory of Government. They are the cornerstone of Government accountability, providing evidence of actions, decisions and communications.

Recordkeeping in the Queensland public sector is governed by the *Public Records Act 2002*, which covers all public records irrespective of the technology or medium used to generate, capture, manage, preserve and access those records.

This means that as public records, digital photographic images made by public authorities are subject to the requirements of the *Public Records Act 2002* and associated recordkeeping Information Standards, IS40 and IS31.

All public records, including digital records, are subject to legal processes such as discovery and subpoena, and access applications under the *Right to Information Act 2009*.

¹¹ *Guideline for Managing Closed Circuit Television Records*,
<www.archives.qld.gov.au/downloads/cctv_guideline.pdf>

¹² This Guideline acknowledges that there may be other legislative requirements specific to individual public authority's records management obligations. This Guideline provides a summary of the records management obligations of Queensland public sector authorities.

2.2 Information Privacy Act 2009

Queensland's *Information Privacy Act 2009*¹³ provides rules for how public authorities must handle personal information. These rules include the Information Privacy Principles and the National Privacy Principles.

The National Privacy Principles only apply to Queensland Health, and are substantially similar to the Information Privacy Principles, except in regard to collection of documents. This Guideline only makes reference to the Information Privacy Principles under the *Information Privacy Act 2009*.

The requirements of a number of the Information Privacy Principles have been integrated into this Guideline as they are of particular relevance to the creation, capture, use and retrieval of digital photographic images. Special consideration would be given to Queensland Health records given their reliance on the National Privacy Principles and the additional confidentiality obligations under the *Health Services Act 1991*¹⁴.

2.3 Right to Information Act 2009

The primary objective of Queensland's *Right to Information Act 2009*¹⁵ is to give a right of access to information in the government's possession or under the government's control unless, on balance, it is contrary to the public interest to give access. Public records captured as digital photographic images may fall within the scope of an information access application.

2.4 Copyright Act 1968 (Cth)

In relation to photographs taken on behalf of a Queensland Government department, the *Copyright Act 1968 (Cth)*¹⁶ applies. This Act states that unless there is an agreement to the contrary, a Commonwealth, State or Territory government is the first owner of copyright in the material created, or first published, under its direction or control.

2.5 Information Standard 40: Recordkeeping

Information Standard 40: Recordkeeping is the umbrella recordkeeping policy for Queensland public authorities as defined in Schedule 2 of the *Public Records Act 2002*. Digital photographic images must be managed according to the principles of IS40.

This Guideline seeks to assist public authorities in their compliance with the principles of IS40, which applies to public records in all formats. The recordkeeping requirements outlined throughout this Guideline, and summarised in Appendix C: Digital Images Recordkeeping Checklist, adhere to the minimum mandatory requirements of IS40.

Information Standard 40: Recordkeeping outlines seven mandatory principles to which public authorities are subject. These principles are summarised in Table 1.

¹³ *Information Privacy Act 2009*, <www.legislation.qld.gov.au/LEGISLTN/CURRENT/I/InfoPrivA09.pdf>

¹⁴ To be replaced by *Health and Hospitals Network Bill 2011*

¹⁵ *Right to Information Act 2009*, <www.legislation.qld.gov.au/LEGISLTN/CURRENT/R/RightInfoA09.pdf>

¹⁶ *Copyright Act 1968 (Cth)*,

<www.comlaw.gov.au/ComLaw/Legislation/ActCompilation1.nsf/0/F02280247B0E4B21CA25775B000FBB07?OpenDocument>

Table 1: Mandatory Principles of Information Standard 40: Recordkeeping

Principle	Requirement
Principle 1:	Public authority recordkeeping must be compliant and accountable
Principle 2:	Recordkeeping must be monitored and audited for compliance
Principle 3:	Recordkeeping activity must be assigned and implemented
Principle 4:	Recordkeeping must be managed
Principle 5:	Recordkeeping systems must be reliable and secure
Principle 6:	Recordkeeping must be systematic and comprehensive
Principle 7:	Full and accurate records must be made and kept for as long as they are required for business, legislative, accountability and cultural purposes.

The management of digital photographic images identified as public records should follow appropriate recordkeeping processes throughout their lifecycle to ensure that they continue to maintain the characteristics of full and accurate records.

2.5.1 Principle 7: Full and Accurate Records

Principle 7 of *Information Standard 40: Recordkeeping* directly relates to the *Public Records Act 2002* requirement that Queensland public authorities make and keep ‘full and accurate’ records of their activities. The characteristics of full and accurate records are detailed in Table 2. Further detail on these characteristics as they apply to digital photographic images, is included in Section 3 of this Guideline.

Table 2: Characteristics of Full and Accurate Records

Attribute	Requirement
Adequate:	Records must be fit for the purposes for which they are created and kept. They should provide adequate evidence of the conduct of business activity to be able to account for that conduct. Records that document more important or higher risk transactions or processes need to be more detailed than records which document low risk activities.
Complete:	To be complete, records should contain not only content, but also the structural and contextual information necessary to document and make sense of the business transaction. It is therefore necessary to maintain adequate recordkeeping metadata relating to the record, to demonstrate that it is a true and accurate representation of the transaction, activity, or facts.
Meaningful:	Records must be able to be understood within the context of the processes and business for which they are created and in which they are used.
Accurate:	Records must correctly reflect what was communicated, decided, or done (or not done). That is, the record’s contents, context and structure can be trusted as true and accurate representation of the transactions, activities, or facts to which it attests and can be relied upon in the course of subsequent transactions or activities.
Authentic:	An authentic record is a record that can be proven and trusted to be what it purports to be. It must have been created, used, transmitted or retained by the person who claims to have done these actions.
Inviolate:	To be regarded as inviolate, a record must be securely maintained to prevent unauthorised access, alteration, removal or destruction. The internal and external processes to which a record has been subject should be traceable.

Attribute	Requirement
Accessible:	Records must remain accessible and available to people both inside and outside the public authority, in accordance with security, privacy and legislative requirements, for the designated period for which they must be retained. To be accessible, records must be maintained so that they can be quickly and easily identified, viewed, and retrieved when required.
Useable:	Useable records are those that can be viewed and remain fully functional. Records must be kept in a format that allows their continued use.

2.6 Information Standard 31: Retention and Disposal of Public Records

Information Standard 31: Retention and Disposal of Public Records relates specifically to the appraisal, retention and disposal of public records. The *Public Records Act 2002* prohibits the disposal of public records without the permission of the State Archivist. This permission is usually given through authorised Retention and Disposal Schedules, as detailed in Section 3.5. All disposals of public records must be documented.

2.7 Additional Relevant Information Standards

Other relevant Information Standards which public authorities¹⁷ should consider when developing any policy related to the management of information include:

- *Information Standard 18: Information Security (IS18)*
- *Information Standard 34: Metadata (IS34)*, and
- *Information Standard 46: Use of Copyright Materials (IS46)*.

3 Recordkeeping Processes for Digital Photographic Images

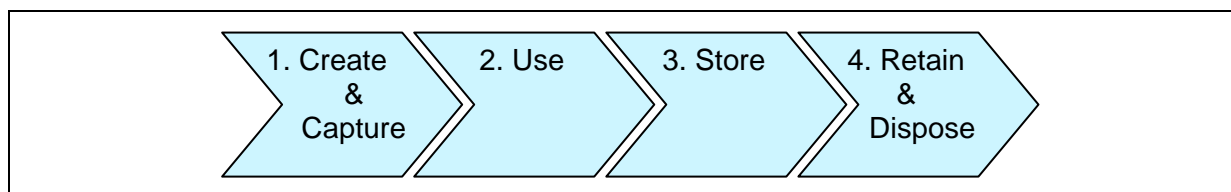
Digital photographic images are increasingly being created by public authorities. As outlined in the Introduction, digital photographic images may be used to record actions and decisions in the course of business, or may be used to add context to these actions and decisions. There may be important business needs to document a particular event or issue and an image will provide essential evidence forming the public record, or the image can supplement other business records. Alternatively, digital photographs may be taken of business events and activities to display in annual reports or websites.

Public authorities should follow appropriate recordkeeping processes in the creation, use, storage and disposal of digital photographic images. Processes should be established and followed which ensure that the images created are fit for purpose, and are captured with adequate contextual information to make the image meaningful to current and future audiences.

Recordkeeping considerations for the management of digital photographic images are mapped to four key process stages as illustrated by Figure 1.

¹⁷ While only applicable to state government departments, local governments and other public authorities may like to refer to these Information Standards for best practice requirements.

Figure 1: Recordkeeping Processes for Digital Photographic Images



Create and Capture examines the use of digital photographic images within public authorities, and identifies the key requirements specific to the process of create and capture to ensure images are fit for purpose.

Use scrutinises how digital photographic images are used, and how use influences a number of factors such as image resolution, compression, file formats, and privacy implications.

Store refers to the media and information technology elements required to ensure digital photographic images remain accessible and useable for as long as required. Key issues discussed specific to storage include media storage options and best practice media handling requirements.

Retain and Dispose identifies the retention and disposal requirements public authorities must consider within the context of digital photographic images.

These four processes support systematic and comprehensive recordkeeping (as required by Principle 6 of IS40), facilitate the creation of full and accurate records and their appropriate retention for business, legislative, accountability and cultural purposes, as required by Principle 7 of IS40.

3.1 Analogue versus digital photographic images

The transition from analogue to digital photographic images has had a significant impact on the way in which images are retained and managed. Previously, photographs were taken on film, developed on paper and stored by the public authority. The cost and storage implications of this technology limited its usage, and the volume of public records created.

By comparison, the current proliferation of digital still photography means that photographers require less physical storage space. Images are now also created in much greater volumes with the potential to be retained indefinitely by organisations. In addition, unlike the costs associated with purchasing and processing of film which limited the volume of images produced, digital cameras have the potential to take, and directly save thousands of images.

In comparison with analogue image capture, digital cameras and the photographic images taken offer:

- increased ease of image capture through the low cost of cameras (often embedded in other devices) with sophisticated technology
- increased speed of processing between taking an image and being able to use the image
- ability to integrate digital images into business processes
- usually higher image quality
- ability to embed metadata
- increased storage options
- greater ease of image retrieval and duplication of data.

Combined with the increase in costs associated with traditional analogue photographic technology and the advantages associated with the use of digital photographic images (listed above), it is likely that the scope of use of digital photographic images within public authorities will only increase. However, despite the advantages listed above, images derived from digital cameras share many of the same basic challenges with all electronic data, and also present special obstacles.

While all medium is inherently unstable, digital photographic images could be considered more at risk due to factors such as the rapidly changing hardware and software requirements necessary for the retrieval and interpretation of that digital information. Concerns include:

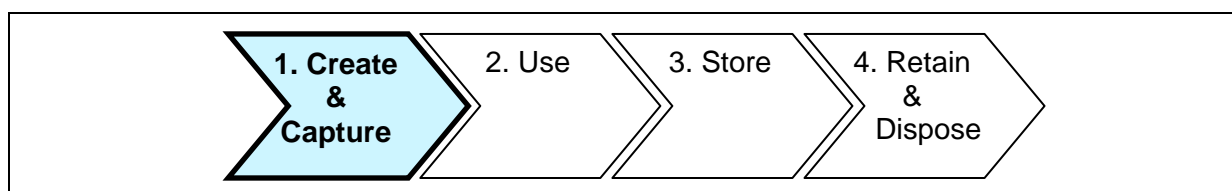
- approximately a five year window to attend to digital photographs before they are at risk of becoming unusable¹⁸ (e.g. through dependence on proprietary image formats see Section 3.2.5)
- image quality – early digital cameras had limited megapixel counts and many current personal mobile devices (e.g. mobile phones, personal digital assistant (PDA), mobile Internet device (MID)) capable of taking pictures produce poor quality images
- RAW file format – RAW files are proprietary formats that are unique to each camera producer (see Section 3.2.5).

It is important that documented policies and procedures are in place to ensure digital photographic images are fit for purpose and meet organisational requirements. The reality of many digital images is that:

- lossy compression compromises image quality (see Section 3.3.2)
- metadata is often unstructured and varies between manufacturers
- systems may be designed to reduce storage requirements, rather than taking into account the purpose for which they have been installed
- proprietary formats may limit accessibility and usability of digital photographic images.

By developing and implementing a framework to ensure digital photographic images are fit for purpose (using the four key process stages identified in Figure 1), Queensland's public authorities should be able to overcome the various issues addressed above. Section 3.2 provides a detailed outline of the elements specifically relating to creation and capture of digital photographic images. Sections 3.3 to 3.5 provide a detailed summary on each of the three other elements.

3.2 Create and Capture



Digital photographic images can be used to facilitate a number of business transactions within public authorities. For example, they can be used to identify authorised officers, record incidents, record or promote events, support maintenance processes, support traffic regulation, and provide evidence in Queensland courts. The business requirement for digital photographic images should guide a public authority's business practices for their creation and capture.

¹⁸ *Collection development for digital photographs*, Library Review 2007, vol. 56, no.2.

