Information Management Standard - Creating and Managing Digitized Records

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TORONTO

City Clerk's Office

An Information Management Standard

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Foreword

City of Toronto Information Management Policies and Standards are the official publication on the policies, standards, directives, guidelines, position papers and preferred practices given oversight and endorsement by the Open Government Committee under delegated authority of Toronto Municipal Code, Chapter 217, Records, Corporate (City). These publications support the City's responsibilities for coordinating standardization of Information Management in the City of Toronto.

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- **Karthi Bala** Director, Information Technology Strategic Planning & Architecture, Information &Technology

Divisions & Business Units:

- Accounts Payable
- City Planning
- Corporate Information Management Services
- Election & Registry Services
- Engineering and Construction Services
- Information and Technology
- Legal Services
- Toronto Building
- Toronto Public Health
- Transportation Services

1. Introduction

All City Divisions now manage records in both physical and digital formats. In many cases, Divisions are reviewing the benefits of Digitizing Physical Records to create one consistent medium in which to conduct their business and improve services to the public.

Digitization, also known as scanning or imaging, refers to the use of a scanner or camera to convert Physical Records such as microfilm, microfiche, paper documents, photographs, drawings, plans, etc., into Digitized Records (also known as electronic records).

The Digitization Process in its entirety includes the planning, prioritization, preparation, metadata creation and collection, Digitization, quality management, storage, and the assessment and evaluation of the Digitization Process itself.

There are generally two types of Digitization that take place in the City:

1. **Convenience Digitization** is the Digitization of a Physical Record for convenience purposes only, such as Digitizing documents for a quick FYI (For Your Information) to send to colleagues. These images are not an integral part of, nor considered, a City Record.

2. **City Record Digitization (or "business record digitization")** are the Digitization Processes, or "scans" of a Physical Record. The objective is to create a City Record by replacing the Physical Record with the Digitized Record. The Digitized Record then becomes the Authoritative Record for purposes of the City's administration or delivery of City services.

2. Application

This Standard applies to all City of Toronto Divisions, City staff, volunteers, and contract staff hired by the City of Toronto.

This Standard does not apply to Elected Officials, Accountability Officers or City Agencies and Corporations.

3. Purpose

The purposes of this Standard are to:

- Provide the process and direction needed to create Digitized Records that are sufficiently authentic, trustworthy, and reliable to serve as City Records; and
- Allow for the suitable management of Digitized Records as City Records.

The content of this Standard is consistent with national and international standards of the same subject matter such as the CGSB (Canadian General Standards Board) 72.11-93, Microfilm and Electronic Images as Documentary Evidence.

This Standard provides both a process and technical standard. A process standard describes how to develop a Digitization Process and a technical standard provides the technical requirements for metadata and scanner settings.

4. Scope

This Standard applies to Divisions who are planning on implementing a Digitization Process. It will allow the disposal of the Physical Record, subject to established records retention periods, and permit the Physical Record to be replaced with the Digitized Record as the City Record retained by the City **(City Record Digitization).**

The Standard does not apply to Divisions Digitizing documents for convenience purposes. However, it is advisable that Digitized Records resulting from **Convenience Digitization** meet the same quality and integrity standards established by this Standard for **City Record Digitization**.

5. Outcomes

The outcome of this Standard is to enable Divisions to implement a Digitization Process to allow the replacement of a Physical Record with a Digitized Record as the City Record. This will result in Divisions creating Digitized Records that are compliant with Quality Control and Quality Assurance requirements, and, admissible in legal proceedings.

6. Definitions

Agent - a person or business authorized to act on another's behalf.

Authoritative Record - The record that is considered the official City Record for evidentiary purposes.

Bit Depth - refers to the number of bits used to represent the colour of a single pixel in a bitmapped image. Higher bit depths provide a broader depth of colour.

Canadian General Standards Board (CGSB) - is a consensus organization composed of people representing procedures, users, and general interest groups, which develop standards for products and test methods specifically required in Canada.

City Record - A record created or received in the course of City administration or delivery of City services.

Colour Accuracy - determines how accurate the colour in the Digitized Record is compared to the original Physical Record.

Compression - reduces the size of the Digitized Record to enable efficient storage and easier transmission. Digitized Records may be lossy or lossless:

- **Lossy compression** is suitable for Digitized Records that don't require a high quality reproduction such as photographs where minor (sometimes imperceptible) loss of accuracy is acceptable to achieve a substantial reduction in size. For example, a Digitized Record compressed using lossy compression may be one tenth the size of the original.

- **Lossless compression** reduces the size of the Digitized Record, to approximately half its original size, with no loss of quality and is preferred for high quality reproduction purposes e.g. technical drawings, photographs, or clip art where detail in the Digitized Record is important.

Digitized Artifact - an alteration in the Digitized Record caused by the scanner or other element e.g. lines, streaks, dust, & banding and which must be corrected, cleaned, or cleared.

