

# MUNICIPAL AUDITING REPORT CITY OF ROANOKE



## **Lean Project: Streamline Work Paper Development**

**November 08, 2016**

Report Number: 17-008  
Audit Plan Number: 16-608

*Municipal Auditing Department  
Chartered 1974*

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## Project Summary

### Goal of the project

To reduce time and waste (paper and other resources) in the work paper development process.

### Key findings

The following waste was identified in the current work paper development process:

- Defects
  - a. Re-work due to errors noted/changes made (work paper development and storage destruction (RM-3))
- Inventory
  - a. Average work paper contains seven (7) printed pages.
  - b. Average audit contains 106 work papers, which equals 776 printed pages.
- Over production
  - a. Work papers printed and maintained on the network drive
  - b. Work papers stored in file room and on the network drive
- Waiting
  - a. Reliance on third party to destroy manual work papers
- Motion
  - a. To and from printer
  - b. To and from inbox/offices for review
  - c. To and from file room

### Summary of improvements

After measuring and analyzing the work paper development process, we decided to implement the following improvements:

1. **Discontinue printing work papers:** Upon completion of a work paper, auditor no longer prints the work paper, but rather, saves the work paper and all supporting documentation on the network drive.
2. **Electronically notify reviewer of work paper completion:** Auditor emails the reviewer to notify him or her that the work paper is ready for review.
3. **Electronically update audit programs (document completion of work):** Auditor updates the Audit Program (in Excel) for each work paper section with his or her initials and the date the work paper was completed.
4. **Electronically review and document feedback:** Reviewer reviews the work paper and all supporting documentation on the shared network, and documents changes/questions

or comments using Track Changes for Word documents. If changes are needed to an Excel or PDF document, the reviewer notates those changes in a different color font.

5. **Electronically notify auditor of work paper approval:** Reviewer replies to the email (received from auditor indicating work paper completion) to notify the auditor that the work paper has been approved. The auditor makes the necessary adjustments to the work paper, accepts the changes as appropriate, and saves the work paper on the shared network.
6. **Electronically update indexes (document approval):** Once the work paper has been approved, the reviewer adds his or her initials to the electronic Index and types in the date to signify review and approval of the work paper.
7. **Electronically create formal record:** Once the audit has been completed, including the final report, all work papers are combined into a single PDF file which is maintained in the audit folder on the shared network. This PDF file serves as the formal public record of the audit work to be used for public inquiries and quality assurance reviews.
8. **Reduce manual records to store and destroy:** Hardcopy and digital records are purged each year according to the Library of Virginia Record Retention guidelines. The volume of hardcopy records will decrease each year as a result of the streamlined work paper process.
9. **Eliminate third party:** The City contracts with Lawrence Data Management for storage and destruction of manual records for all departments. The volume of hardcopy records for destruction will decrease each year as a result of the streamlined work paper process.

***Note: the process for shredding manual documents will continue for eight (8) years until all current manual work papers have been destroyed. By 2024, all work papers should be electronic only; at this point, the manual shredding part of the process can possibly be eliminated.***

## **Results**

### **Resource Reduction**

Based on Municipal Audit's goal of eight (8) completed audits per Senior Auditor each fiscal year, and four (4) Senior Auditors in the department, we anticipate completing thirty-two (32) audits per year. Per the calculations in the "Measure" phase of this project, we print, on average, a total of 776 pieces of paper (including dividers) per audit. Therefore, by not printing our work papers, we should save approximately 24,832 pieces of paper per year.

**Time Reduction (labor hours)**

Per the calculations in the "Measure" phase of this project, we currently spend approximately 2,534 minutes (or 42.23 hours) on developing, binding, storing, and destroying one (1) audit. Our anticipated process improvements will result in approximately 2,159 minutes (or 35.98 hours) spent on developing, storing, and destroying one (1) audit. This is a total savings of 6.26 labor hours per audit. Based on the goal of eight (8) completed audits per Senior Auditor each fiscal year, and four (4) Senior Auditors in the department, we anticipate completing thirty-two (32) audits per year. This would result in anticipated savings of approximately 200.17 labor hours per year for the department.

**Cost Reduction (actual dollars)**

Due to the reduction in printing, the Municipal Audit Department can anticipate to save approximately \$203.50 per year on paper alone. Similarly, the reduction in labor hours translates to an annual savings of \$7,306.