3.2.1 Key recordkeeping considerations

To assist public authorities to identify the key recordkeeping requirements related to create and capture, the following checklist is provided. More detailed information about each key recordkeeping consideration is provided throughout Section 3.2.

Create & Capture – Key Recordkeeping Considerations	
Digital photographic images are fit for their intended purpose.	<input type="checkbox"/>
Procedures for the creation and capture of digital photographic images have been developed and implemented.	<input type="checkbox"/>
Digital photographic images are captured at an appropriate quality and resolution setting necessary for their intended purpose.	<input type="checkbox"/>
Digital photographic images are captured in suitable file formats e.g. TIFF, JPEG, PNG or Adobe DNG.	<input type="checkbox"/>
Documented business processes are in place to identify images as public records.	<input type="checkbox"/>
Digital photographic images identified and retained as public records are preserved as ‘master’ images with working copies created where appropriate.	<input type="checkbox"/>
Mandatory recordkeeping metadata ¹⁹ associated with the capture of digital photographic images is created and captured.	<input type="checkbox"/>
The public authority’s collection of personal information is in accordance with Information Privacy Principles 1 – 3.	<input type="checkbox"/>

3.2.2 Defining fitness for purpose

Before any image capture can be undertaken, any limitations on required file sizes and file types should be known. Digital cameras have various size and/or quality options. Size refers to the pixel dimensions (resolution) of the captured file, and quality refers to the amount of compression applied to the saved image. This means that wherever possible, the image size appropriate for all reasonable business uses should be applied unless there is a valid reason for not doing so.

Digital photographic images must be fit for their intended purposes. For example, a photograph taken for an annual report will require much less rigorous preparation than forensic images captured by the Police. When capturing images, it is important that they are created at the appropriate quality for all subsequent uses (see Section 3.2.4 for further information relating to image quality).

Extra consideration is needed if there are important evidential requirements to capture the images. Specific measures may be needed to ensure their integrity will be safeguarded. This may include:

- training and assessing staff for competency with regard to the public authority’s standard operating procedures and relevant camera technologies
- authorising particular staff members to capture images
- establishing a quality management program

¹⁹ Queensland Recordkeeping Metadata Standard and Guideline, www.archives.qld.gov.au/downloads/QRKMS.pdf

- ensuring equipment is checked for accuracy before every use
- adding levels of protection or verification to images such as hash verification²⁰
- ensuring that appropriate levels of documentation will be captured in audit trails.²¹

In addition to the above factors which will influence fitness for purpose, there are a number of recordkeeping issues to consider, including:

- considering image resolution requirements based on all reasonable business uses (Section 3.2.4)
- keeping only those images that are required (Section 3.2.6) in the appropriate file format (Section 3.2.5)
- ensuring storage methods are commensurate with volumes of images to be stored (Section 3.4.3)
- metadata requirements associated with captured images (Section 3.2.9).

3.2.3 Digital photographic image creation considerations

Prior to the creation of any digital images, some preparation is needed to ensure that the correct photographic equipment, expertise and controls required to produce images fit for their intended purpose are identified. Images and imaging processes should be governed by documented policies and procedures which can specify requirements such as:

- the equipment required to capture images and how to ensure this equipment is operated with accuracy and precision and maintained appropriately
- the image quality, colour settings, resolution and size appropriate for all reasonable business uses
- criteria regarding what to capture
- capture formats
- naming conventions
- saving instructions and formats
- recording or availability of metadata
- quality checking and validation processes
- rights management
- retention and disposal requirements.²²

Where known in advance, the purpose and requirements of the digital images to be taken may drive the selection of the camera. If images are being captured for evidential purposes, the camera chosen should be capable of producing an accurate representation of the evidence being recorded.²³ Therefore, the final use of the image should determine the choice of camera. Factors which contribute to quality of digital photographic images include:

- lens quality
- resolution of the image sensor
- physical size of the image sensor
- degree of compression chosen in the camera
- sensitivity (ISO) setting selected
- predefined exposure mode selected
- sophistication of the exposure algorithms in the camera
- lighting.

²⁰ Ensuring that a file has not been corrupted by comparing the file's hash value to a previously calculated value

²¹ *Australasian Guidelines for Digital Imaging Processes*, www.nifs.com.au/2004%20Digital%20Imaging%20Guidelines.pdf

²² State Records NSW, *Managing digital records (Guideline 22)*, www.records.nsw.gov.au/recordkeeping/government-recordkeeping-manual/guidance/guidelines/guideline-22-managing-digital-records/5-2-managing-born-digital-images

²³ *Australasian Guidelines for Digital Imaging Processes*, www.nifs.com.au/2004%20Digital%20Imaging%20Guidelines.pdf

Section 3.2.5 contains a discussion on the recommended file formats for digital images. Once decisions have been made on the above considerations, they should be detailed in organisational policies or procedures. Sections 3.2.4 and 3.3.2 contain further information on resolution and compression.

3.2.4 Digital photographic image resolution

Image resolution describes the detail and clarity of an image, and is therefore a primary indicator of the quality of that image. Resolution is a measure of the number of lines or pixels in an image file. Resolution is dependent upon the image sensor in a camera.

Image capture should be at an appropriate quality and resolution setting necessary for the intended purpose. To assist in determining the most appropriate quality and resolution settings for digital photographic images, the following factors should be considered:

- higher image resolution should be used for digital photographic images where it is necessary to retain fine details e.g. photographs taken for marketing purposes are required to meet documented guidelines, or images taken during investigations and which, or will be used as evidence in a court
- lower image resolutions may be suitable for routine image capture e.g. images to be published on a web site.

As an example of current requirements for archival quality images, the National Archives and Records Administration in the United States of America recommend the use of 6 megapixels or greater size images.²⁴ The image resolution associated with this size of image assists to ensure archival quality images that are adequate for long term use, large reproductions or publishing. However, everyday business use may require images of a lower megapixel resolution.

In some instances, it is not always necessary or feasible to produce the highest quality images to demonstrate the facts necessary for evidence. However, the image quality may only be relaxed after thorough analysis has confirmed that the resulting images are adequate for all reasonable business purposes. The analysis must:

- identify all reasonable business uses of the records. Note that reasonable business uses of the records are broader than day-to-day business uses, and include, for example, use in legal action, investigations and Right to Information requests.
- confirm that it can be reasonably expected that all images at the lower specification are useable for all of the identified reasonable business uses.

High resolution digital photographs require more storage space as the amount of data in an image increases and can cause network congestion, so they are not suitable for all uses²⁵. As stated above, the resolution chosen for a scene depends on the operational objective of image capture – higher resolutions will be required for higher risk areas. Images captured at low resolutions may cause accuracy and authenticity issues. For example, images taken for investigations with a high resolution may, when viewed at 100 per cent magnification, not necessarily identify an individual captured. However, individuals may be able to be identified if magnification is increased to 400 per cent. A lower resolution image would not allow this, as the image would become extremely distorted at 400 per cent magnification.

²⁴ *Expanding Acceptable Transfer Requirements: Transfer Instructions for Permanent Electronic Records, Digital Photographic Records*, <www.archives.gov/records-mgmt/initiatives/digital-photo-records.html>

²⁵ State Records NSW, *Managing digital records (Guideline 22)*, <www.records.nsw.gov.au/recordkeeping/government-recordkeeping-manual/guidance/guidelines/guideline-22-managing-digital-records/5-2-managing-born-digital-images>

Appendix D: Comparison of File Formats, Image Compression and Pixels provides examples of the difference that resolution makes to image quality and file size.

3.2.5 Digital photographic image file formats

As noted above, digital photographic images can occupy significant storage capacity. Appendix D: Comparison of File Formats, Image Compression and Pixels contains a comparison between TIFF (Tagged Image File Format) and JPEG (Joint Photographic Experts Group) file formats and their comparative image sizes. Consideration should be given to the image format used to capture and store the digital photos, the compression method used, the size of the photo, and for what purposes it will be used.

A file format should be chosen that:

- is capable of representing any image capable of being captured by the camera
- retains any capture device colour management information
- does not use (or can be set up to not use) compression.²⁶

It is recommended that dependence on proprietary file formats are avoided as far as possible to help ensure the accessibility of the images over time. If a proprietary format is used (e.g. for some level of existing functionality) the public authority may wish to convert to an open standard before being stored as a public record. Suggested file formats include:

- TIFF²⁷
- PNG (Portable Network Graphics)
- JPEG or JFIF (Joint Photographic Experts Group File Interchange Format)
- Adobe DNG (Digital Negative).²⁸

Each of the above file formats have a number of pros and cons associated with their use. For example, while the TIFF file format is one of the most common and widely used preservation image formats, it is also a proprietary format, with a number of versions in existence. Baseline TIFF revision 6 is a recommended file format for digital photographic image preservation. TIFF images can be very space intensive due to their large size. TIFF is used as a preservation format by the National Libraries of Australia and New Zealand, all Australian state libraries, Library of Congress and many other libraries which capture image files for preservation. TIFF is recommended by the Australian Government Information Management Office.²⁹

The PNG file format is a fully open source format, offering patent free lossless compression (see Section 3.3.2 for more information regarding compression). As with TIFF, PNG has a number of variations, and therefore the baseline version of the format is the most suitable for preservation purposes.

JPEG is a popular file format for web publishing and ideally suited to images where a picture is a photograph. However because JPEG uses lossy compression (see Section 3.3.2), some of the data that makes up the image is lost in the compression process (which may not be suitable for archival purposes).

²⁶ *Choosing a File Format for Digital Still Images*,
<www.jiscdigitalmedia.ac.uk/stillimages/advice/choosing-a-file-format-for-digital-still-images/>

²⁷ *Choosing a File Format for Digital Still Images*,
<www.jiscdigitalmedia.ac.uk/stillimages/advice/choosing-a-file-format-for-digital-still-images/>

²⁸ *Digital Images Archiving Study*, JISC,
<www.jisc.ac.uk/media/documents/programmes/preservation/finaldraftimagesarchivingstudy.pdf>

²⁹ State Library of Queensland, *Digital Standard 2 – Digital capture and format*,
<www.slq.qld.gov.au/_data/assets/pdf_file/0009/139815/SLQ_-_DS2Capture_v3.00.pdf>

The Adobe DNG format has been developed in order to standardise archival file formats. Adobe DNG is an attempt to standardise digital camera RAW formats (see below for more information on the RAW format), which are typically proprietary to the camera manufacturer. However as with TIFF, Adobe DNG is a proprietary format.

A risk assessment should be undertaken to determine the most appropriate format to use when capturing and storing your public authority's digital photographic images. Decisions may change over time, and will be dependent on factors such as resources available and current and future use of the images.

Appendix E: Example Quality Specifications contains a summary from the Queensland Government Image Library and the U.S. National Archives and Records Administration (NARA) of approved quality specifications for transfer of digital photographs and their collections.

RAW format: Some compact digital cameras and all digital SLR cameras offer a native or RAW format.

RAW format is not a single file type, but the name given to any image file containing unprocessed data as captured by the digital sensor. Most camera manufacturers have created their own unique RAW formats.

Native RAW files are encrypted and the formats are largely undocumented.³⁰ It is not recommended that agencies retain images in RAW format as it is a proprietary format. Ongoing storage of images only in proprietary formats such as RAW could threaten their longevity and continued readability.³¹

3.2.6 Digital photographic images as public records

Example 1

A digital image of a crack in the pavement is captured as part of an investigation of maintenance work required in a particular location. This image will be a public record forming part of a collection of records documenting the business activity of assessing the maintenance action required.

Example 2

Consider the digital image captured by speed or red light cameras, or of an applicant captured as part of the process of issuing a driver's licence. These digital images are public records forming part of a collection of records documenting the business activity of identifying driving infringements or processing a license application. The same digital images also often form one item within a set of items which are evidence of one coherent transaction.

Once digital photographic images have been captured, they should be transferred from the image capture device (e.g. digital camera, memory card, mobile phone) to a suitable storage

³⁰ *The Camera RAW File Format*, <www.jiscdigitalmedia.ac.uk/stillimages/advice/the-camera-raw-file-format/>

³¹ State Records NSW, *Managing digital records (Guideline 22)*, <www.records.nsw.gov.au/recordkeeping/government-recordkeeping-manual/guidance/guidelines/guideline-22-managing-digital-records/5-2-managing-born-digital-images>

medium (refer to Section 3.4.3 for more information on storage options). Transfer of images from the image capture device to a suitable storage medium should be as soon as practically possible.

While it is common for multiple images to be captured and stored, not all digital photographic images need to be retained. Digital cameras have the potential to take and directly save thousands of images. Where multiple images are taken, many might be considered ephemeral due to there being duplicates or some being insufficient quality.

Images that could be considered ephemeral may be those that do not provide the best evidence of business activity. The decision as to which images may be considered ephemeral should be based on business needs (as well as other requirements such as legislative obligations). The following questions may be useful when appraising digital photographic images to determine which image(s) best serves the business purpose(s) for which the image was captured:

- Are the images in focus?
- Are the light levels adequate?
- Is the image framed appropriately?
- Are there multiple angles of the same image?
- Do the photographs relate to and/or enhance existing collections?
- Do the photographs have intrinsic and/or long term historical value?
- Are the photographs readily available elsewhere?
- Are the photographs saved in a proprietary format which cannot be accessed?
- Are the photographs created at a low resolution, or embedded in application software, such as spreadsheets?