Digitized Record - a record that has been converted from a Physical Record, to a Digitized Record, via a Digitization (Scanning) Process.

Digitization - The action by which a device such as a scanner or camera, is used to convert a Physical Record to a Digitized Record for use in a computer.

Digitization Procedures - details the e.g. Authorizations, Governance Requirements, and steps in the Digitization Process that must be documented.

Digitization Technician - individual responsible for Digitizing City Records.

Digitization Process - includes the planning, prioritization, preparation, metadata creation and collection, Digitization, quality management, storage, and the assessment and evaluation of the Digitization Process itself.

Division - An organizational unit of the City, whether or not it is called a Division or office, including the offices of the City Manager, a Deputy City Manager, the Deputy City Manager and Chief Financial Officer, the Treasurer and the Chief Corporate Officer that is headed by a Division head, including the employees, volunteers, or other individuals employed, appointed, assigned or otherwise retained by the organizational unit.

Division Head - Any General Manager or any director or executive director reporting to the City Manager, a Deputy City Manager, the Deputy City Manager and Chief Financial Officer, the Treasurer or the Chief Corporate Officer.

Document - a written or printed, hardcopy paper medium that provides information or evidence or that may serve individually or as a collection to create a City Record e.g. maps, technical drawings, reports, etc.

File Format - refers to the file format of a Digitized Record e.g. Portable Document Format (PDF).

Image Type - refers to the image type of the Digitized Record e.g. bitonal (black and white), colour, or greyscale (black and white and many shades of gray in between).

Intelligent Character Recognition (ICR) - is an advanced handwriting recognition system that allows fonts and different styles of handwriting contained within Digitized Records to be learned by a computer to improve accuracy and recognition levels.

Metadata - data describing context, content and structure of records and their management through time. Metadata can describe the properties of a document. For example, the following information about a document is typically recorded: Title (or name of the document), Date (the document was created), and Created By (document creator). These descriptors are known as 'metadata'. Metadata facilitates search, identification, and the management of information.

Microform - any form, either film or paper, containing micro reproductions of documents for transmission, storage, reading, and printing. Three common formats are: microfilm (reels), aperture cards and microfiche (flat sheets).

Optical Character Recognition (OCR) - is the mechanical or electronic conversion of Digitized Records containing typewritten or printed text, into machine-encoded/computer-readable text.

Physical Record - The original Physical Record that was used to create the Digitized Record. Examples of Physical Records include microfilm, microfiche, paper documents, photographs, drawings, plans, etc.

Pixel Density or pixels per inch (PPI) - a measurement of the resolution of devices such as computer displays, scanners, and camera image sensors. PPI can also describe the resolution, in pixels, of a Digitized Record to be printed within a specified space. For instance, a 100x100-pixel Digitized Record that is printed in a 1-inch square could be said to have 100 DPI.

Plastic Sleeve - a transparent, plastic cover that envelopes and protects an aged or damaged record during Digitization.

Posterization - a conversion of a continuous gradation of tone, to several regions of fewer tones, with abrupt changes from one tone to another.

Quality Assurance (QA) - refers to a program for the systematic monitoring and evaluation of the various aspects of a project or service to ensure that standards of quality are being met.

Quality Assurance Operator - the individual responsible for performing Quality Assurance on the Digitization Process.

Quality Control - is the process by which the quality of all factors involved in production are reviewed.

Record - means information however recorded or stored, whether in printed form, on film, by electronic means or otherwise, and includes documents, financial statements, minutes, accounts, correspondence, memoranda, plans, maps, drawings, photographs, and films.

Scanning - the action by which a device such as a scanner or camera, is used to convert a Physical Record to a Digitized Record for use in a computer.

7. Establishing a Digitization Process

City Divisions choose to Digitize for a number of business reasons including:

- Improving search, retrieval, and access to City Records
- Making City Records available to employees and members of the public via social media tools and mobile technology
- Accommodating an accessibility request (a requirement of the Accessibility for Ontarians with Disabilities Act (AODA))

If a Division determines their records have to be Digitized to support their operational needs and want to establish a Digitization Process, there are governance and administrative decisions that need to be put in place first.

7.1 Authorizing a Digitization Process

Authorization for the creation of a Digitization Process should be given by the most senior individual within a Division and can be in the form of a memorandum, approved business case, project charter, or senior management team meeting minutes. The authorization must also acknowledge that the new Digitization Process will be integrated into normal business practices.

However, no Digitization Process may be authorized until compliance with Governance Requirements has been confirmed by the Division Head.

7.2 Governance Requirements

Prior to the commencement of any Digitization Process, Divisions must contact Corporate Information Management Services - City Clerk's Office, to initiate a review of existing retention and disposition schedules to ensure Physical Records and Digitized Records will be retained and disposed of as required. This review will establish:

- Which record will become the Authoritative Record once it has been Digitized e.g. Physical or Digitized Record (based on the business purpose for Digitization);
- Which records must be retained in their original Physical Record format due to their historical significance or other value;
- How to assign the appropriate disposition to the Physical Record after Digitization; and
- How Physical Records & Digitized Records will be organized and managed before they are disposed of and/or transferred to Archives.