**Lead Time Reduction**

The anticipated lead time reduction is insignificant.



## LEAN Process

### Project Charter Form

Lean Project Name:	Streamline Workpaper Development		
Group Members:	Cari Spichek		
	Ann Clark		
	Drew Harmon		
Process Owner:	Drew Harmon	Business Area:	Municipal Audit
Opportunity or Problem Statement: (What is the problem?)	<p>There is considerable time and resource cost to printing, reviewing, approving, correcting, binding and storing workpapers. Audit workpapers can vary in length from one (1) page to 20+ pages, depending on the content. Once the preparer has completed the workpaper, it is printed and physically carried to the reviewer. The reviewer may make notes on the workpaper or suggest changes, and then physically carries it back to the preparer. If changes need to be made, the preparer makes the changes, re-prints the workpaper, and carries it back to the reviewer for final approval.</p> <p>Once a workpaper is approved, the preparer punches holes in the document and places the workpaper in the correct order within the audit binder. Once the audit is completed, all workpapers are bound using thick (cardstock) binding paper and stored in the Municipal Audit file room.</p> <p>The following resources are used at some point during the manual workpaper completion process:</p> <ul style="list-style-type: none"> <li>• Paper (some workpapers may be printed multiple times due to review and re-work)</li> <li>• Cardstock (used to separate between workpapers that are more than five (5) pages)</li> <li>• Staples, white out, ink, hole reinforcements, highlighters, erasers, etc.</li> <li>• Staff time (walking to and from copier, walking to and from inbox to drop off workpaper, re-printing, hole punching, stapling, staple removing, placing workpapers in binder, binding workpapers, storing workpapers in file room)</li> </ul> <p>There is also a cost associated with destroying workpapers at the destruction date.</p>		



## LEAN Process

### Project Charter Form

Business Impact: (How does this problem impact your unit or customers?)	The manual workpaper process impact's Municipal Audit's customers by the increased time it takes to complete workpapers. This ultimately translates into the increased time it takes to complete the entire audit and issue the report. The report cannot be issued to management until all workpapers are finalized, reviewed and approved.		
Goal Statement: (What would you like to see accomplished?)	We would like to see the amount of waste (in the form of paper, ink and cardstock) reduced, as well as the amount of time reduced for workpaper development.		
Start Date:	4/6/16	End Date:	9/21/16
Project Champion's Signature:		Date:	4/6/16

## Define Tollgate

**Project Name:** Streamline Work Paper Development

**Review the items below. Comment on any questions that you answer no below.**

REQUIRED: Does the charter clearly define:

- A Quantified *Opportunity* including
- The *Business Impact*, and
- A measurable *Goal*

**Yes – there is opportunity to have an impact on service (time and resources) for the Municipal Auditors, citizens, and members of Roanoke City and RCPS Audit Committees. The goal of reducing the amount of waste (in the form of resources as well as time) can be measured. The Municipal Auditing Department has discussed and agreed on average times currently used to complete the various steps of the work paper development process, and is currently measuring data on the volume of resources used in a given month. We should be able to see how any changes we make impact resource and time allocation.**

REQUIRED: Have critical customer requirements been captured in terms that are measurable? **While the primary users of work papers are the auditors, the Roanoke City and RCPS Audit Committee members, as well as the citizens of the city, are also indirect users of the work papers. Accuracy is the most critical customer requirement in the creation of the work papers. Similarly, upon completion of an audit, accuracy remains as the most critical requirement as the customer becomes the audit committees and citizens, The International Standards for the Professional Practice of Internal Auditing state:**

- **Internal auditors must document relevant information to support the conclusions and engagement results.**
- **Communications must be accurate, objective, clear, concise, constructive, complete, and timely.**

**Accuracy is a requirement that is somewhat difficult to measure.**

REQUIRED: Have additional needed resources been identified in addition to team members? **Yes, the only additional resources we need are data. As noted above, we have discussed average times for work paper development, and are gathering data on resources used.**

Have the responsibilities of each team member been clearly defined? Are the expectations for each team member clear? **Yes – three (3) members of the Municipal Auditing staff will serve as a resource and an interested party only. Two (2) Senior Auditors are team members, and the Municipal**