The answers to these questions might be a consideration in rejecting some (or all) photographs. Public authorities should have documented procedures in place which outline the decision making process used to determine which digital photographic images are retained as public records, and what is considered to be ephemeral. Digital photographic images that provide the best evidence of business activity should be captured into a public authority's recordkeeping system. For efficient storage, digital photographic images considered to be ephemeral should be deleted to avoid space-intensive digital clutter.

Images retained as public records should be sentenced according to the *General Retention and Disposal Schedule for Administrative Records*³² or the public authority's core business Retention and Disposal Schedule. The disposal action for digital photographic images identified as ephemeral under the *General Retention and Disposal Schedule for Administrative Records* is to 'retain until reference ceases'. Once the images are no longer needed, they should be disposed. For more information on retention and disposal, refer to Section 3.5.

Public authorities should only keep digital photographic images that provide the best evidence of business activity. Ephemeral photos should be disposed.

3.2.7 Digital photographic image optimisation

Where any type of image optimisation is desired (e.g. crop, adjust shadow and tones, change the colour balance, rectify faults, restore etc.), the master images should be preserved and a working copy created.

³² *General Retention and Disposal Schedule for Administrative Records*,
<www.archives.qld.gov.au/downloads/GeneralDisposalSchedule.pdf>

Editing and processing may be useful to achieve better quality images, highlight what is relevant or reduce an image's size. A common example of the need for working copies to be made from the master image will be to produce an image at lower resolution for the purposes of delivery or display (e.g. on websites) (see Section 3.3.3 for more information).

Any optimising of images will affect the quality of the image file. If the image is being used as evidence in court, it is important that changes are recorded, e.g. optimisation procedures may be documented as part of organisational procedures with any variations recorded in the metadata for the digital image. Any adjustments must be repeatable – an appropriately trained technician should be able to recreate the working copy from the master image if necessary.³³

Any copies that have been optimised should be named in a way that connects them to the master and shows that they are new working copies of the master image.³⁴

3.2.8 Characteristics of 'full and accurate' digital photographic public records

Table 2 in Section 2.5.1 illustrates the general characteristics of full and accurate records. Table 3 tailors this information in relation to digital photographic images.

Table 3: Characteristics of Full and Accurate Digital Photographic Public Records

Attribute	Requirement
Adequate:	Images that document more important or higher risk transactions or processes need to meet higher quality requirements (e.g. resolution, use of lossless compression etc.) than images which document low risk activities.
Complete:	To provide a complete public record, a digital photographic image should contain not only content, but the necessary structural and contextual information (including who captured the image, whether the image relates to other records, copyright information etc.) to document and make sense of the business transaction.
Meaningful:	Digital photographic images must be able to be understood within the context of the processes and business for which they are created and used. For example, a photograph of the construction of a new tunnel will be of limited value without supporting information such as date, location, and other relevant information.
Accurate:	If images are re-sized or converted, the image must still be fit for its intended purpose, and remain a true and accurate representation of the transactions, activities, or facts to which the image attests. Changes should be recorded (as part of organisational procedures) to ensure editing or modification has not sacrificed accuracy.

³³ State Records NSW, *Managing digital records (Guideline 22)*, <www.records.nsw.gov.au/recordkeeping/government-recordkeeping-manual/guidance/guidelines/guideline-22-managing-digital-records/5-2-managing-born-digital-images>

³⁴ *Basic Guidelines for Image Capture and Optimisation*, <www.jiscdigitalmedia.ac.uk/stillimages/advice/basic-guidelines-for-image-capture-and-optimisation/>

Attribute	Requirement
Authentic:	An authentic digital photographic image is one that can be proven and trusted to be what it purports to be. An image identified as a public record must always be able to be relied upon as an authentic record. Any optimising or alterations to images should result in a working copy.
Inviolate:	To be regarded as inviolate, the digital photographic image identified as a public record must be securely maintained to prevent unauthorised access, alteration, removal or destruction. Documented procedures must be available to demonstrate any internal or external processes used to modify images.
Accessible:	The file format must enable the image to be found and viewed. For example, the image cannot be converted to a format that is highly compressed and easy to store, but inaccessible.
Useable:	Images must be fit for purpose. If an image is required to be captured at a high resolution whereas the actual image is captured at a low resolution and is highly pixelated, then the image will not be able to be used for its intended purpose.

3.2.9 Metadata considerations

A key to ensuring that images are authentic, meaningful, useable and accessible is ensuring that sufficient metadata is associated with the images. *ISO 15489 Records Management* defines metadata as 'data describing the context, content and structure of records and their management through time'.³⁵

All digital cameras record a wide range of metadata when an image is captured. Metadata captured includes simple information like the date and time the image was taken, to information about the specific camera and actual camera settings used to capture the image. In cameras with GPS sensors, the location of the image can be included in the metadata information package at the time of creation. Accuracy of camera system information such as GPS location and date/time should be periodically checked to ensure accuracy.

Metadata requirements for images which are public records go beyond the implicit metadata recorded at the time of image capture (such as file size, type and date created). Additional metadata requirements can include capturing information about how an image is used or managed as well as data about the image itself. This additional metadata may provide important assurance of the authenticity of the record. Some metadata is written by the recording device and some requires manual input by the photographer after transfer from the recording device to the storage medium. It is recommended that the recording device should embed as much of the metadata associated with a digital image at the time of capture where possible.

To facilitate the ongoing management and retrieval of digital photographic images which are public records, Queensland public authorities must adhere to at least the minimum mandatory requirements of *Queensland Recordkeeping Metadata Standard and Guideline* (QRKMS),³⁶ as specified in Principle 7 of *Information Standard 40: Recordkeeping*. Appendix B of the Standard specifies the minimum mandatory elements required to enable appropriate recordkeeping.

³⁵ Standards Australia (2002) AS ISO 15489.1-2002 *Information and Documentation: Records Management* section 3.12.

³⁶ *Queensland Recordkeeping Metadata Standard and Guideline*, <www.archives.qld.gov.au/downloads/QRKMS.pdf>

Much of the metadata elements required as part of the QRKMS will often be captured as part of a larger 'transaction sequence'.

For digital images, metadata is especially important in facilitating retrieval. The most effective way to locate specific information will be through its metadata. Metadata allows for sorting of information, and makes it possible to locate, use, and evaluate information through standard search criteria. Metadata can be used to sort digital photographic images by elements such as size and type, date modified, date picture was taken, author/photographer, title, numerical identifier or keyword, camera model, picture dimensions, owner, and copyright information.

Metadata should be retained and managed in a way that ensures its reliable association with the relevant image, for the required retention period of the image and following an image's destruction.

Where digital images are transferred between systems or transferred from third party capture, it is important that the metadata associated with the digital image is transferred with the image.

3.2.10 Digital photographic images containing personal information

Digital photographic images contain personal information if the identity of the individual captured is apparent or can be reasonably ascertained. If so, any information concerning that individual (e.g. that they are within a photograph at that particular time) constitutes that individual's personal information. Other personal information relating to the digital photographic images may also be captured, including:

- the 'descriptive metadata', if it names those depicted
- the 'technical metadata', if it says who worked on the image
- user data, if personal information is collected when people register to use the images.

In capturing personal information via digital photographic images, the public authority must comply with the relevant Information Privacy Principles set out in the *Information Privacy Act 2009*.³⁷

The Office of the Information Commissioner has released *Information Privacy Act 2009 Guidelines* which are intended to assist agencies and members of the public to understand the privacy principles and the privacy rights and obligations contained in the *Information Privacy Act 2009*.³⁸

It is recommended that agencies consult the above document together with this Guideline (*Managing Digital Photographic Images*), as this Guideline contains only summary information on selected aspects of the Information Privacy Principles most relevant to the collection and management of digital photographic images.

Refer to Appendix F: Information Privacy Requirements for a summary of the collection requirements relating to Information Privacy Principles 1 – 3: Collection of Personal Information.

³⁷ *Information Privacy Act 2009*, <www.legislation.qld.gov.au/LEGISLTN/CURRENT/I/InfoPrivA09.pdf>

³⁸ *Right to Information and Privacy Guidelines*, <www.oic.qld.gov.au/files/IPAGuidelines/Privacy%20Guideline%20%28complete%29%20-%2030-06-09.pdf>

3.2.11 Photo consent forms

Public authorities must ensure that any images, captions used on images and any acknowledgements of authorship, comply with the Information Privacy Principles (or National Privacy Principles for Queensland Health) of the *Information Privacy Act 2009*³⁹ insofar as collection, storage, use and disclosure of personal information are concerned.

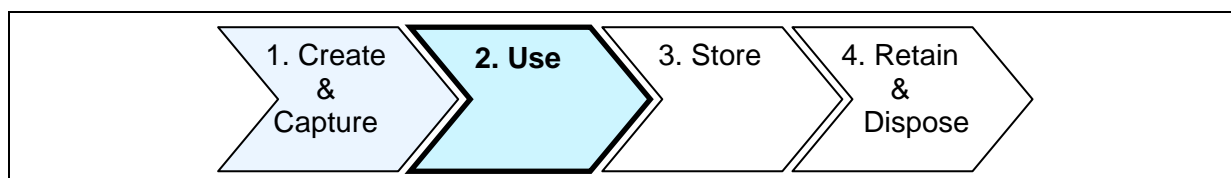
Where a public authority may collect digital photographic images which contain personal information, a Photo Consent Form must be obtained if the image is to be used in any communication or marketing material to comply with the requirements of Information Privacy Principle 2 of the *Information Privacy Act 2009*. This is to ensure that the individual being photographed is aware of the purpose of its collection, any legal requirements for collection, and the possibility that the image may be disclosed, or passed to another public authority.

A signed Photo Consent Form will be required for:

- any photo or recording that depicts a recognisable person
- parents or guardians of, or other persons responsible for, children
- images of Queensland Government employees during the course of their duties
- recognisable or non-recognisable individuals in any setting where personal information (e.g. name of their vital statistics) will be documented in the corresponding caption
- where an individual has been asked to sit for a photograph or a recording and there is no modelling contract in place with the individual which allows the Queensland Government to use the image.⁴⁰

3.3 Use

The second of the key recordkeeping processes relates to ensuring that use of digital photographic images is appropriate (identified in Figure 1). Section 3.3 provides a detailed discussion outlining the key considerations specifically related to the use of digital images, including image resolution, file formats, and privacy considerations.



The intended use of digital photographic images will influence a number of factors such as image resolution, compression used and file formats for delivery. There are also a number of other considerations relating to privacy requirements as specified by the *Information Privacy Act 2009*.

³⁹ *Information Privacy Act 2009*, <www.legislation.qld.gov.au/LEGISLTN/CURRENT/I/InfoPrivA09.pdf>

⁴⁰ The Queensland Government Photo Consent Form can be found at: <<http://premiers.govnet.qld.gov.au/policies/downloads/photo-consent-form-guidelines.pdf>>. This form is accessible to Queensland Government only. All Queensland Government agencies are participating in and contributing images towards the secure online Queensland Government Image Library project <www.imagelibrary.qld.gov.au>. For more information about the Queensland Government Image Library, refer to Appendix E or visit the Queensland Government Image Library Toolbox at <<http://premiers.govnet.qld.gov.au/policies/imagelibrary.html>>. For queries to the project team, email: images@premiers.qld.gov.au.

3.3.1 Key recordkeeping considerations

To assist public authorities to identify the key recordkeeping requirements related to use, the following checklist is provided. Greater detail is provided throughout Section 3.3 on each of the key recordkeeping considerations identified below.

Use – Key Recordkeeping Considerations	
Appropriate compression methods are used to ensure digital photographic images remain suitable for all reasonable business purposes.	<input type="checkbox"/>
Watermarks are not applied to master images.	<input type="checkbox"/>
Moral rights are applied where required.	<input type="checkbox"/>
Appropriate copyright information is applied to digital photographic images, and the GILF Creative Commons licensing applied.	<input type="checkbox"/>
Use of personal information and disclosure of personal information contained within digital photographic images is in accordance with Information Privacy Principles 8, 9, 10 and 11.	<input type="checkbox"/>

3.3.2 Digital photographic image compression

Compression is a way of encoding a file's data more concisely or efficiently by squeezing or squashing the file. Image files tend to be very large and sometimes compression is required to save space or assist delivery. Compression is generally divided into two categories: lossless or lossy compression.⁴¹

Lossless: Uses redundancy reduction techniques which find patterns and repetitions in the image data and expresses these more efficiently. For example, if there are 25 black pixels in a row, during lossless compression information would be recorded for one pixel, with directions that the next 24 are all the same, rather than recording each pixel separately. The common .zip format is an example of lossless compression if used to 'zip' a collection of text documents, the exact same documents will be reconstructed once 'unzipped'.

With lossless compression, the decompressed image is identical to the original.