7.3 Record-Keeping Requirements - Physical Records after Digitization

Disposing Physical Records after Digitization:

Physical Records cannot be disposed of after Digitization until an approved process has been established between the Division and Corporate Information Management Services - City Clerk's Office, to address Governance Requirements. For example, changes have to be made to the record retention bylaw, (which define and govern how long records are kept for and when they can be disposed of) to recognize the newly Digitized Record as the Authoritative Record. The process of how Physical Records will be organized, stored, and managed before being disposed of also has to be determined.

As part of the approval process, Divisions must meet the requirements set out in the Record-Keeping Assessment (Record-Keeping Assessment before Physical Records can be disposed of.

Retaining Physical Records after Digitization:

The details of the retention process for Physical Records, retained for historical or other purposes, is established between the Division and Corporate Information Management Services - City Clerk's Office. The historical significance of a record is determined on a case by case basis as is the need to retain records for other reasons e.g. legal purposes.

7.4 Record-Keeping Assessment – Digitized Records

Corporate Information Management Services - City Clerk's Office has developed a Record-Keeping Assessment (Appendix B) for Divisions to use to assess their Digitization Process. The Assessment criteria are based on recommendations outlined in this Standard and the Canadian General Standards Board (CGSB) Standards 72.11-93 & 72.34-2005 **(Corporate Information Management Services has copies of these Standards for reference)**.

The Assessment enables Divisions to demonstrate that their Digitized Records have the same weight and authority as their Physical Records.

Signed Assessments provide a baseline confirming that the level of accountability, operational integration into business practices, record maintenance, and reliability of the Digitized Records is comparable or superior to that of the Physical Record.

7.5 Digitization Procedures

Divisions must be able to demonstrate that their Digitized Records are accurate and complete. The City must be able to justify claims that their Digitized Records are reliable as evidence, either to a court of law or a member of the public. It is important that all aspects of the Digitization Process are well documented.

To demonstrate that the Digitization Process produces Digitized Records that are sufficiently authentic and complete to function as City Records, Divisions must, for example, document the following in their Digitization Procedures:

- Which records will be Digitized, retained, transferred to Archives, or disposed, in accordance with established retention and disposition periods;
- Quality Control and Quality Assurance measures that are being applied;
- Annotation and other editing techniques that will be used and when they are allowable e.g." editing techniques can only be used on version 2 of the Digitized Record in order to preserve the integrity of the original (version 1)";

- Where the Digitized Records will be stored e.g. business system, shared network drive, EDRMS, etc.; and
- File formats the Digitized Records will be stored in e.g. TIFF or PDF/A

See Appendix A for a template to get you started.

7.6 Designating Responsibility for Administration of Digitization Process

Once the Digitization Process has been authorized by the Division Head as being in compliance with the Governance Requirements, an Agent should be assigned the responsibility of administering the Digitization Process. This may be an individual within the Division e.g. Supervisor, or in some cases, a third party vendor external to the City.

This Agent will be responsible for ensuring that the integrity of the Digitization Process is maintained according to City and industry standards, and to act as the contact for the process.

They are also responsible for creating Digitization Procedures, updating the procedures as needed, communicating any updates, and, ensuring Digitization Technicians are trained.

External third party vendors will have to meet City requirements. Contracts must include language to ensure the proper management, storage, protection, and transfer of City information.

8. Planning for the Digitization Process

To ensure a strategic and responsible approach to Digitizing City Records, a number of considerations should be determined by Divisions before starting a Digitization Process.

Subsection 8.1 below provides an overview of considerations. Subsections (8.2. to 8.5) are specific considerations that should also be included in the planning of a Digitization Process.

8.1 Consideration Overview

- The Governance Requirements for Physical Records and Digitized Records;

- The business reasons for converting Physical Records to a Digitized format;

- The volume of Physical Records (e.g. documents, microform, photographs) that need to be Digitized;

- Size of Digitized Records and what impacts that will have on server space requirements (which can be significant depending on volume of Digitized Records);

- Budgetary considerations towards technology costs for (potentially specialized) scanners, software, and server/space requirements to house Digitized Records;

- Determining the location of Digitized Records e.g. a business application, shared network drive, or an EDRMS, with an enabled audit trail.

- Plans for long term accessibility of the Digitized Records, especially in instances where the retention is extensive e.g. over 25 years.