	<p><b>Auditor is the approver, as well as the project champion. Each team member is aware of their roles.</b></p>
<p>Is the scope of the project reasonable and aligned with the problem, goals, and business impact? <b>Yes – we have limited the scope to streamlining the development of one [1] work paper, from creation to filing and eventually, destruction. However, this ultimately is the process for an entire audit, as multiple work papers make up an entire audit.</b></p>	<p>Has a high level project tracking plan been developed with key milestones? <b>Yes – we plan to use the DMAIC Tollgates as key milestones and will be able to track project progress utilizing these.</b></p>
<p>Have the customers been clearly identified? <b>Yes – internal customers are the Municipal Auditors and members of the Roanoke City and RCPS Audit Committees. External customers are the citizens of Roanoke City.</b></p>	<p>Has a well-developed communication plan been created and agreed upon? <b>Yes – we are all located within the same office suite which allows for ease of communication on a daily basis. We will also communicate with team members during staff meetings and other times as our work schedules allow in order to complete the project.</b></p>

## Measure Tollgate

**Project Name:**

**Streamline Work Paper Development**

**Review the items below. Comment on any questions that you answer no below.**

REQUIRED: Has a Value Stream Map been completed to better understand the process and highlight problem areas? **Yes – see the Value Stream Maps of the current process on Exhibits 1 - 3.**

REQUIRED: Has baseline performance(s) been established? This (These) measure(s) are what we will use to determine the project success. **Yes – I have discussed with members of the department to get an accurate baseline of the current process. Additionally, I have performed several audits over the past year, and have a good understanding of the baseline process. The baseline process is documented on the Value Stream Maps (Exhibits 1 - 3).**

Has the team collected all necessary data (either existing data or newly measured data) to understand the baseline process? **Yes – See Exhibit 4.**

Have other mapping tools and diagrams been used to better understand the baseline process (spaghetti, concentration, etc.)? **Yes**

Have Observations been conducted to better understand the baseline process and identify waste? **Yes**

## Analyze Tollgate

Project  
Name:

**Streamline Work Paper Development**

**Review the items below. Comment on any questions that you answer no below.**

REQUIRED: Has the team conducted a cycle time and lead time analysis, identifying areas where time and resources are devoted to tasks not critical to the customer? **Yes – this was performed on the Value Stream Maps (Exhibits 1 - 3).**

REQUIRED: Has the value-stream process been analyzed to identify areas to focus improvement efforts? **Yes** Where flow stops? **Yes**

REQUIRED: Has the appropriate tool been used to identify root causes (5 whys, fishbone diagram, etc.)? **Yes – 5 why's, fishbone, and FMEA were used to identify root causes and begin to explore recommendations.**

REQUIRED: Have data analysis tools (such as pareto, histograms, etc.) been used if applicable to better understand the baseline situation and identify areas to focus improvement efforts? **No – not applicable for this process.**

Has the current process been analyzed to identify waste and non-value added processes? **Yes**

## Improve Tollgate

<b>Project Name:</b>	<b>Streamline Work Paper Development</b>
<b>Review the items below. Comment on any questions that you answer "no" to below.</b>	
REQUIRED: Has the team seen evidence that the root causes of the initial problems have been addressed through pilot, test or initial implementation? <b>Yes</b>	Did the team create a Future State Map? And has all potential changes been communicated to all stakeholders? <b>Yes</b>
REQUIRED: Have potential solutions been fully defined and narrowed to focus on the root causes? <b>Yes</b>	Have tools been used to generate ideas and implement solutions? (7 Ways, 5S, Poka-yoke, SMED, TPM, Level-loading, etc.) <b>Yes – the team brainstormed during staff meetings</b>
REQUIRED: Has a formal implementation plan been put together? <b>Yes</b> This includes documentation such as SOPs and training plan update. <b>We revised our current procedures and updated templates and indexes to support the new process. We formally implemented our new process and have been using it.</b>	If needed, has the team assessed and put together a plan to manage risk? (FMEA) <b>We have addressed risk; however, a formal plan to manage risk is not considered necessary for this project.</b>
REQUIRED: Were the solutions verified with the project sponsor, process owners and all stakeholders? <b>Yes</b>	REQUIRED: Has performance been evaluated after implementing improvement solutions? <b>Yes</b>