Lossy: Uses some redundancy reduction techniques combined with irrelevancy reduction techniques which aim to remove or alter information that makes little or no difference to the user's perception of the image. For example, some of an image's colour information can be simplified without perceptible changes. In extreme cases lossy compression can compromise the quality of the image. Lossy compressions transform and simplify the image information in a way that gives much larger reductions in file size than lossless compressions.⁴²

With lossy compression, the decompressed image is different to the original. The loss of information is permanent and irretrievable once lossy compression is applied.

⁴¹ State Records NSW, *Managing digital records (Guideline 22)*, <www.records.nsw.gov.au/recordkeeping/government-recordkeeping-manual/guidance/guidelines/guideline-22-managing-digital-records/5-2-managing-born-digital-images>

⁴² *File Formats and Compression*, <www.jiscdigitalmedia.ac.uk/crossmedia/advice/file-formats-and-compression/>

The majority of digital cameras (specifically cheaper consumer models) capture images in the JPEG file format. As outlined in Section 3.2.5, JPEG uses a lossy compression format. Alternatively, high end professional cameras will likely have the capability to capture images in TIFF or RAW file formats (which use lossless compression). For master images captured in JPEG (lossy compression) format, any manipulations to the image or additional saving (resulting in multiple generations of the image) will result in image degradation. Any alterations should be saved as a working copy to preserve the master image.

The application of lossless compression can be used to cut file sizes by as much as 50 per cent. In contrast, a lossy compression can reduce the file size to as little as one per cent of the original, although anything less than 10 per cent is likely to distort the file's content. The trade off however, is that a lossy compression is by definition irreversible – it permanently disposes of information.

Lossless compression is recommended where possible:

- **for images that are required to be retained according to requirements expressed in a retention and disposal schedule**
- **as no information is irretrievably lost in the compression process.**

Once decompressed, a lossless image will always appear exactly the same as the original, uncompressed, image. Lossy compression can be used for images intended as working copies (e.g. for display on websites).⁴³ Compression algorithms used should be open (i.e. not patented) and they should be captured in a non proprietary format.⁴⁴

3.3.3 File format for delivery

In some cases agencies may need to 'deliver' images to users (e.g. via email or downloaded from websites, via display on websites, through PowerPoint presentations etc.). Consideration will need to be made as to what formats are most appropriate for the required task. For example, delivering images through a web browser means formats supported by web browsers will need to be selected, such as JPEG or PNG.

As specified in Section 3.2.4, digital photographic images retained as public records should be stored at a resolution setting appropriate for all reasonable business uses, and a working copy made that is appropriate to the form of output.

3.3.4 Watermarks

A watermark is information stored in or on a digital image, which allows image creators to store copyright or branding information to images, audio and video files and documents. Watermarks are applied to images in hopes of reducing misuse or unauthorised distribution of images.

If a public authority is debating whether or not to watermark, an alternate option could be to consider controlling the use of the images by creating working copies and limiting the quality and size of publicly accessible images.

⁴³ *File Formats and Compression*, <www.jiscdigitalmedia.ac.uk/crossmedia/advice/file-formats-and-compression/>

⁴⁴ State Records NSW, *Managing digital records (Guideline 22)*, <www.records.nsw.gov.au/recordkeeping/government-recordkeeping-manual/guidance/guidelines/guideline-22-managing-digital-records/5-2-managing-born-digital-images>

There is a need to ensure that metadata concerning ownership and copyright information travels with images, either in embedded file information or associated metadata records.⁴⁵

While watermarks can assist in controlling the use and distribution of images, they can also degrade the image when layered on top, and can obscure image content. The use of electronic watermarks (or 'invisible' watermarks⁴⁶) is suggested as an alternative to visible watermarks.

Watermarks should only be applied to working images, not to images identified as public records.

3.3.5 Moral rights

Moral rights provide recognition of an attribution to individual creators of images and other materials where the author can be identified. Moral rights provide the creator with the ability to protect the artistic integrity of their work. Moral rights can be summarised as follows:

- the right of the author of a work to be acknowledged as the author or creator
- the right of the author to not have authorship falsely attributed
- the right not to have his or her work subjected to 'derogatory' treatment.

Within a digital environment, moral rights are important to adhere to because of the ease with which content can be altered, changed and manipulated. If digital images are reproduced electronically, it is important to ensure that they are reproduced in their entirety unless permission has been secured from the rights holder to do otherwise.

Whilst copyright is a property right which can be transferred through being sold, being assigned or through legacy, moral rights cannot be transferred however they can be waived. For further information, the Queensland Government Image Library has produced a fact sheet on moral rights and digital photographic images.⁴⁷

3.3.6 Copyright

The Government Information Licensing Framework (GILF) is a flexible licence management tool for Queensland Government departments to manage the use of government information in an online environment. GILF:

- is based on the Creative Commons (Australia) philosophy
- contains six Creative Commons licences plus a restrictive licence template, as shown in Appendix G: Overview of GILF Licences
- offers a range of copyright licences that departments can use to licence government information before it is released by the Department or shared within the Queensland Government environment⁴⁸.

Public authorities should apply appropriate licences when making images available⁴⁹. Each licence provides a range of options with increasing levels of restriction. GILF makes it easy

⁴⁵ This functionality is incorporated within the Queensland Government Image Library – a whole-of-Government secure online image management solution for all state government departments (see Appendix E).

⁴⁶ An invisible watermark is an overlaid image which *cannot* be seen, but which *can* be detected algorithmically. The invisible watermark could be used so as any manipulation of an image would result in the watermark being destroyed (potentially useful in proving authenticity of an image), or used so as digital detection would indicate the source of the image. As with other watermarking methods, the use of invisible watermarks will change (degrade) an image.

⁴⁷ Moral Rights guidelines when using images,

<http://premiers.govnet.qld.gov.au/policies/downloads/moral_rights_photography.pdf>

⁴⁸ Government Information Licensing Framework, <www2.dpi.qld.gov.au/extra/era/GILF_Guidelines.pdf>

for people who use digital photographic images to understand the rights of use associated with the material.⁵⁰

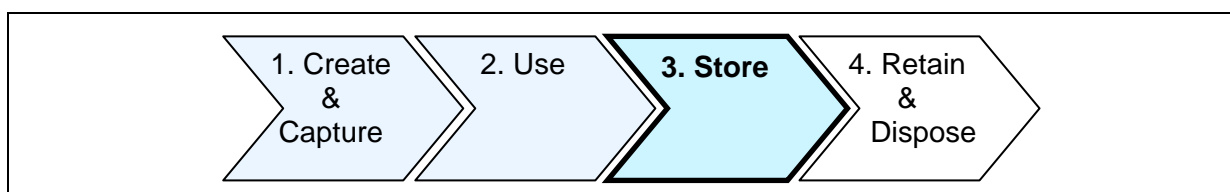
Note: Copyright Law in Australia dictates that the photographer of an image owns the copyright of that image unless this is explicitly transferred (e.g. in a contract), or if the photographer takes an image as part of the terms of their employment. Where a public authority hires a photographer to take images, the public authority does not own the copyright unless this is explicitly transferred in an agreement.

3.3.7 Personal information

Use and disclosure of personal information is governed by the *Information Privacy Act 2009*. For more information relating to use and disclosure of personal information, refer to Appendix F: Information Privacy Requirements⁵¹.

3.4 Storage of images

The third of the key recordkeeping processes (see Figure 1) associated with digital photographic images relates to storage. This section outlines the key characteristics specifically related to storage of digital photographic images.



Under the *Public Records Act 2002*, public authorities must take all reasonable action to ensure public records which require the use of particular equipment or information technology remain accessible (section 14 of the Act).

3.4.1 Key recordkeeping considerations

To assist public authorities to identify the key recordkeeping requirements related to storage, the following checklist is provided. Detailed information is contained within Section 3.4 for each of the following key recordkeeping considerations.

Storage – Key Recordkeeping Considerations	
Digital photographic images captured into and managed by recordkeeping systems are accessible and meaningful, and maintained with appropriate controls to ensure the attributes of full and accurate records are retained.	<input type="checkbox"/>
Storage media is selected and implemented to ensure ongoing availability and longevity of digital photographic images, taking into consideration retention periods; protection requirements and storage capacity requirements.	<input type="checkbox"/>

⁴⁹ The Queensland Government Image Library has developed a fact sheet specifically created for digital photographic images and the application of Creative Commons licences. This fact sheet is available at: <<http://premiers.govnet.qld.gov.au/policies/imagelibrary.html>>

⁵⁰ *Government Information Licensing Framework*, <www.qgcio.qld.gov.au/SiteCollectionDocuments/Architecture%20and%20Standards/QGEA%202.0/GILF%20Guideline.pdf>

⁵¹ Specific advice relating to the operation of the *Information Privacy Act 2009* may be obtained from the Office of the Information Commissioner, Queensland, via <www.oic.qld.gov.au/information-privacy> or by email: enquiries@oic.qld.gov.au.

Storage – Key Recordkeeping Considerations	
Media decay is monitored, and migration to new file formats over time to ensure accessibility is considered.	<input type="checkbox"/>
A reliable system and documented processes are in place to ensure digital photographic images remain secure from unauthorised access, damage and misuse, in accordance with <i>Information Standard 18: Information Security</i> .	<input type="checkbox"/>
Storage of digital photographic images is in accordance with Information Privacy Principle 4.	<input type="checkbox"/>

3.4.2 Recordkeeping system specifications

In accordance with Principle 4 of *Information Standard 40*, recordkeeping must be managed through an identifiable recordkeeping program that includes records in all formats, and be administered by appropriately skilled staff. Public authorities must implement an identifiable records management program with documented policies, procedures, and business rules. A record's capture and storage within a suitably designed and implemented recordkeeping system will support its continuing authenticity, integrity, reliability and useability.

Public authorities should aim to manage digital photographic images by capturing them within a recordkeeping system, such as an Electronic Document and Records Management System (eDRMS) or other business system with recordkeeping functionality. Alternatively, digital photographic images should be stored securely, with appropriate controls to ensure the attributes of full and accurate records are retained, with metadata captured into a recordkeeping system.

These recordkeeping systems should have accurately documented policies, assigned responsibilities and formal methodologies for their management.

3.4.3 Storage media considerations

Digital photographic images are recommended to be stored in active systems or in a RAID (Redundant Array of Independent Disks) hard drive rather than on removable media (e.g. CDs, DVDs) if they are:

- **vital to business processes**
- **required to be retained for long periods of time or permanently**
- **to be used in legal or judicial proceedings.**

Digital records such as digital photographic images face a number of special challenges such as technological obsolescence and media degradation. Due to these special challenges, digital records must be carefully managed for as long as they are required to support accessibility, accountability, good business and the expectations of the public.

When assessing storage options, considerations should be made to the quality, durability, permanence and reliability of media. Where the length of the required minimum retention period warrants, archive-quality materials should be chosen to safeguard the longevity of the records⁵².

Digital storage media options include the following:

- magnetic tape

⁵² The Queensland Government Image Library project team can be contacted in relation to the whole-of-Government secure online image management solution available to Queensland Government departments for advice in relation to image management needs. For queries to the project team, email images@premiers.qld.gov.au.

- WORM (Write-Once, Read-Many) media
- re-useable, removable, non-tape media, such as memory cards
- network servers with disk-based storage
- disk based storage on desktop computers and/or laptops.

Many public authorities generally keep digital photographic images on either network servers or Write-Once Read-Many (WORM) technologies. WORM technologies are currently found in the form of optical discs such as CDs and DVDs, magnetic disks and tape. Given that WORM media is inherently non-editable, it brings the protection that data cannot be altered, over-written or corrupted. The one-time nature of WORM media means that it is often admitted as evidence in court.

Several issues exist however, in relation to the management of WORM media. A CD, for example, is more easily able to be destroyed, damaged, or removed from its environment. Being more transportable, audit trails are not automatically generated unlike records stored on servers. Additionally, once it has been noticed that the media has failed it is often too late to retrieve the required data. In terms of preservation, the current thinking is that CD/DVDs may be at risk of end-of-life and obsolescence within 10 to 20 years. The drives required to read media can also become obsolete before the actual media itself reaches expiry.

Where WORM devices are used, the Senior Managers of Australian and New Zealand Forensic Laboratories (SMANZFL) *Australasian Guidelines for Digital Imaging Processes* recommends that 'generally CD-R, DVD-R, digital tapes, etc., are designed for short-to-medium term storage periods. To ensure the integrity of the data the files need to be transferred to new media regularly, or transferred to professionally managed data management archive systems.'

One of the biggest challenges associated with digital storage devices is identifying when it is appropriate to replace them. Deterioration of digital storage devices may not become obvious until the point of data loss and, by that stage it can often be too late to salvage the records. Due to the limited life expectancy of digital media, no digital storage medium is adequate for the long term or archival preservation of records. Therefore the media will need to be refreshed regularly to avoid obsolescence. To be able to reliably locate records stored on external media it is important to retain appropriate indexes of records through full and accurate metadata.