- The metadata elements that will be captured to facilitate the management and efficient search and retrieval of Digitized Records;

- The appropriate access rights needed for Digitized Records to ensure protection of privacy and prevention of unauthorized use;

- How business continuity plans will be impacted, including storage and access requirements;

- Skill sets of employees and what training may be required;

- Determining whether Digitization will be outsourced e.g. third party vendor. In doing so, Digitized Records that are managed by a third party vendor must adhere to the City of Toronto's policies, standards and guidelines for information management requirements and access and privacy requirements, and, when Digitized Records are transferred (data transfer) between the vendor and the City, the mandatory metadata properties must also be migrated (see Appendix D for data transfer metadata).

8.2 Accessibility for Ontarians with Disabilities Act (AODA)

Divisions who provide public facing services and or post Digitized Records to the City's external website must comply with AODA. See the City's Multi-Year Accessibility Plan and Accessibility at the City of Toronto website for further information and resources.

8.3 Metadata Requirements

Metadata should be captured and managed to prove that records are complete, accurate, and trustworthy. Appendix D describes technical metadata to be used when configuring scanner software and dealing with third party vendors. Divisions should also consult the City's two published metadata standards: Descriptive Metadata Standard and the Records Management Metadata Standard.

8.4 Optical Character Recognition (OCR) & Intelligent Character Recognition (ICR)

Optical Character Recognition and Intelligent Character Recognition are the processes of converting Digitized Records into machine-encoded/computer-readable text. These processes allow Digitized Records to be searched using keywords, enables electronic editing, captures handwritten text, and permits the extraction of metadata for auto-population purposes. It's also a means of making Digitized Records accessible.

8.5 Compression Type

Digitization Processes involve Compression which consists of two types: Lossless Compression or Lossy Compression. Lossless compression results in no data loss; this is preferred for high quality reproduction purposes e.g. technical drawings, photographs, or clip art but is also stored at a larger file size. Lossy compression results in a minor or visually imperceptible loss. This may be acceptable to achieve a substantial reduction in "file size" and where the quality of the reproduction is sufficient for the record's obligations as a City Record.

Divisions will need to determine the appropriate Compression Type based on their business needs.

9. Digitization Steps

Subsections 9.1 – 9.5 go through each step of Digitization and outlines what should occur in those steps. A Digitization Steps Diagram (Figure 1) is provided below for visualization purposes.

Note: For large Digitization Processes and prior to full scale implementation, Divisions should pilot the Digitization Process first. This will allow the Division to explore options and make adjustments to produce the best possible Digitized Records.