## Control Tollgate

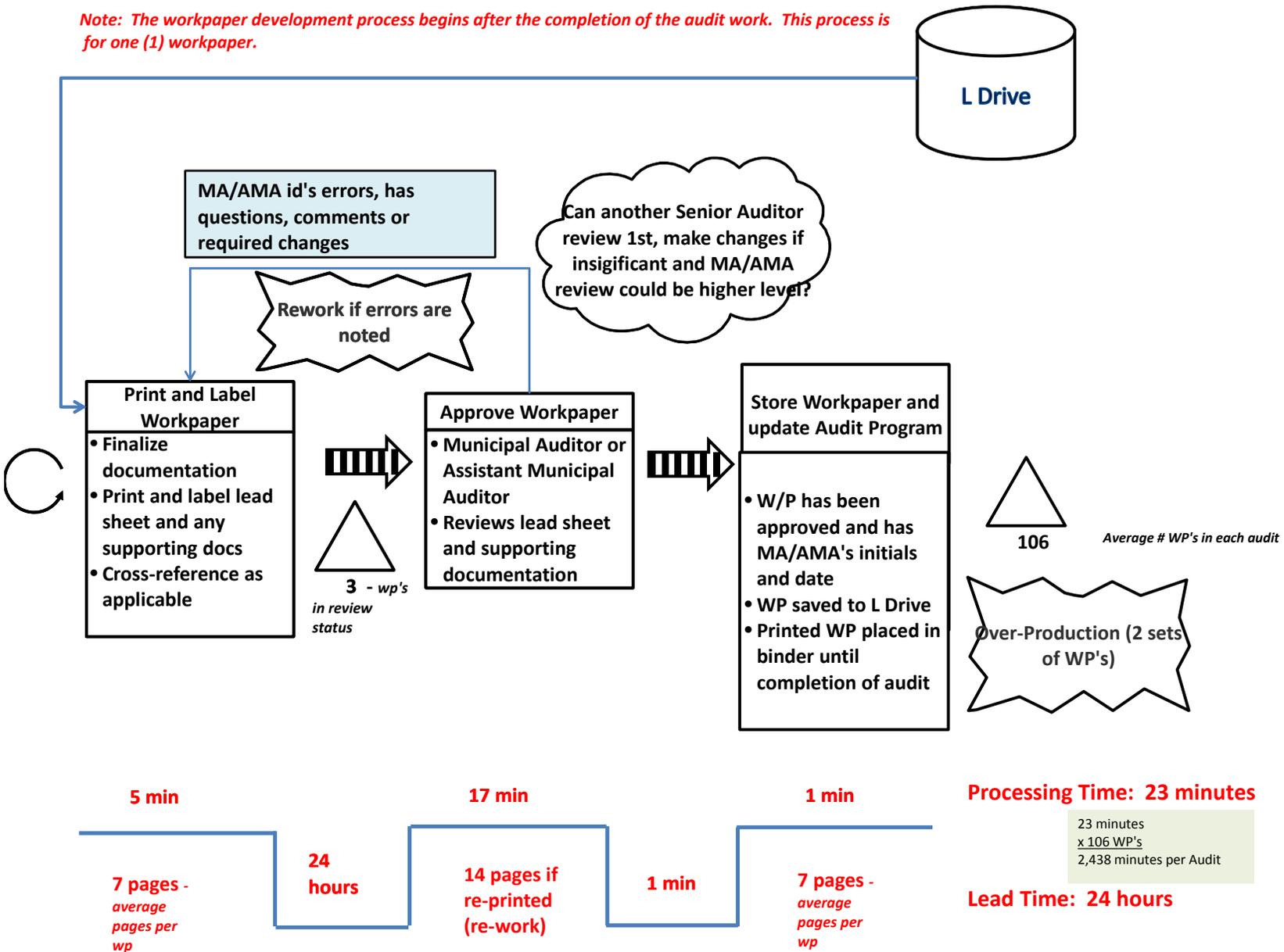
<b>Project Name:</b>	<b>Streamline Work Paper Development</b>	
<b>Review the items below. Comment on any questions that you answer no below.</b>		
<p>REQUIRED: Has the team prepared all the essential documentation of the improved process, including key procedures and process maps? <b>Yes – we have revised our policies, procedures, templates, indexes and audit programs according to the new process.</b></p>	<p>REQUIRED: Has the process owner been ‘commissioned’ and agrees to take over responsibility for managing continuing operations? <b>Yes</b></p>	
<p>REQUIRED: Has the team developed a <b>control plan</b> that defines activities if performance slips? <b>No – see Comments below</b></p>	<p>REQUIRED: Have “lessons learned” been captured and shared? <b>Yes</b></p>	
<p>Has the team compiled results or data confirming that the solution has achieved the goals defined in the Project Charter? <b>Yes – see results data on Exhibit 5.</b></p>	<p>Have opportunities been identified and shared where this project could also improve other processes? <b>Yes – we can use similar processes to streamline our work paper development procedures for Consultations and Investigations.</b></p>	