Appropriate recordkeeping practices should be developed to ensure that the media bearing digital photographic images and associated metadata does not degrade and that the media can be replayed in the future. While use of rewritable media such as CD-RW/DVD-RW may be appropriate for short term storage, it is not recommended as a long term solution. Rewritable media has a much shorter life expectancy compared to WORM media, and is susceptible to loss or alteration of content as a result of the rewriting. Refer to Appendix H for best practice handling recommendations for offline media such as CDs and DVDs.

Regardless of the media used, regular auditing should be undertaken to ensure early detection of media decay. To achieve optimum outcomes where WORM media is used, it is recommended that the National Archives of Australia's handling guidelines for optical disks be followed.⁵³ A disadvantage associated with removable storage media is that they tend to be more easily overlooked in back up and migration exercises.

The storage capacity of media should also be taken into account. Where it becomes necessary to store vast quantities of large digital photographic images requiring long-term retention, it may be impractical to transfer the entirety of the records to WORM media, as it

⁵³ *Optical Disks FAQs*, <www.naa.gov.au/records-management/secure-and-store/physical-preservation/faq/optical-disks.aspx>

may take a considerable time to copy, and require many discs. Where single images and short video excerpts are required, CD/DVDs will often be fit for purpose. In contrast, a secure server with attached disk storage offers a central, searchable, metadata-rich repository from which authorised persons can view digital photographic images. Secure servers have the advantage that data can be migrated automatically and with no loss within a RAID system.

Systems which allow the protection of identified sequences from being overwritten offer additional protection for the security of public records. This includes disk-based systems which provide a form of WORM functionality. Additionally, RAID storage allows images to be distributed across multiple hard disk drives, to protect against the failure of a single drive.

Disk-based RAID systems also regularly conduct integrity checking and can perform repairs from the Parity Disk where data integrity is compromised. If the drive is not repairable it is replaced from a 'hot spare'⁵⁴ pool in the array with no data loss. This feature is present in standard RAID arrays and in WORM disk-based storage. In contrast, the WORM devices outlined above have minimal/no data recovery capability if they are damaged.

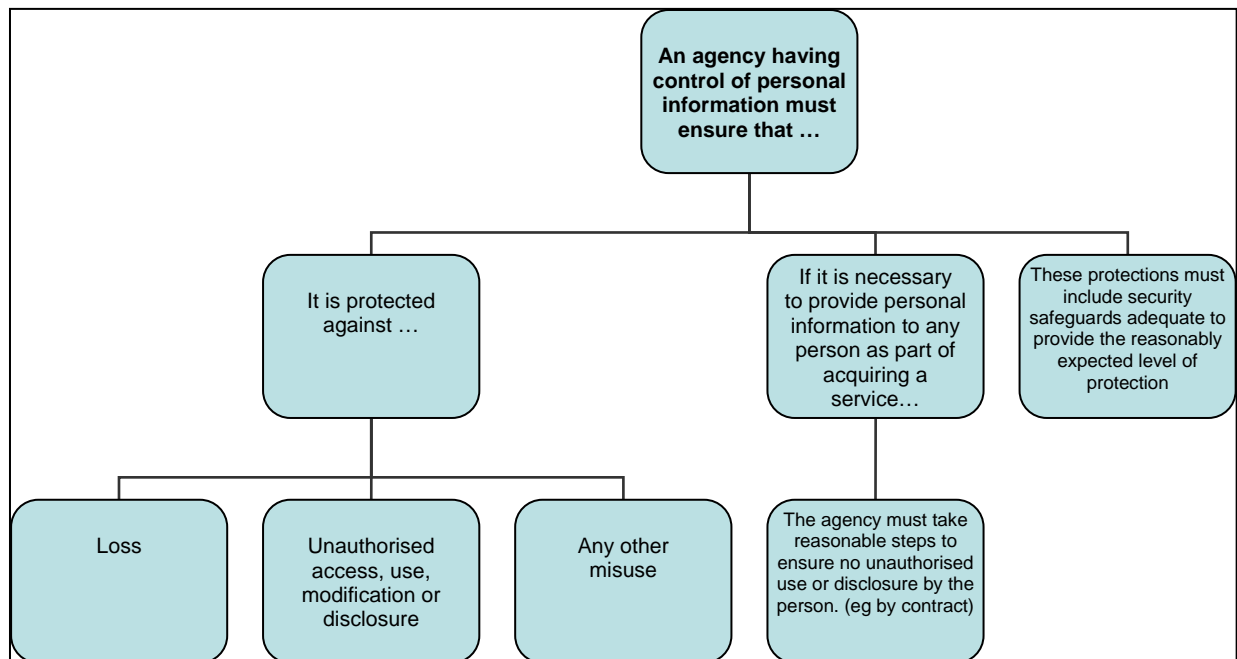
3.4.4 Security

Principle 5 of *Information Standard 40: Recordkeeping* (IS40) requires recordkeeping systems to be reliable and secure. Additionally, Information Privacy Principle 4 of the *Information Privacy Act 2009* relates to the storage and security of personal information.⁵⁵ Where personal information is contained within stored digital photographic images, agencies must comply with Principle 5 of IS40 and Information Privacy Principle 4 to ensure that the personal information is adequately preserved and safeguarded for the life of the record.

Figure 2 and Table 4, summarise the requirements of Information Privacy Principle 4.

Figure 2: Summary of Information Privacy Principle 4 – Storage and Security of Documents

Image used with the permission of the Office of the Information Commissioner, Queensland



⁵⁴ A hot spare is a slice (not a volume) that is functional and available, but not in use. A hot spare is reserved, meaning that it stands ready to substitute for a failed slice in a sub-mirror or RAID 5 volume. A hot spare pool is a collection of slices (hot spares).

⁵⁵ *Information Privacy Act 2009*, <www.legislation.qld.gov.au/LEGISLTN/CURRENT/I/InfoPrivA09.pdf>

Table 4: Security Considerations – Storage and Security of Documents

Used with the permission of the Office of the Information Commissioner, Queensland

The safeguards must apply equally to personal information held in paper form, electronically, as film, photographs, audio or video recording or any other media.

Techniques for securing personal information include securing physical access to personal information, using audit logs to detect security breaches, securing/encrypting portable electronic storage, securing data during and after transmission.

The primary safeguard in protecting documents containing personal information is to limit access only to those who need to access it in order to do their jobs.

The security measures that an agency takes to protect documents containing personal information should be proportionate and appropriate to the possible risk of a security breach and the level of harm that could result from a breach.

Practices that may lead to breaches of security include:

- leaving files containing personal information unattended at a public counter
- not disposing of records in a secure manner
- inadequate controls regarding which staff can access information; for example, inadequate user ID and password control on a database
- storing sensitive data on a laptop computer that is taken 'off-site' and not stored securely
- emailing confidential information
- neglecting to include audit capabilities or audit trails in databases.

Queensland Government *Information Standard 18, Information Security (IS18)* requires all departments and agencies to:

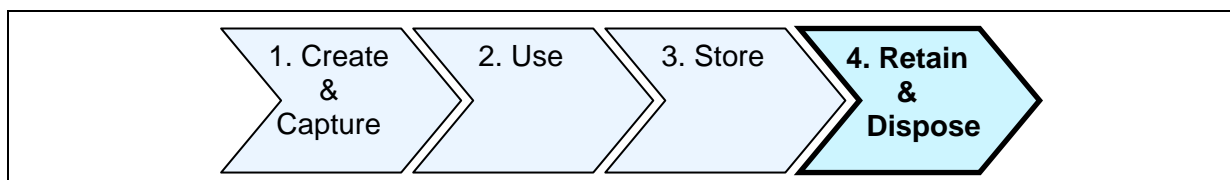
- establish an appropriate information security culture within the department
- satisfy the 10 mandatory information security principles set out in IS18
- implement security measures beyond the minimum requirements commensurate with the information's value, business significance and sensitivity
- adhere to all legal and legislative requirements.

The *Information Privacy Act 2009 Guidelines* released by the Office of the Information Commissioner, Queensland, provide further guidance on the storage and security of personal information.⁵⁶

3.5 Retain and Dispose

The final key recordkeeping component identified in Figure 1 relates to retention and disposal of digital photographic images. Section 3.5 outlines the most significant recordkeeping considerations relating to disposal of digital photographic images.

⁵⁶ *Right to Information and Privacy Guidelines*,
<www.oic.qld.gov.au/files/IPAGuidelines/Privacy%20Guideline%20%28complete%29%20-%2030-06-09.pdf>



Under the *Public Records Act 2002*, disposal of a record includes:

- (a) destroying or damaging the record, or part of it; or
- (b) abandoning, transferring, donating, giving away or selling the record, or part of it.⁵⁷

Note that in the case of electronic records including digital photographic images, disposal includes deleting a record or failing to take the necessary steps to ensure a record's readability/useability over time.

Under section 13 of the *Public Records Act 2002*, the disposal of public records must be authorised by the State Archivist. Such authorisation is generally given in the form of a Retention and Disposal Schedule.

3.5.1 Key recordkeeping considerations

To assist public authorities to identify the key recordkeeping requirements related to retention and disposal, the following checklist is provided. Section 3.5 contains more detailed information about each of the key recordkeeping considerations below.

Retention and Disposal - Key Recordkeeping Considerations	
Digital photographic images are retained appropriately and disposed of lawfully, in accordance with <i>Information Standard 31: Retention and Disposal of Public Records</i> .	<input type="checkbox"/>
Digital photographic images are retained for at least the specified minimum retention period, in accordance with the <i>General Retention and Disposal Schedule for Administrative Records</i> or relevant sector or agency-specific Retention and Disposal Schedule.	<input type="checkbox"/>
Disposal of public records is conducted appropriately and documentation regarding disposal of public records is captured and retained permanently.	<input type="checkbox"/>

3.5.2 Retention and disposal

Information Standard 31: Retention and Disposal of Public Records requires Queensland public authorities to ensure that records are appraised and retained according to accountability, legal, administrative, financial, research and community requirements and expectations.⁵⁸ Records of continuing value need to be identified and retained in a useable form for a minimum period as specified in an approved Retention and Disposal Schedule.

⁵⁷ *Public Records Act 2002*, <www.legislation.qld.gov.au/LEGISLTN/CURRENT/P/PublicRecA02.pdf>

⁵⁸ *Information Standard 31: Retention and Disposal of Public Records*, <www.qgcio.qld.gov.au/SiteCollectionDocuments/Architecture%20and%20Standards/Information%20Standards/Current/is31_print.pdf>

The two mandatory principles of *Information Standard 31* are:

1. Public authorities must ensure public records are retained for as long as they are required.
2. The disposal of public records must be authorised by the State Archivist.

Disposal of digital photographic images retained as public records can only be carried out in accordance with an authorised Retention and Disposal Schedule (e.g. *General Retention and Disposal Schedule for Administrative Records* (GRDS⁵⁹) or a public authority's core-business Retention and Disposal Schedule). The GRDS authorises the disposal of common administrative records for all Queensland public authorities, while an agency-specific Retention and Disposal Schedule only applies to those records relating to the public authority's core business activities. The agency's legislative and operational requirements will be reflected in their Retention and Disposal Schedule through suitable retention periods for digital photographic images. The disposal process should also take into consideration the security classification of the digital photographic images⁶⁰.

Agencies using the GRDS to dispose of digital photographic images that are not used for business purposes, and are not intended for future use, should establish business processes to determine when the disposal action of 'retain until reference ceases' can be applied.

See Section 3.2.6 for questions to consider when appraising digital photographic images to decide the images which provide the 'best' evidence of business activity and those which could be considered ephemeral (and where the disposal action of 'retain until reference ceases' can be applied).

If the use of digital photographic images relates to the core business activities of the public authority, these records should be included in a sector or agency-specific Retention and Disposal Schedule approved by the State Archivist. The agency's legislative and operational requirements will be reflected in suitable retention periods for digital photographic images.

Digital photographic images will not have their own class within the GRDS or agency-specific Retention and Disposal Schedule. Digital photographic images form part of the complete record of a matter. For example, the records contained within section 17.3 of the GRDS *Investigations / Inspections* may contain digital photographic images. These images form part of the complete record of an investigation.

In some cases, a digital photograph may be used for a number of different business purposes. For example, a digital photograph may be taken to document a community relations event, and then be used in a number of different business contexts, including in an agency's annual report. In this case, the agency may need to consider which of a number of different retention periods is suitable to apply⁶¹, and then keep the record for the longest specified period.

⁵⁹ *General Retention and Disposal Schedule for Administrative Records*,
<www.archives.qld.gov.au/downloads/GeneralDisposalSchedule.pdf>

⁶⁰ When disposing of digital photographic images, public authorities must take into consideration the security classification of the records and use appropriate methods to destroy the records beyond any possible reconstruction. The Queensland Government Information Security Classification Framework (QGISCF) details appropriate methods for destroying records beyond any possible reconstruction and provides guidance on media which cannot be sanitised and should be destroyed if they contain or may have contained classified information.
www.qgcio.qld.gov.au/SiteCollectionDocuments/Architecture%20and%20Standards/QGISCF%20v1.0.1.doc

⁶¹ State Records NSW, *Managing digital records (Guideline 22)*,
<www.records.nsw.gov.au/recordkeeping/government-recordkeeping-manual/guidance/guidelines/guideline-22-managing-digital-records/5-2-managing-born-digital-images>

Public authorities requiring further advice on the retention and disposal of public records should contact Queensland State Archives' Agency Services unit.