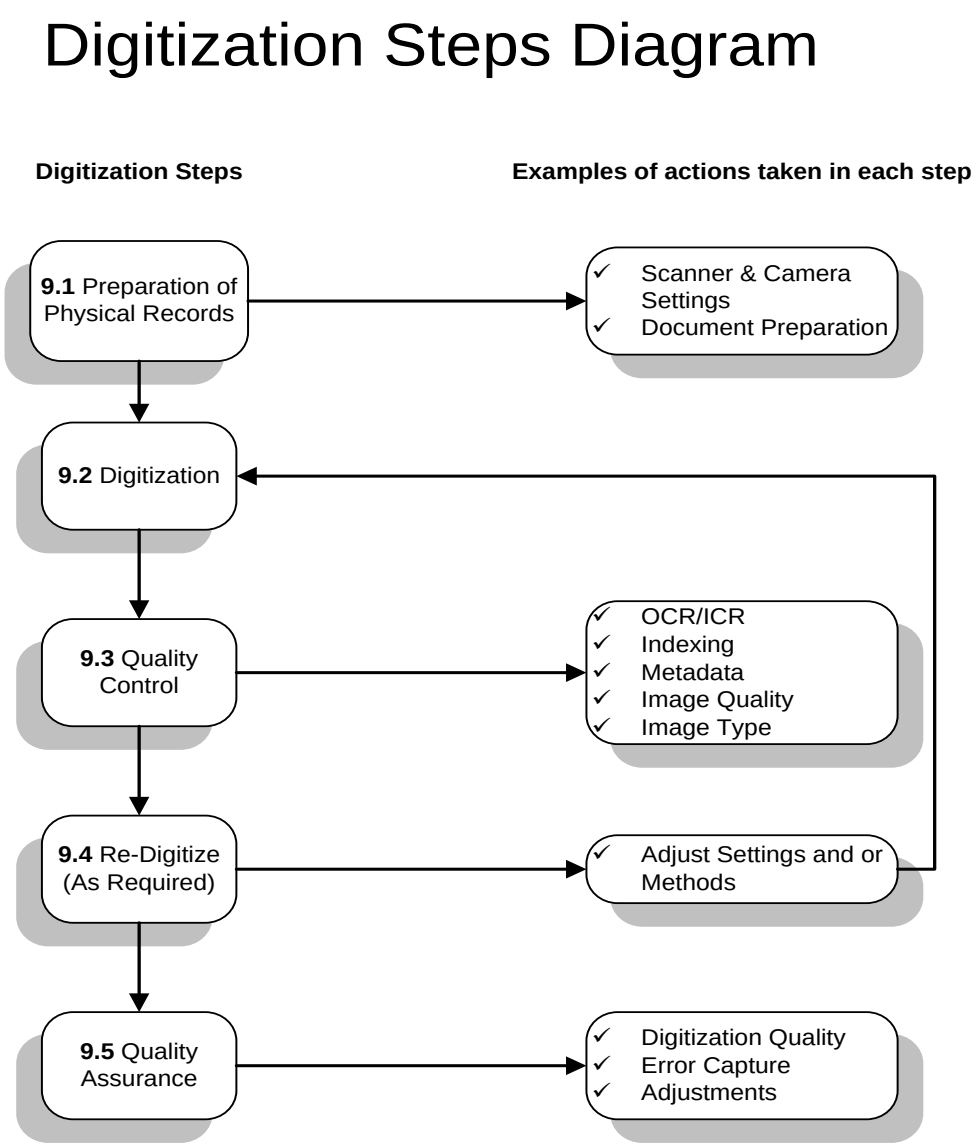

Figure 1 Digitization Steps Diagram

9.1 Preparation of Physical Records e.g. Paper Documents and Microform

The first step in the Digitization Process is to prepare and organize Physical Records ahead of Digitization. Doing so will increase Digitization productivity and quality.

Tasks include the sorting of documents and microform, disassembling attached or stapled documents, fixing torn documents or using plastic sleeves to protect the damaged documents, and making photocopies to increase quality or to resize documents.

The following qualities of a Physical Record should be taken into consideration when deciding the best method of capture:

- Paper density or Type of paper (e.g. tissue, carbon, card stock, etc);
- Size (e.g. a larger scanner may be needed for oversized documents);
- Condition (e.g. creased, stapled, rolled, brittle, etc);
- Orientation (e.g. requires rotation of documents);
- Unique finishes (e.g. transparent, semi-transparent, or opaque);
- Binding (e.g. spiral spines of reports, fasteners, staples, paper clips, etc.);
- Colour (e.g. quality of colour capture (calibration), file size, etc.);
- Stick-on/Post-It notes (should be separated from documents and scanned as the next page immediately after the document it was attached to); and
- Embossing (e.g. seals).

9.1.1 Embossing:

Some documents, such as notarized documents, have embossed/raised/imprinted/wax seals. These types of seals may require a specialized scanner and/or camera that allow one directional or angled lighting to capture/show the embossed information. The City of Toronto Archives has subject matter experts and specialized scanners and cameras to facilitate this particular type of capture. Divisions can contact their Archive liaisons for advice and assistance as needed.

9.2 Digitization (Scan)

In this step, the Digitized Record is captured using scanners and or cameras.

Scanner settings and metadata should be set before the start of Digitization.

As the Physical Record is being digitized, Quality Control checks should be taking place at the same time (details outlined in the next step).

9.3 Quality Control

Quality Control occurs during and immediately after Digitization. The purpose of Quality Control is to ensure that the Digitized Record mirrors the Physical Record. Errors can occur during Digitization due to scanner mis-feeds or poor quality Physical Records. Digitization Technicians should be aware of any potential errors and take the steps to address them as they occur. There may be a need for Re-Digitization (outlined in step 9.4).

In high volume environments where batch Digitization occurs, performing Quality Control on individual images may not be practical. In those instances, the Digitization Technician and or Quality Assurance Operator should do a random check on one of the Digitized batches.

Quality Control techniques should be documented in the Division's Digitization Procedures. Examples include:

- Count the number of pages of the Digitized Records and ensure they match the number of pages of the Physical Records. Be aware of blank pages in the Digitized Record that can count as a page.
- Ensure images are in the correct order.
- Ensure page alignment is correct e.g. Physical Record orientation (portrait/landscape), rotation, image skew, proportions/distortion, and cropping.
- Check for completeness and accuracy of detail e.g. text clarity, sufficient capture of punctuation marks, etc.
- Check for scanner generated speckle e.g. speckle not on the Physical Record. If speckle is present, an option within your scanning software should clean it. If not, adjust scanner settings and re-digitize.
- Check for density of solid black areas. An example of where this is problematic is if a Physical Record has highlighted text, the Digitization could black out the text. Adjust scanner settings as required.
- When Digitizing in colour ensure colour is accurately captured in the Digitized Record.

- Check Digitized Record quality e.g. lack of sharpness, over-sharpened, inconsistent sharpness, banding, posterization, evenness of tonal values and illumination.
- When compressing a Digitized Record, ensure the quality is sufficient to meet business needs.
- Ensure metadata is complete and accurate.

Note: Errors can occur in the following areas:

- Metadata accuracy, Digitized Record accuracy compared with the Physical Record, Colour accuracy, Minimum point per inch (PPI) specification, Image Type, Compression, File Format, and Digitized artifacts – lines, streaks, dust, & banding.