Comments:

**A control plan is not applicable regarding the improved process of streamlining work paper development. If performance were to slip (an Auditor prints a work paper and submits to the Reviewer), the Reviewer should question why the work paper was printed. Conversely, if a Reviewer were to print out a work paper with handwritten review notes, the Auditor should question the hard-copy feedback. For this process, it will be fairly simple to get back on track, due to the detailed procedures we have documented, the designed templates, and the electronic indexes and audit programs.**

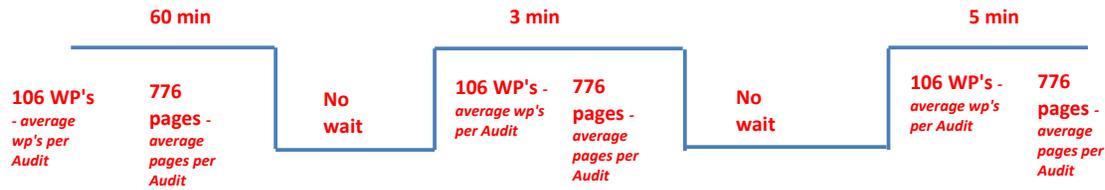
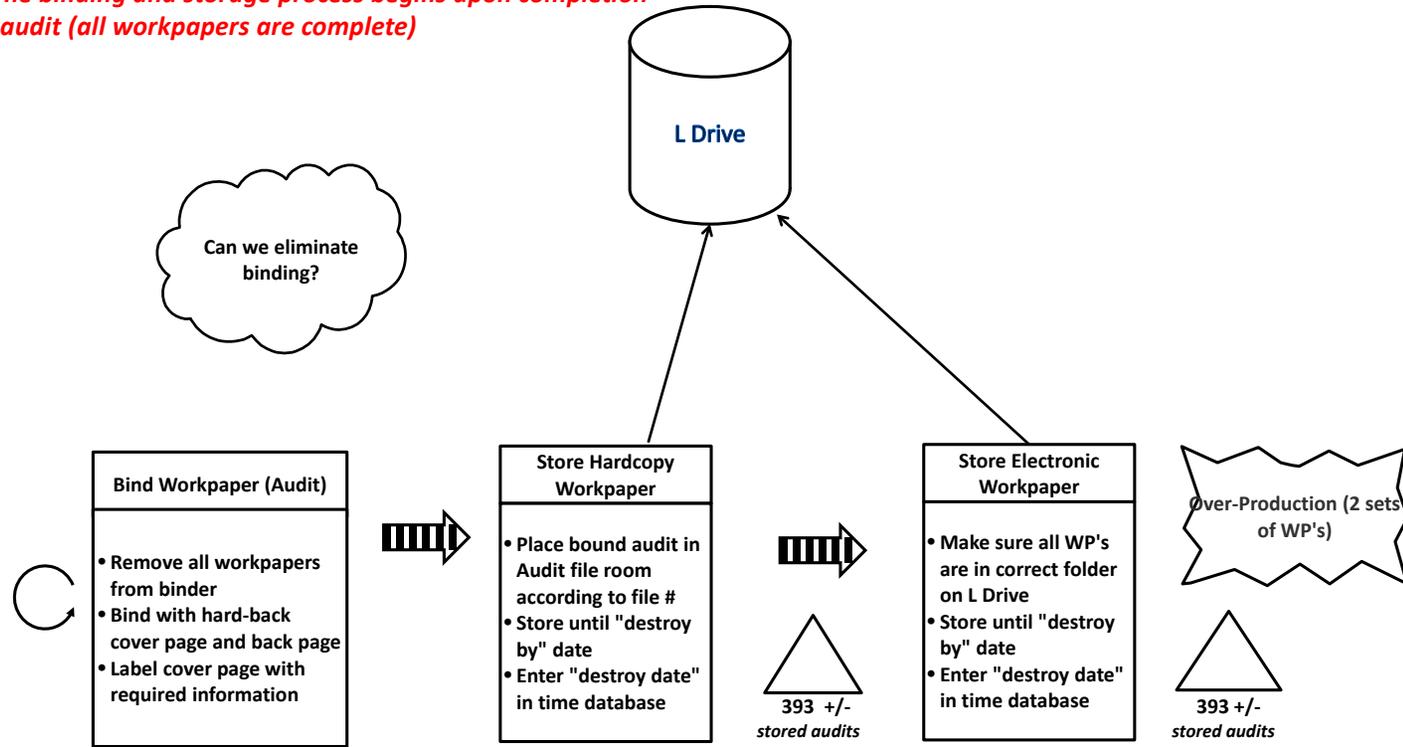
# Exhibit 1 - Value Stream Map [W/P Development]