3.5.3 Custody and ownership

The QSA *Custody and Ownership Guideline* addresses the issue of a public authority's responsibility for public records when those records may not be in its possession. Public authorities should refer to the Guideline to ensure that they are fulfilling their responsibilities for managing digital photographic images identified as public records in accordance with the *Public Records Act 2002*.⁶²

3.5.4 Documenting disposal of public records

Disposal of digital photographic images which are public records must be in accordance with the principles of *Information Standard 31: Retention and Disposal of Public Records*. Public authorities must document the disposal of public records. This documentation must be retained permanently in accordance with the requirements of the GRDS. Public authorities are not required to keep a record of destruction if the digital photographic image is ephemeral⁶³.

Appendix B of the *Queensland Recordkeeping Metadata Standard and Guideline* details the minimum metadata which must be retained after the destruction of a public record. At a minimum, this includes the following:

- unique record identifier
- record title
- record creation date/time
- Queensland Disposal Authority Number (QDAN), version number and reference number under which the records are disposed
- disposal sentence (e.g. Retain for 7 years after last action)
- date of disposal
- authorising officer
- the manner of destruction of the records, and
- who destroyed the records.⁶⁴

⁶² *Custody and Ownership Guideline, Managing Public Records during Outsourcing or Privatisation*, <www.archives.qld.gov.au/downloads/Guideline_Custody_and_Ownership.pdf>

⁶³ *Advice on the Destruction of Public Records*, <www.archives.qld.gov.au/publications/PublicRecordsBriefs/Advice_on_the_Destruction_of_Public_Records.pdf>

⁶⁴ *Queensland Recordkeeping Metadata Standard and Guideline*, <www.archives.qld.gov.au/downloads/QRKMS.pdf>

Appendix A: Glossary

The Glossary below provides clarification and definitions of the terms relating to digital photographic images used in this document.

Records and information management-specific terms are defined in Queensland State Archives' *Glossary of Archival and Recordkeeping Terms* available on Queensland State Archives' website at:

www.archives.qld.gov.au/downloads/GlossaryOfArchivalRKTerms.pdf.

B	
Bit Depth	Bit depth quantifies how many unique colours are available in an image's colour palette in terms of the number of 0's and 1's, or "bits".
D	
Dots Per Inch or DPI	A measure of resolution used for printed text or images and monitor displays.
E	
EXIF	Exchangeable Information File Format (EXIF) is a standard used by camera manufacturers to store camera-created information in the file. This includes camera settings like aperture and shutter speed as well as information like the white balance selected for the image. EXIF also describes the characteristics of the image data itself so programs can know how to open the file properly. In general, EXIF is not supposed to be edited after capture, with the exception of correcting a camera's date/time setting and adding GPS data.
F	
File Size	The file size of a digital image is proportional to its resolution. The higher the resolution, the bigger the file size.
G	
GRDS – General Retention and Disposal Schedule	The <i>General Retention and Disposal Schedule for Administrative Records (GRDS)</i> authorises the disposal of administrative records created by all Queensland public authorities, such as those relating to asset management, financial management and human resources.
I	
Image Analysis	The application of digital processing techniques to extract information from images. Image analysis is used in number plate recognition (NPR) technologies and for facial/iris recognition.
Image Size	Describes the actual physical dimensions of an image, not the size it appears on a given display device.
J	
JPEG – Joint Photographic Experts Group	A lossy compression algorithm for condensing the size of image files. JPEGs are helpful in allowing access to full screen image files online because they require less storage and are therefore quicker to download into a web page.
L	
Lens	An optical device which focuses light onto an image sensor to create a visible image. Lenses are typically made of optical-grade glass and have curved surfaces to converge or diverge transmitted light from an object.

Lossless Compression	Any compression technique where smaller file sizes are achieved without the loss of image data values. The image can be retrieved in its original form.
Lossy Compression	Any compression technique where image data is irretrievably lost in the compression process. The effects of the compression may or may not be visible, but the original data cannot be restored.
M	
Megapixels	Equivalent to one million pixels, commonly employed to describe the resolution of digital cameras (e.g. 7MP).
Metadata	Data about data, or information provided about a digital object in order to provide access to that image. Usually includes information about the original object, intellectual content of the image, digital representation of the data, the creation of the digital files, and security or rights management information.
Moral Rights	The right of integrity and authorship. It provides the right of attribution of authorship and the right to not have authorship falsely attributed, particularly as conferred by the Copyright Act 1968 (Cth).
O	
Optical Resolution	The number of pixels (in both height and width) making up an image, the more pixels in an image, the higher the resolution, and the higher the resolution of an image, the greater its clarity and definition (and the larger the file size).
P	
Personal Information	Information or an opinion (including information or an opinion forming part of a database), whether true or not, and whether recorded in a material form or not, about an individual whose identity is apparent or can reasonably be ascertained from the information or opinion.
Pixel	Pixel is short for picture elements, which make up an image, similar to grains in a photograph or dots in a half-tone. Each pixel can represent a number of different shades or colours, depending on how much storage space is allocated for it.
Pixels Per Inch (PPI)	Pixels per inch refers to the number of pixels captured in a given inch. When referring to digital capture pixels per inch (PPI) is the preferred term, as it more accurately describes the digital image.
R	
Resolution	The measure of the ability of an imaging system to reproduce detail, seen in how clear and sharp a video image will be displayed. The greater the number of pixels, the higher the resolution.
S	
Scene Illumination	The average light level of an identified area, usually measured for the human visible spectrum. Illumination is measured in lux.
T	
TIFF	Tagged Image/Interchange File Format is an open standard file format implemented on a wide variety of computer systems, usually used for archival or master digital capture.
W	
WORM – Write Once, Read Many	WORM, Write-Once, Read-Many, is a storage technology that allows data to be written permanently to an optical medium, preventing alteration or erasure. WORM devices are typically used for archival or judicial purposes.

Appendix B: Legislation specific to digital photographic images

Table 5 provides an overview of selected legislation outlining specific requirements for digital photographic images. This list is not comprehensive and is intended to provide a summary of selected legislation specific to digital photographic images.

Table 5: Legislation outlining specific requirements for photographic images

Legislation	Purpose
<i>Corrective Services Act 2006</i>	Section 10 describes requirements for recording prisoners' details, including photographing them, as well as for the destruction of photographs in certain circumstances.
<i>Electrical Safety Act 2002</i>	Section 144 details rights of an inspector to inspect, measure, test, photograph or film any part of the place or anything at the place.
<i>Evidence Act 1977</i>	Section 107 details evidentiary provisions about the use of photographing machines.
<i>Police Powers and Responsibilities Regulation 2000</i>	Division 3 sets out procedures for identification using photographs.
<i>Police Powers and Responsibilities Act 2000</i>	Section 22 details powers for police officers to inspect, photograph or copy a prescribed item at a place or remove it to a place with appropriate facilities for photographing or copying the item. Section 33 details powers for police officers to search public places without warrant, including power to photograph anything the police officer reasonably suspects may provide evidence of the commission of an offence.
<i>Public Health Act 2005</i>	Section 347 describes the rights of an emergency officer who enters a place to respond to a declared public health emergency to photograph or film any part of the place or anything at the place.
<i>Survey and Mapping Infrastructure Act 2003</i>	Section 62 details evidentiary provisions about the images from the State Remotely Sensed Image Library.
<i>Traffic Regulation 1962</i>	Section 209 details requirements for operating and testing red light cameras and Automatic Number Plate Recognition (ANPR) camera systems to provide evidence of a prescribed offence against the Queensland Road Rules, section 104(1), (2) or (3).
<i>Transport Operations (Road Use Management) Act 1995</i>	Section 118 details inspection and challenge of photographic evidence steps for a person who has been charged with a camera-detected offence to examine a copy of the image from a photographic detection device on which the offence is based.

Appendix C: Digital Images Recordkeeping Checklist

The following checklist is a combination of each of the checklists from the Guideline and is designed to assist public authorities to generate full and accurate digital photographic image records (i.e. records which are adequate, complete, meaningful, authentic, inviolate, accessible, and useable).

Create & Capture	
Digital photographic images are fit for their intended purpose. (see Section 3.2.2)	<input type="checkbox"/>
Procedures for the creation and capture of digital photographic images have been developed and implemented. (see Section 3.2.3)	<input type="checkbox"/>
Digital photographic images are captured at an appropriate quality and resolution setting necessary for their intended purpose. (see Section 3.2.4)	<input type="checkbox"/>
Digital photographic images are captured in suitable file formats e.g. TIFF, JPEG, PNG or Adobe DNG. (see Section 3.2.5)	<input type="checkbox"/>
Documented business processes are in place to identify images as public records. (see Section 3.2.6)	<input type="checkbox"/>
Digital photographic images identified and retained as public records are preserved as 'master' images with working copies created where appropriate. (see Sections 3.2.6 & 3.2.7)	<input type="checkbox"/>
Mandatory recordkeeping metadata ⁶⁵ associated with the capture of digital photographic images is created and captured. (see Section 3.2.9)	<input type="checkbox"/>
The public authority's collection of personal information is in accordance with Information Privacy Principles 1 – 3. (see Sections 3.2.10 & 3.2.11)	<input type="checkbox"/>
Use	
Appropriate compression methods are used to ensure digital photographic images remain suitable for all reasonable business purposes. (see section 3.3.2)	<input type="checkbox"/>
Watermarks are not applied to master images. (see Section 3.3.4)	<input type="checkbox"/>
Moral rights are applied where required. (see Section 3.3.5)	<input type="checkbox"/>
Appropriate copyright information is applied to digital photographic images, and the GILF Creative Commons licensing applied. (see Section 3.3.6)	<input type="checkbox"/>
Use of personal information and disclosure of personal information contained within digital photographic images is in accordance with Information Privacy Principles 8, 9, 10 and 11. (see Section 3.3.7)	<input type="checkbox"/>

⁶⁵ Queensland Recordkeeping Metadata Standard and Guideline, www.archives.qld.gov.au/downloads/QRKMS.pdf

Store	
Digital photographic images captured into and managed by recordkeeping systems are accessible and meaningful, and maintained with appropriate controls to ensure the attributes of full and accurate records are retained. (see Sections 3.2.8 & 3.4.2)	<input type="checkbox"/>
Storage media is selected and implemented to ensure ongoing availability and longevity of digital photographic images, taking into consideration retention periods; protection requirements and storage capacity requirements. (see Section 3.4.3)	<input type="checkbox"/>
Media decay is monitored, and migration to new file formats over time to ensure accessibility is considered. (see Section 3.4.3)	<input type="checkbox"/>
A reliable system and documented processes are in place to ensure digital photographic images remain secure from unauthorised access, damage and misuse, in accordance with <i>Information Standard 18: Information Security</i> . (see Section 3.4.4)	<input type="checkbox"/>
Storage of digital photographic images is in accordance with Information Privacy Principle 4. (see Section 3.4.4)	<input type="checkbox"/>
Dispose	
Digital photographic images are retained appropriately and disposed of lawfully, in accordance with <i>Information Standard 31: Retention and Disposal of Public Records</i> . (see Section 3.5.2)	<input type="checkbox"/>
Digital photographic images are retained for at least the specified minimum retention period, in accordance with the <i>General Retention and Disposal Schedule for Administrative Records</i> or relevant sector or agency-specific Retention and Disposal Schedule. (see Section 3.5.2)	<input type="checkbox"/>
Disposal of public records is conducted appropriately and documentation regarding disposal of public records is captured and retained permanently. (see Sections 3.5.3 & 3.5.4)	<input type="checkbox"/>

Appendix D: Comparison of File Formats, Image Compression and Pixels

Table 6 provides a comparison between the file sizes of JPEG and TIFF images.

Table 6: Comparison of file size between JPEG and TIFF images (24 bit)

Pixel Dimensions	Megapixels	JPEG File Size	TIFF File Size
2700 x 1800	4.8	2.2 MB – 3.8 MB	14.2 MB
4050 x 2700	10.9	4.3 MB – 7.1 MB	32 MB
5400 x 3600	19.4	6.7 MB – 10.8 MB	56.9 MB

The following image (at 200 per cent magnification) provides a comparison between an image with no compression (image below left), and one with 10% (high) compression (below right).⁶⁶ At 100 per cent magnification, there will be little visual difference between images. As outlined in Sections 3.2.4 and 3.2.5, the chosen image file format and resolution will be dependent upon all reasonable business uses. For example, if a high level of detail is required in an image (e.g. to identify individuals), a higher resolution may be required.