9.4 Review for need to Re-Digitize

When errors are found in the initial Digitized Record, it is mandatory that the Physical Record be re-digitized. Upon re-digitization of the Physical Record the Digitized Record must go through the Quality Control step again and the process repeated until no errors are detected.

9.5 Quality Assurance Review

Quality Assurance activities include the systematic monitoring and review of the Digitization Process. This helps to determine whether the Digitization Process and quality of the Digitized Record meets or exceeds expectations.

A Quality Assurance Operator not directly involved in the Digitization Process should conduct the review. This enables an impartial view of the Digitization Process.

Divisions are responsible for ensuring their Digitization Process meets the recommendations described in this Standard and industry standards e.g. CAN/CGSB 72.11-93 & 72.34-2005.

10. Bibliography

The following sources were used in the development of this Standard:

- Association for Information and Imaging Management (AIIM). Silver Spring, Maryland, U.S. 1943. Available at: www.aiim.org

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Appendix A – Digitization Procedures Template

City of Toronto

Digitization Standard

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Digitization Procedures should include the following sections as described in the Digitization Process. This is a template and Divisions may create several additional sections to address individual needs or processes.

1. Introductions/Authorizations

In the introduction section, indicate the date the Digitization Process was authorized and if possible a link to the memorandum, email or policy that came from senior management authorizing the process.

2. Records to be Digitized

Identify which City Records will be Digitized.

3. Preparation of Physical Records for Digitization

Document the steps to be performed to prepare Physical Records (e.g. documents, microforms, photographs) for Digitization.

4. Digitize

Document the responsibility of the Digitization Technician such as enhancing readability of the image, resizing, and cropping.

5. Quality Control

Document the Quality Control checks used to reduce the risk of insufficient Digitized Record quality and inaccurate metadata. Include steps to amend errors.

6. Re-Digitze

Indicate when it's necessary to re-digitize e.g. poor Digitized Record quality.

7. Editing Techniques

Indicate what editing techniques will be used such as annotation and how and when they are allowable e.g. editing can only be used on the second version of the Digitized Record in order to preserve the integrity of the original.

8. Optical Character Recognition (OCR) & Intelligent Character Recognition (ICR)

Include indexing techniques such as OCR & ICR that will be performed on the Digitized Record. Where applicable, indicate the process for making Digitized Records accessible for AODA purposes.

9. File Formats

Identify what file formats the images will be stored in e.g. TIFF, PDF/A, JPEG, etc.

10. Metadata

The metadata recommended in this Standard are at a minimum and Divisions are strongly encouraged to include additional metadata from the City's corporate standards to enrich the description, findability, and management of Digitized Records. See the corporate metadata standards: Descriptive Metadata Standard and Records Management Metadata Standard.

11. Digitized Record Storage

Indicate where the Digitized Records will be stored e.g. business system, shared network drive, EDRMS, etc.

12. Treatment of Physical Records after Digitization

Describe what will happen to the Physical Records after Digitization e.g. to be retained for legal, archival/long term preservation, and/or other business purposes, and the details of how and where they will be kept e.g. stored in a box in a locked file room

For Physical Records that will be disposed of, the pre-approved disposal process (established between the Division/business unit and Corporate Information Management Services) should be included.

13. Quality Assurance

Document the Quality Assurance process and what it entails e.g. monthly review of Digitization Process to ensure procedures are up-to-date, employees are trained, checking batch Digitization, etc.

14. References

Cite the Digitization Standards that the Digitization Process is modelled after e.g. City and/or industry standards.

Appendix B – Sample Record-Keeping Assessment for Digitizing City Records

The purpose of the Assessment is to enable program areas to demonstrate that the Digitized Records have the same weight and authority as the Physical Records.

Signed Assessments provide a baseline confirming that the level of accountability, operational integration into business practices, record maintenance, and reliability of the Digitized Records is comparable or superior to that of the Physical Records.

Using the Assessment

This Assessment is based on Canadian standards for Digitization and relevant City Policies and Standards. It is intended primarily as a self-assessment tool for business areas that are:

- introducing Digitization into their normal business practice; and
- Initiating a process to digitize existing or legacy records.

The considerations set out in this Assessment may be helpful to program areas that occasionally Digitize Records in the course of their work, such as one-off or multiple scans by a multi-functional printer. However it is not intended to be applied in that type of environment.

Note: The Assessment provided below is just a sample and Divisions should contact Corporate Information Management Services - City Clerk's Office, to access the most up-to-date version.