Note: The workpaper development process begins after the completion of the audit work. This process is for one (1) workpaper.



# Exhibit 2 - Value Stream Map [W/P Binding and Storage]

*Note: The binding and storage process begins upon completion of the audit (all workpapers are complete)*



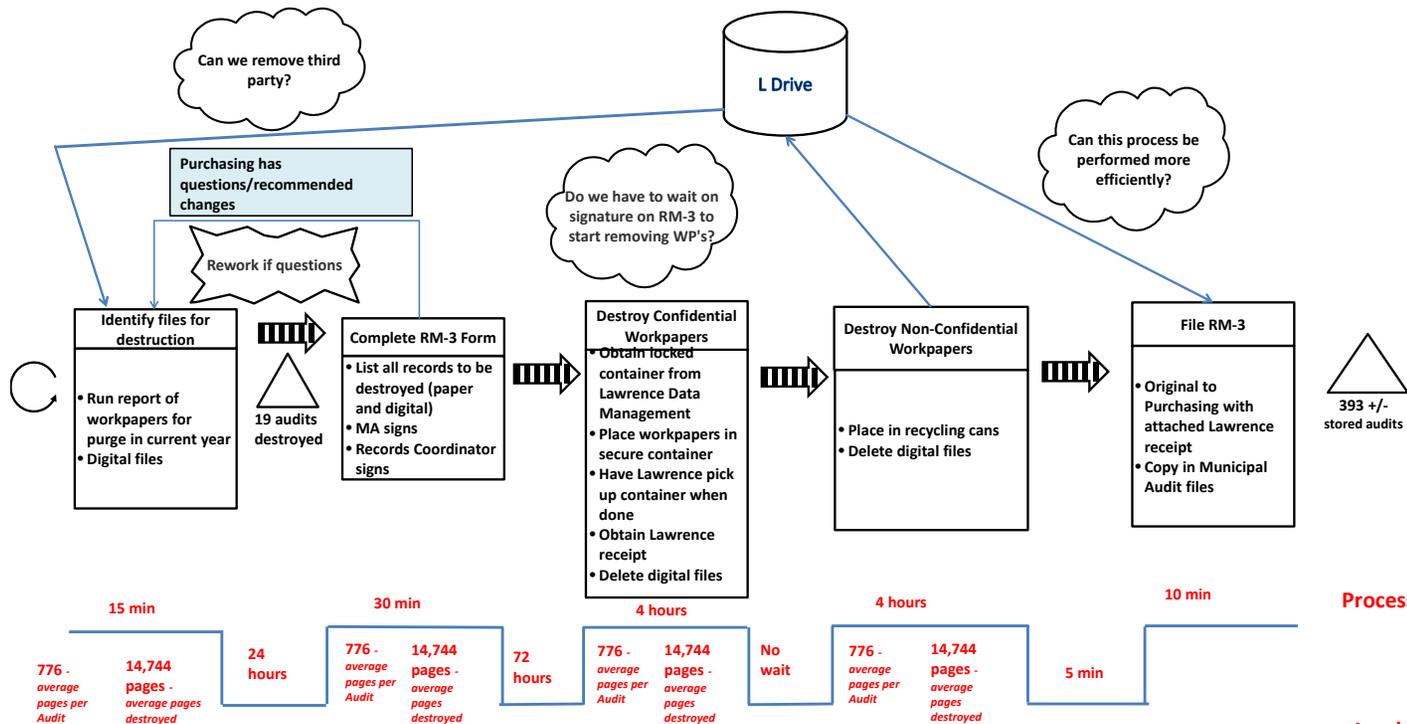
**Processing Time: 68 minutes (1 hour and 8 minutes)**