Master Image

Compressed Image

The more pixels there are in relation to the area, the higher the resolution. The higher the resolution, the sharper the image is and the larger the file. The picture below left has a ppi of 150; the picture below right has a resolution of 50 ppi.⁶⁷



150 PPI



50 PPI

⁶⁶ Image types: JPEG and TIFF files, <www.cambridgeincolour.com/tutorials/imagetypes.htm>

⁶⁷ File Format Guidelines for Preservation and Long-term Access, <www.collectionscanada.gc.ca/digital-initiatives/012018-2220.04-e.html>

Appendix E: Example Quality Specifications

The following examples provide an indication of image quality specifications specific to each scenario. Image quality specifications in your public authority will likely be lower than the examples provided below.

Queensland Government Image Library

The Queensland Government Image Library⁶⁸ is a secure online image library resource. The library recognises that digital images are a key communication element, used to help promote Queensland Government priorities, messages and information to the public. The library recognises that images are integral to reflecting the key activities of each department.

Images submitted to the Library must be:

- a high resolution
- at least 3600 pixels (A4) on the longest side and no more than 5400 pixels (A3) on the longest side
- 300 ppi, and
- recognisable persons in images must have signed Queensland Government photo consent forms.

Image file format should be in JPEG saved at maximum quality level 12 compression, TIFF Images can also be submitted but be aware they are often significantly larger and will take up more space than a JPEG.

Image colour mode should preferably be in either sRGB or AdobeRGB, the Library can generate JPEG derivatives from these formats that are suitable for print and web applications.⁶⁹

National Archives and Records Administration (NARA)

According to NARA's policy for digital photographs⁷⁰, before government agencies may transfer permanent digital photographs to NARA, the files must meet minimum quality standards, and have descriptive and technical metadata. The minimum quality standards for colour digital photographs are:

- 24 or 48-bit colour RGB files
- captured on a digital camera at 6 megapixels or greater (minimum pixel array of 3000 x 2000 pixels).

NARA will accept digital photographs in TIFF file formats that are compressed using a lossless compression method (e.g. LZW, RLE). If available, NARA prefers that agencies transfer uncompressed versions of these files.

NARA will accept permanent digital photographs in the JPEG file format, using at least high quality compression settings (or better).

Agencies transferring permanent digital photographs to NARA must also provide descriptive metadata including:

- a documented unique identification number
- a caption

⁶⁸ Queensland Government Image Library, <www.imagelibrary.qld.gov.au/>

⁶⁹ Conditions of use for the Queensland Government Image Library, <<http://premiers.govnet.qld.gov.au/policies/downloads/image-library-conditions-of-use.pdf>>

⁷⁰ Expanding Acceptable Transfer Requirements: Transfer Instructions for Permanent Electronic Records, Digital Photographic Records, NARA, <www.archives.gov/records-mgmt/initiatives/digital-photo-records.html>

- the name of the photographer, and
- copyright information.

The technical metadata requirements are file format, bit depth, image size, image source, compression, ICC/ICM profile and EXIF information.

Picture Australia

As a further example, Picture Australia (which includes over 1.78 million images from the National Library collection, together with images from the collections of other libraries, museums, archives and galleries from across Australia and overseas) uses the Dublin Core (DC) metadata schema. For promotional purposes, contributors are required to supply a number of representative images from their collection, preferably as TIFF files with a resolution of at least 300 dpi.⁷¹

⁷¹ Picture Australia Service Guide, <www.pictureaustralia.org/contribute/guide.html>

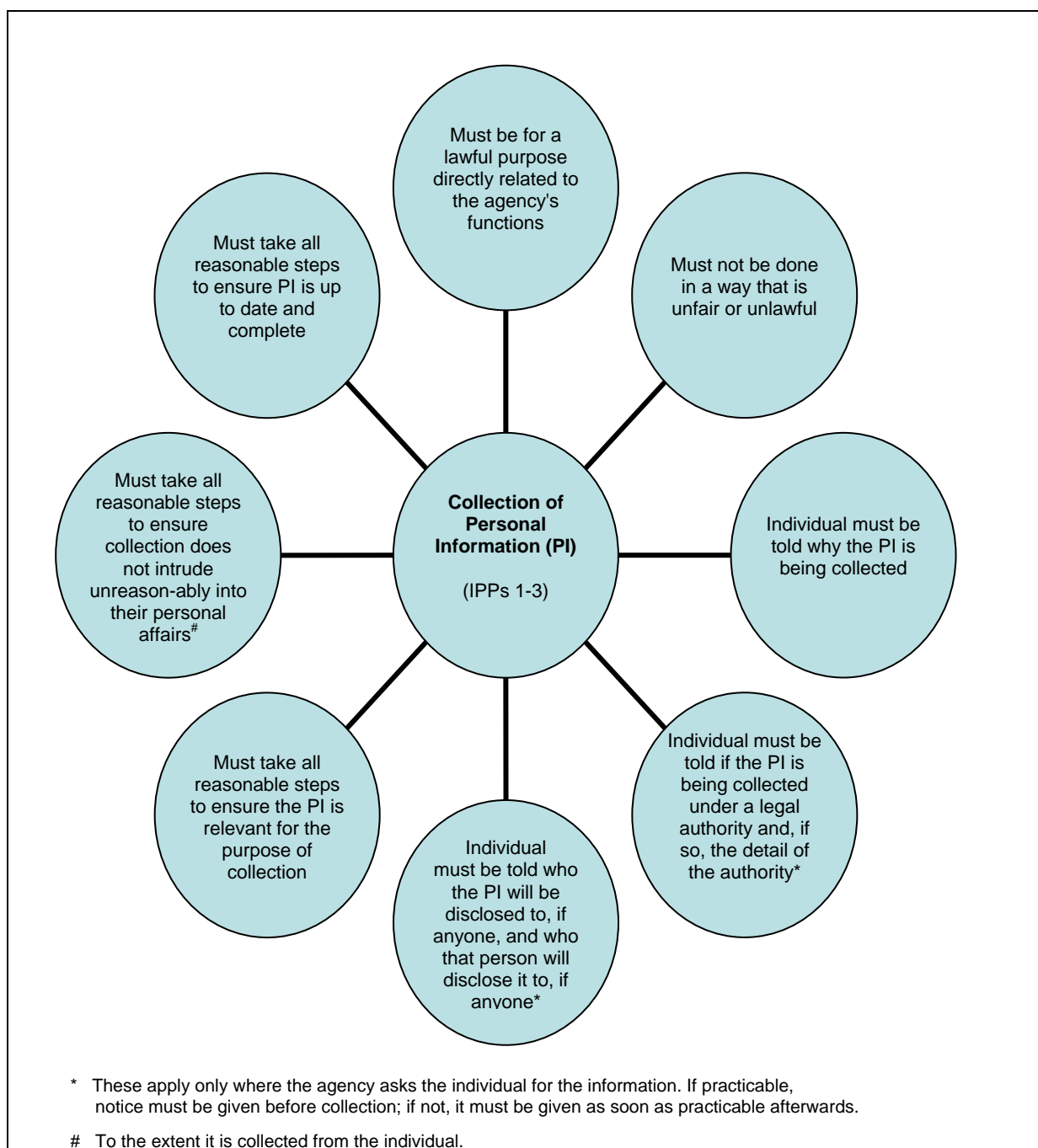
Appendix F: Information Privacy Requirements

Information Privacy Principles 1 – 3: Collection of Personal Information

Information Privacy Principles 1 – 3 relate to the collection of personal information by a public authority. Figure 3 summarises the aspects of these three Information Privacy Principles.

Figure 3: Summary of Information Privacy Principles 1-3 – Collection

Image used with the permission of the Office of the Information Commissioner, Queensland



Before Using Personal Information

Use of personal information is governed by the *Information Privacy Act 2009* through Information Privacy Principles 8 and 9. Information Privacy Principles 8 and 9 relate to accuracy of personal information and using only relevant personal information, as detailed in Figure 4. Use is also governed by Information Privacy Principle 10, which outlines when personal information may be used, and is addressed below. When a public authority intends to use digital photographic images containing personal information, it must comply with these Information Privacy Principles.

Figure 4: Information Privacy Principles 8 and 9⁷²

<p>Information Privacy Principle 8 – Checking of accuracy etc. of personal information before use by agency Before an agency uses personal information contained in a document under its control, the agency must take all reasonable steps to ensure that, having regard to the purpose for which the information is proposed to be used, the information is accurate, complete and up to date.</p> <p>Information Privacy Principle 9 – Use of personal information only for relevant purpose (1) This section applies if an agency having control of a document containing personal information proposes to use the information for a particular purpose. (2) The agency must use only the parts of the personal information that are directly relevant to fulfilling the particular purpose.</p>
--

Disclosure of personal information for the protection of an individual or the public

Use and disclosure of personal information is governed by the *Information Privacy Act 2009* through Information Privacy Principles 10 and 11 relating to limits on use of personal information and limits on disclosure. When a public authority intends to use or disclose digital photographic images containing personal information, it must comply with these Information Privacy Principles. The *Information Privacy Act 2009 Guidelines* released by the Office of the Information Commissioner provide further guidance on the disclosure of personal information.⁷³

Figure 5 on the following page summarises the requirements of Information Privacy Principles 10 and 11 associated with the protection of an individual or the public when using or disclosing personal information.

⁷² *Information Privacy Act 2009*, <www.legislation.qld.gov.au/LEGISLTN/CURRENT/I/InfoPrivA09.pdf>

⁷³ *Right to Information and Privacy Guidelines*,

<www.oic.qld.gov.au/files/IPAGuidelines/Privacy%20Guideline%20%28complete%29%20-%2030-06-09.pdf>

Figure 5: Summary of Information Privacy Principles 10(1)(b) and 11(1)(c) – Use or Disclosure Necessary for the Protection of an Individual or the Public

Image used with the permission of the Office of the Information Commissioner, Queensland



Disclosure of personal information for law enforcement

It may become necessary for agencies to disclose digital photographic images to the Queensland Police or other law enforcement bodies in the course of their business or, if they are law enforcement bodies, to use digital photographic images for law enforcement purposes.

Use of personal information in this regard is covered by section 1(d) of Information Privacy Principle 10 which requires the public authority to be satisfied on reasonable grounds that the use will contribute to the prevention, detection, investigation, prosecution or punishment of criminal offences or breaches of law imposing penalties or sanctions, or seriously improper conduct. Section 1(e) of Information Privacy Principle 11 deals with disclosure to law enforcement bodies (Figure 6) to assist with their law enforcement functions. If a public authority discloses personal information under IPP 10(1)(d) or IPP 11 (1)(e), the public authority must include with the document a note of the disclosure.

Figure 7 on the following page summarises the requirements of Information Privacy Principles 10 and 11 associated with the use and disclosure of personal information for law enforcement.

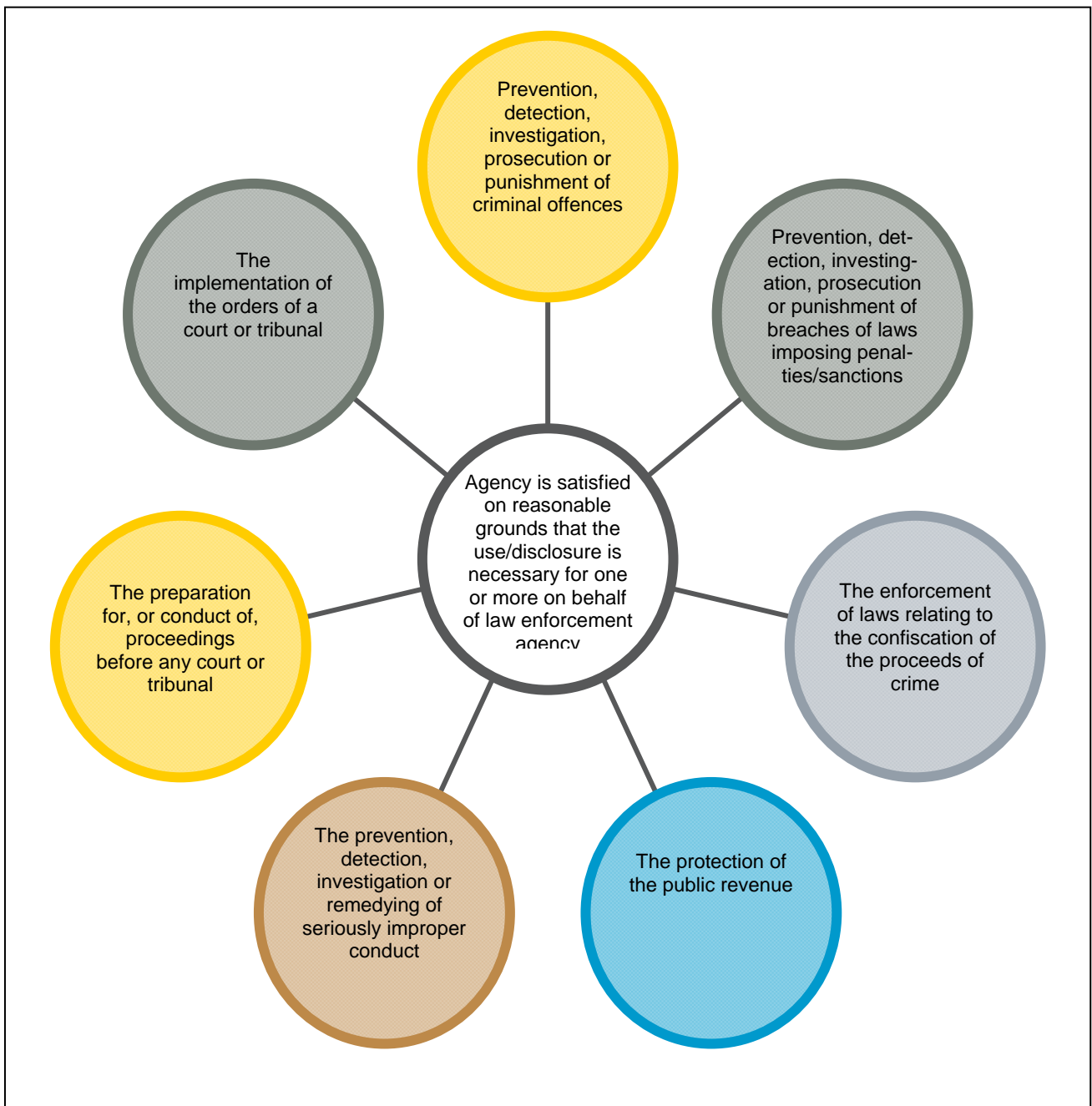
Figure 6: *Information Privacy Act 2009* definition of law enforcement agency