Record-Keeping Assessment for Digitizing City Records

CRITERIA	REQUIREMENT	MEASURE	CONFIRMATION

Accountability		
Authorization - establishes executive responsibility for the decision to Digitize	Documented decision	Examples: • approved business case • senior management team meeting minutes • approved project charter
Oversight/Supervision - establishes operational responsibility for Digitization and related record keeping practices	Management lead	Examples: • lead program area • specific position
Scope - sets out the records for which authorization is provided	Documented decision	Examples: • approved procedure • approved project charter • approved record class
Openness		
Access - sets out locations for the Digitized Records and Physical Records (for historical and/or for storage-until-disposal purposes)	Documented decision	Examples: • approved procedure • routine disclosure policy • approved project charter detailing system integration
Business Planning		
Training - establishes responsibilities and expectations of Digitization Technicians	Training documentation	Examples: • approved procedures

and those working with the Digitized Records		• training reference material, e.g., on-line demos, slides
Digitization Procedures and Processes, including Quality Assurance and retakes	Documented procedures	Examples: • approved procedures • on-line help
Work procedures - processes using the Digitized Records	Documented procedures	Examples: • approved procedures • on-line help
Storage procedures - processes for storing Physical Records	Documented procedures	Examples: • approved procedures • on-line training or reference materials
Trust and Reliability		
Technical standards - establishes scanning standards, as applicable, for o Digitized Record resolution o format o optical character recognition o compression type o Digitized Record manipulation o Digitized Record clarity o contextual data (metadata)	Documented standards	Examples: • approved procedures • on-line help • Adoption and use of City of Toronto Digitization Standards

AUTHORIZATIONS				
	Name	**Title**	**Signature**	**Date**

Deputy City Clerk, CIMS, City Clerk's Office				
Division Head				

Appendix C – Table: Recommended Scanner Setting and File Formats

The Recommended Practices for Scanner Settings and File Formats Table recommends scanner settings based on Physical Record Type. It does not include settings for cameras.

Ultimately, it is at the discretion of the Division and Digitization Technician to determine the appropriate settings based on the Division's business needs. For example, the Division and Digitization Technician may choose to Digitize in bi-tonal, whereas the table recommends using greyscale, as it may be sufficient to capture the quality needed e.g. legibility of text. Another consideration includes determining the right file format if the business need is to create high quality images for high quality reproductions and/or for creating images that need to be preserved for the long term.

Note: These recommended practices for scanning settings and file formats are valid at the time this Standard is published. However, given that e.g. file formats can change over time, Divisions should research the most up-to-date formats and techniques to utilize the best methods for Digitized Record capture.

For additional standards that recommend scanner settings, see Information & Technology's Standards:

Standard for Document Scanners (S106)

Standard for Print Output Devices (S126)

Table: Recommended Practices for Scanner Settings and File Formats

Physical Record Type	Resolution	Bit Depth	Image Type	Compression	File Formats *[1]	Business Purpose
Text only, Black and White	Minimum 300 ppi	1-bit	Bi-tonal	Lossless	TIFF, PDF, PDF/A	Image of Text

[1] *This is not an exhaustive list of File Formats and business may use other formats based on their needs.

Physical Record Type	**Resolution**	**Bit Depth**	**Image Type**	**Compression**	**File Formats** *1	**Business Purpose**
Documents with watermarks, grey shading, grey graphics	Minimum 300 ppi	8-bit	Greyscale (Embedded ICC profile: Gray Gamma 2.2)		TIFF, PDF, PDF/A	Content Research
Documents with discrete colour used in text or diagrams	Minimum 300 ppi	24-bit (minimum)	Colour		TIFF, PDF, PDF/A	
Documents with embossed, raised, imprinted, or wax seals	Minimum 300 ppi with reduced brightness	8-bit OR 24-bit	Greyscale (Embedded ICC profile: Gray Gamma 2.2) OR Colour		TIFF, PDF, PDF/A	
Maps including printed tones, printed colour	Minimum 300 ppi	24-bit	Colour (Embedded ICC profile: Adobe RGB (1998) or sRBG IEC61966-2.1		TIFF, PDF, PDF/A, PDF/E, JPEG2000	Content Research & Reproduction
Black and White Photographs	Sufficient to provide > 1000-1500 pixels across long side	8-bit	Greyscale (Embedded ICC profile: Gray Gamma 2.2)		TIFF, PDF, PDF/A	Access to content & Reproduction
Colour Photographs	Sufficient to provide > 3000 pixels across long dimensions	24-bit	Colour (Embedded ICC profile: Adobe RGB (1998) or sRBG IEC61966-2.1	Lossless	TIFF, PDF, PDF/A, DNG, JPEG2000	Access to content & Reproduction

Physical Record Type	**Resolution**	**Bit Depth**	**Image Type**	**Compression**	**File Formats** *1	**Business Purpose**
Black and White Negatives	Sufficient to provide > 3000 pixels across long dimensions	8-bit OR 24-bit	Greyscale (Embedded ICC profile: Gray Gamma 2.2) OR Colour (Embedded ICC profile: Adobe RGB (1998) or sRBG IEC61966-2.1		TIFF, PDF, OR PDF/A	Access to content & Reproduction
Colour Negatives and Transparencies	Sufficient to provide > 3000 pixels across long dimensions	24-bit	Colour (Embedded ICC profile: Adobe RGB (1998) or sRBG IEC61966-2.1		TIFF, PDF, PDF/A	Access to Content & Reproduction
Graphic Arts: Limited tone originals, continuous tone colour	Minimum 300 ppi	24-bit	Colour (Embedded ICC profile: Adobe RGB (1998) or sRBG IEC61966-2.1		TIFF, PDF, PDF/A, PDF/E	Access to Content & Reproduction
Manuscripts: Handwritten, Typewritten	Minimum 400 ppi	8-bit	Greyscale		TIFF, PDF, PDF/A	Access to Content