Per Audit

**Lead Time: NA**

# Exhibit 3 - Value Stream Map [W/P Destruction]

**Note: The destruction process begins upon receipt of the "Annual Records Compliance Memo" from Purchasing**



**Processing Time: 535 minutes (8 hours and 55 minutes)**

535 minutes / 19 Audits

= 28 minutes per Audit

**Lead Time: 5,765 minutes (96 hours and 5 minutes)**

## Exhibit 4 - Summarized Data

Calculation of Pages	
Average Pages per Workpaper	7
Average Workpapers per Audit	106
Total Average Pages per Audit	<u>742</u>
Average Dividers per Audit	34
Total Average pages per Audit	<u>776</u>

Calculation of Labor Hours	
Average # WP's per Audit	106
x Minutes for WP Development	23 (From VSM)
Total Average Minutes for 1 Audit (WP Development)	<u>2,438</u>
Average # Minutes to Bind and Store 1 Audit	68 (From VSM)
Average # Minutes to Destroy 1 Audit	28 (From VSM) --> 535 minutes / 19 Audits destroyed in 2015
Total # Minutes to Develop, Store, and Destroy 1 Audit	<u>2,534</u>
Converted to Hours	42.23 Hours

Anticipated Application of Paper and Labor Hours per year	
Municipal Audit's Goal is 8 audits per Senior Auditor	
There are four (4) Senior Auditors	
	32 Audits per year
Average # pages per audit	776 Printed pages per audit
	<u>24,832</u> Printed pages per year
Average # Labor	42.23 Hours per audit
x 32 audits per year	<u>1,351.36</u> Hours per year

## Exhibit 5 - Results Data

	Existing Process	Revised Process	2024 and Beyond	Current Reduction		2024 and Beyond Reduction	
Average # WP's per Audit	106	106	106	NA			
x Minutes for WP Development	23	20	20	(3.00)	Minutes per WP	(20.00)	Minutes per WP
Total Average Minutes to Develop 1 Audit	<u>2,438</u>	<u>2,120</u>	<u>2,120</u>	(318.00)	Minutes per audit	(2,120.00)	Minutes per audit
Average # Minutes to Finalize and Store 1 Audit	68	35	35	(33.00)	Minutes per audit		
Average # Minutes to Destroy 1 Audit	28	28	3.68	0.00	Minutes per audit	(24.32)	Minutes per audit
Total # Minutes to Develop, Store, and Destroy 1 Audit	<u>2,534</u>	<u>2,183</u>	<u>2,159</u>	(351)	Minutes per audit	(375.32)	Minutes per audit
Converted to Hours	42.23	36.38	35.98	(5.85)	Hours per audit	(6.26)	Hours per audit
<b>Anticipated Reduction of Paper and Labor Hours per year</b>							
Municipal Audit's Goal is 8 audits per Senior Auditor	8	8	8	NA		NA	
There are four (4) Senior Auditors	4	4	4	NA		NA	
Audits per year	<u>32</u>	<u>32</u>	<u>32</u>	NA		NA	
Average # printed pages per audit	776	0	0	(776)	Printed pages per audit	(776)	Printed pages per audit
x 32 audits per year	32	32	32	NA		NA	
	<u>24,832</u>	<u>-</u>	<u>-</u>	(24,832)	Printed pages per year	(24,832)	Printed pages per year
Average # Labor Hours per audit for WP Development, Storage and Destruction	42.23	36.38	35.98	(5.85)	Hours per audit	(6.26)	Hours per audit
x 32 audits per year	32	32	32	NA		NA	
	<u>1,351.47</u>	<u>1,164.27</u>	<u>1,151.30</u>	(187.20)	Hours per year	(200.17)	Hours per year