Under the *Information Privacy Act 2009*, **law enforcement agency** means—

- a) the Queensland Police Service under the *Police Service Administration Act 1990*; or
- b) the Crime and Misconduct Commission under the *Crime and Misconduct Act 2001*; or
- c) the community safety department; or
- d) any other agency, to the extent it has responsibility for—
 - i. the performance of functions or activities directed to the prevention, detection, investigation, prosecution or punishment of offences and other breaches of laws for which penalties or sanctions may be imposed; or
 - ii. the management of property seized or restrained under a law relating to the confiscation of the proceeds of crime; or
 - iii. the enforcement of a law, or of an order made under a law, relating to the confiscation of the proceeds of crime; or
 - iv. the execution or implementation of an order or decision made by a court.

Figure 7: Summary of Information Privacy Principles 10(1)(d) and 11(1)(e) – Use or Disclosure Necessary for Law Enforcement Activities/Action

Image used with the permission of the Office of the Information Commissioner, Queensland





Disclosure of personal information for other purposes and to other entities




Information disclosed to further third parties for purposes other than those listed above must be authorised under another law, done with the express or implied agreement of the individual or where the individual was made aware of the disclosure through advice/notification to this extent. Refer to Section 3.2.11 *Photo Consent Forms* to review the requirement that individuals be informed in situations where they may be recorded.



Appendix G: Overview of GILF Licences

Figure 8: Overview of licences available within GILF⁷⁴

GILF Licences	Standard terms (plain English summary version)
<p data-bbox="201 427 387 450">Attribution (BY)</p> 	<p data-bbox="488 427 639 450">You are free:</p> <ul data-bbox="488 483 1074 562" style="list-style-type: none"> • to Share — to copy, distribute and transmit the work • to Remix — to adapt the work. <p data-bbox="488 595 826 618">Under the following conditions:</p> <p data-bbox="488 622 1374 701">Attribution. You must attribute the work in the manner specified by the author or licensor (but not in any way that suggests that they endorse you or your use of the work).</p> <ul data-bbox="488 734 1401 925" style="list-style-type: none"> • For any reuse or distribution, you must make clear to others the license terms of this work • Any of the above conditions can be waived if you get permission from the copyright holder • Nothing in this license impairs or restricts the author's moral rights. <p data-bbox="488 929 1238 952">Legal code: http://creativecommons.org/licenses/by/2.5/au/legalcode</p>
<p data-bbox="201 954 411 1032">Attribution – Non-Commercial (BY-NC)</p> 	<p data-bbox="488 954 639 976">You are free:</p> <ul data-bbox="488 1010 1074 1088" style="list-style-type: none"> • to Share — to copy, distribute and transmit the work • to Remix — to adapt the work <p data-bbox="488 1122 826 1144">Under the following conditions:</p> <p data-bbox="488 1149 1374 1227">Attribution. You must attribute the work in the manner specified by the author or licensor (but not in any way that suggests that they endorse you or your use of the work).</p> <p data-bbox="488 1232 1262 1254">Non-Commercial. You may not use this work for commercial purposes.</p> <ul data-bbox="488 1288 1401 1478" style="list-style-type: none"> • For any reuse or distribution, you must make clear to others the license terms of this work • Any of the above conditions can be waived if you get permission from the copyright holder • Nothing in this license impairs or restricts the author's moral rights <p data-bbox="488 1512 1270 1534">Legal code: http://creativecommons.org/licenses/by-nc/2.5/au/legalcode</p>

⁷⁴ Government Information Licensing Framework, www.qgcio.qld.gov.au/SiteCollectionDocuments/Architecture%20and%20Standards/QGEA%202.0/GILF%20Guideline.pdf

GILF Licences	Standard terms (plain English summary version)
<p>Attribution – Share Alike (BY-SA)</p> 	<p>You are free:</p> <ul style="list-style-type: none"> • to Share — to copy, distribute and transmit the work • to Remix — to adapt the work <p>Under the following conditions:</p> <p>Attribution. You must attribute the work in the manner specified by the author or licensor (but not in any way that suggests that they endorse you or your use of the work).</p> <p>Share Alike. If you alter, transform, or build upon this work, you may distribute the resulting work only under the same or similar license to this one.</p> <ul style="list-style-type: none"> • For any reuse or distribution, you must make clear to others the license terms of this work • Any of the above conditions can be waived if you get permission from the copyright holder • Nothing in this license impairs or restricts the author's moral rights <p>Legal code: http://creativecommons.org/licenses/by-sa/2.5/au/legalcode</p>
<p>Attribution – No Derivatives (BY-ND)</p> 	<p>You are free:</p> <ul style="list-style-type: none"> • to Share — to copy, distribute and transmit the work <p>Under the following conditions:</p> <p>Attribution. You must attribute the work in the manner specified by the author or licensor (but not in any way that suggests that they endorse you or your use of the work).</p> <p>No Derivative Works. You may not alter, transform, or build upon this work.</p> <ul style="list-style-type: none"> • For any reuse or distribution, you must make clear to others the license terms of this work • Any of the above conditions can be waived if you get permission from the copyright holder • Nothing in this license impairs or restricts the author's moral rights <p>Legal code: http://creativecommons.org/licenses/by-nd/2.5/au/legalcode</p>
<p>Attribution – Non-Commercial – Share Alike (BY-NC-SA)</p> 	<p>You are free:</p> <ul style="list-style-type: none"> • to Share — to copy, distribute and transmit the work • to Remix — to adapt the work <p>Under the following conditions:</p> <p>Attribution. You must attribute the work in the manner specified by the author or licensor (but not in any way that suggests that they endorse you or your use of the work).</p> <p>Non-Commercial. You may not use this work for commercial purposes</p> <p>Share Alike. If you alter, transform, or build upon this work, you may distribute the resulting work only under the same or similar license to this one</p> <ul style="list-style-type: none"> • For any reuse or distribution, you must make clear to others the license terms of this work • Any of the above conditions can be waived if you get permission from the copyright holder • Nothing in this license impairs or restricts the author's moral rights <p>Legal code: http://creativecommons.org/licenses/by-nc-sa/2.5/au/legalcode</p>

GILF Licences	Standard terms (plain English summary version)
<p data-bbox="204 255 416 360">Attribution – Non-Commercial – No Derivatives (BY-NC-ND)</p> 	<p data-bbox="486 255 628 277">You are free:</p> <ul data-bbox="486 309 1062 331" style="list-style-type: none"> • to Share — to copy, distribute and transmit the work <p data-bbox="486 362 815 385">Under the following conditions:</p> <p data-bbox="486 392 1362 472">Attribution. You must attribute the work in the manner specified by the author or licensor (but not in any way that suggests that they endorse you or your use of the work).</p> <p data-bbox="486 474 1251 497">Non-Commercial. You may not use this work for commercial purposes.</p> <p data-bbox="486 499 1299 521">No Derivative Works. You may not alter, transform, or build upon this work.</p> <ul data-bbox="486 553 1401 692" style="list-style-type: none"> • For any reuse or distribution, you must make clear to others the license terms of this work. Any of the above conditions can be waived if you get permission from the copyright holder • Nothing in this license impairs or restricts the author's moral rights <p data-bbox="486 719 1299 741">Legal code: http://creativecommons.org/licenses/by-nc-nd/2.5/au/legalcode</p>
<p data-bbox="204 754 427 808">Restrictive Licence (RL)</p> 	<p data-bbox="486 754 628 777">You are free:</p> <ul data-bbox="486 808 1401 996" style="list-style-type: none"> • to acquire the material according to the terms you have agreed to with the supplier • to use and modify the material according to the terms you have agreed to with the supplier • to do other things with the material according to the terms you have agreed to with the supplier. <p data-bbox="486 1028 671 1050">You are required:</p> <ul data-bbox="486 1081 1401 1328" style="list-style-type: none"> • to pay any fees that you have agreed to with the supplier • to protect confidential information according to the use constraints and protective terms you have agreed to with the supplier; • to protect personal information according to the use constraints and protective terms you have agreed to with the supplier • to comply with additional conditions that you have agreed to with the supplier. <p data-bbox="486 1359 724 1382">You are not permitted:</p> <ul data-bbox="486 1413 1410 1601" style="list-style-type: none"> • to share to copy, distribute and transmit this material unless the supplier has expressly agreed that you can do this • to commercialise you may not use this material for commercial purposes unless the supplier has agreed that you can do this • to infringe the copyright owner's moral rights. <p data-bbox="486 1632 1347 1655">Restrictive licence template: http://www.gilf.gov.au/about-gilf-restrictive-licence</p>

The Queensland Government Image Library has developed a fact sheet outlining the relationship between the GILF Licences and digital photographic images. This fact sheet is available at: <http://premiers.govnet.qld.gov.au/policies/imagelibrary.html>.

Appendix H: Best practice handling recommendations for offline media

Business requirements may dictate that some digital photographic images will be stored on offline media such as CDs/DVDs. To maximise the longevity of offline storage media containing digital records, the National Archives of Australia's advice for the management of optical disks recommends that disks and drives are:

- stored in a clean, dry environment
- protected from strong magnetic fields
- stored at temperatures between 4°C and 20°C and relative humidity between 20 to 50 per cent
- not exposed to prolonged sunlight or other sources of ultraviolet light and chemical contamination
- appropriately held, with all attempts made not to scratch CD/DVDs.⁷⁵

Media should be stored according to the manufacturer's specifications. Importantly, users should not:

- scratch the label side of a disk
- use a pen, pencil, or other sharp writing instrument to write on a disk. If a disk must be labelled, a non-solvent based felt-tip permanent marker designed for optical media is recommended
- use inkjet printing on disks intended for long term archiving⁷⁶
- use adhesive labels including 'post-it' notes (or try to peel off or reposition already applied labels e.g. non-acidic labels).⁷⁷

⁷⁵ *Optical Disks FAQs*, <www.naa.gov.au/records-management/secure-and-store/physical-preservation/faq/optical-disks.aspx>

⁷⁶ *ISO 18921:2008*, Imaging materials - Compact discs (CD-ROM) - Method for estimating the life expectancy based on the effects of temperature and relative humidity.

⁷⁷ *Optical Disks FAQs*, <www.naa.gov.au/records-management/secure-and-store/physical-preservation/faq/optical-disks.aspx>

Appendix I: Further Guidance

Law enforcement and forensic organisations should also refer to the SMANZFL *Australasian Guidelines for Digital Imaging Processes* Version 2 produced by the Electronic Evidence Specialist Advisory Group, 10 March 2004⁷⁸.

The Australian Pictorial Thesaurus (APT) (www.picturethesaurus.gov.au/) is a collection of topic terms for indexing Australian images. The APT uses contemporary Australian terminology to describe objects, people, places and structures, activities and concepts depicted in an image. It ensures the common description of pictorial collections across Australian libraries, museums and archives.

The Joint Information Systems Committee (JISC) (www.jiscdigitalmedia.ac.uk/stillimages/) have prepared a large number of fact sheets on a variety of topics regarding image management. Those viewed in the production of these guidelines include Basic guidelines for image capture and optimisation; The camera raw file format; Choosing a file format; Copyright, data protection and other IPR; Digital preservation and storage; File formats and compression; File naming; How should you store your digital data?; Metadata: Image description, indexing and cataloguing; Search and retrieval. (Formally the Technical Advisory Service for Images (TASI)).

For more detailed guidance on the management of public records visit the Queensland State Archives website at www.archives.qld.gov.au or contact us on:

Telephone: (07) 3131 7777 or

Email: info@archives.qld.gov.au

⁷⁸ *Australasian Guidelines for Digital Imaging Processes*,
<www.nifs.com.au/2004%20Digital%20Imaging%20Guidelines.pdf>