Appendix D - Metadata Requirements

The following tables identify and describe technical metadata for scanner software configuration. Most of this metadata can be automatically captured depending on software and setting capabilities. Divisions should indicate how manual metadata entry will addressed in their respective Digitization Procedures.

Note: Metadata must be retained for at least as long as the records to which they relate are retained.

Metadata Table Legend

Name of Element	Name of the metadata element.
Definition	A short description of the metadata element.
Purpose	The goal of the metadata element.
Obligation	Whether the metadata element is mandatory or optional.
Guidance	Conditions and rules that govern the use and value(s) of the metadata element.

Metadata Elements

Name of Element	**Digitized Record Identifier**
Definition	Uniquely identifies a Digitized Record captured during the Digitization Process.
Purpose	To uniquely identify a Digitized Record for reference and retrieval purposes.
Obligation	Mandatory
Populated	System generated
Guidance	Cannot be modified

Name of Element	**Digitization Date**
Definition	The day, month, and year the Digitized Record was created.

Purpose	To determine when the Digitized Record was created.
Obligation	Mandatory
Populated	System generated (ISO 8601 recommended)
Guidance	Cannot be modified

Name of Element	**Number of Pages Digitized**
Definition	Number of pages of a Digitized Record.
Purpose	To ensure the count of Digitized Record pages match the number of Physical Record pages.
Obligation	Mandatory
Populated	System generated
Guidance	1. Cannot be modified 2. During the Digitization Process blank page detection may result in the Digitized Record having a different page count than the Physical Record page count.

Name of Element	**Digitization Technician**
Definition	Uniquely identifies the individual who performed the Digitization of the Physical Record.
Purpose	To uniquely identify the individual who Digitized the Physical Record for accountability purposes.
Obligation	Mandatory
Populated	System generated or manual entry
Guidance	Cannot be modified

Name of Element	**Batch Reference**
Definition	Uniquely identifies a group of Digitized Records that have similar Digitization requirements and were Digitized during the same process.
Purpose	To uniquely identify a group of Digitized Records for reference, retrieval, and Quality Assurance purposes.
Obligation	Mandatory for batch input
Populated	System generated

Guidance	Cannot be modified

Name of Element	**Quality Assurance Operator**
Definition	Uniquely identifies the individual that performed Quality Assurance on the Digitization Process.
Purpose	To identify the individual who performed Quality Assurance on the Digitization Process for accountability purposes.
Obligation	Mandatory
Populated	System generated or manual entry
Guidance	Cannot be modified

Name of Element	**Quality Assurance Check Approval Date**
Definition	The day, month, and year the Digitized Record(s) passed Quality Assurance criteria.
Purpose	To determine when the Digitized Record(s) passed Quality Assurance criteria.
Obligation	Mandatory (ISO 8601 recommended)
Populated	System generated
Guidance	Cannot be modified

Data Transfer Metadata

This metadata applies to instances where Divisions receive Digitized Records from a third party vendor to which Digitization was outsourced.

Name of Element	**Transfer Date**
Definition	The day, month, and year the Digitized Record is imported from the (vendor) host system to a (City) business system.
Purpose	To determine when the Digitized Record and associated metadata was imported into a (City) business system. This assists in demonstrating that the Digitized Record is authentic, reliable, and trustworthy.
Obligation	Mandatory
Populated	System generated or manual entry (ISO 8601 recommended)

Guidance	Cannot be modified

Name of Element	**Transfer Title**
Definition	The unique name assigned to the transfer (import) of Digitized Records and associated metadata.
Purpose	To identify the Digitized Records and metadata related to a particular transfer (import).
Obligation	Mandatory
Populated	System generated or manual entry
Guidance	Cannot be modified

Name of Element	**Transfer Description**
Definition	Explanation of what is transferred (imported) from the (vendor) host system to a (City) business system.
Purpose	To provide clarification for what is transferred (imported) into the (City) business system.
Obligation	Mandatory
Populated	System generated or manual entry
Guidance	Cannot be modified

Name of Element	**Transfer Reason**
Definition	Provides an explanation for the transfer (import) of Digitized Records and associated metadata into a (City) business system.
Purpose	To identify and capture the reason for the transfer (import).
Obligation	Mandatory
Populated	System generated or manual entry
Guidance	Cannot be modified