



## Six Sigma DMAIC Improvement Story

***Green Belt Team Leader*** Project Objective:  
**Improve the Timely Processing of Property Tax Refunds**

*Last Updated: 07-23-2013*

Team: ***Expedited Refund Processing***

Mario Morlote (Team Leader)

Marcus Saiz

Ed Marquez (Sponsor)

Carlos Maxwell (Team Leader)

Carla Cunningham

# Six Sigma Problem Solving Process

The team utilized the 5-Step DMAIC problem solving process.

## DMAIC Performance Improvement Process

Process Step		Description of Team Activities
Number	Name	
1	DEFINE	<ul style="list-style-type: none"><li>• Select Problem</li><li>• Identify Project Charter</li><li>• Develop Project Timeline</li><li>• Establish Method to Monitor Team Progress</li><li>• Construct Process Flowchart</li><li>• Develop Data Collection Plan</li><li>• Display Indicator Performance “Gap”</li></ul>
2	MEASURE	<ul style="list-style-type: none"><li>• Stratify Problem (i.e. “Gap”)</li><li>• Identify Problem Statement</li></ul>
3	ANALYZE	<ul style="list-style-type: none"><li>• Identify Potential Root Cause(s)</li><li>• Verify Root Cause(s)</li></ul>
4	IMPROVE	<ul style="list-style-type: none"><li>• Identify and Select Improvement(s)</li><li>• Identify Barriers and Aids</li><li>• Develop and Implement Improvement Plan</li><li>• Confirm Improvement Results</li></ul>
5	CONTROL	<ul style="list-style-type: none"><li>• Standardize Improvements within Operations</li><li>• Implement Process Control System (PCS)</li><li>• Document Lessons Learned</li><li>• Identify Future Plans</li></ul>



# Identify Project Charter

The team developed a team Project Charter.

Project Charter	
Business Case	<b>Project Name:</b> Improve the Timely Processing of Property Tax Refunds
	<b>Problem/Impact:</b> The lengthy amount of time taken to process property tax refunds due to VAB action exceeds statutory timeframes, as well as decreases satisfaction with Miami-Dade County government.
	<b>Expected Benefits:</b> Improvement will result in refunds being issued more quickly as well as greater overall satisfaction with process.
Objectives	<b>Outcome Indicator(s)</b> Percentage of VAB-related tax payer refunds processed in 60 days for taxpayers not using a mortgage company
	<b>Proposed Target(s)</b> Target = 90% of VAB-related refunds processed in 60 days for tax payers without a mortgage company. <i>The 60-day threshold is interim. Once the backlog issued is resolved the threshold should be 30 days.</i>  <i>This 30-day threshold would be consistent with state's 30-30-30 day statutes governing the time required to process VAB appeals, issue decisions and issue a refund. The Miami-Dade County Tax Collector has difficulty meeting its portion of this 30-30-30 target due to the backlog of VAB appeals.</i>
	<b>Time Frame:</b> March 2013 through August 2013
	<b>Strategic Alignment:</b> Supports departmental Business Plan objective of increasing timeliness of refund processing.
Scope	<b>In Scope:</b> Refunds generated by successful 2011 appeals to Value Adjustment Board.
	<b>Out-of-Scope:</b> Refunds not part of this study include refunds due to overpayment or duplicate payment of taxes, current year or pre-2011 VAB appeals, and VAB-related refunds issued via a mortgage company.
	<b>Authorized by:</b> Ed Marquez, Fernando Casamayor
Team	<b>Sponsor:</b> Ed Marquez
	<b>Team Leaders:</b> Mario Morlote; Carlos Maxwell
	<b>Team Members:</b> Marcus Saiz, Carla Cunningham
	<b>Process Owner(s):</b> Fernando Casamayor
	<b>Mgmt Review Team:</b> Ed Marquez, Fernando Casamayor
Schedule	<b>Completion Date:</b> August 30, 2013
	<b>Review Dates:</b> August 30, 2013
	<b>Key Milestone Dates:</b> See Action Plan



# Monitor Team Progress



The Team and Management used a Checklist to monitor team progress.



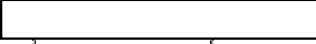



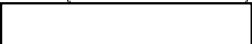



		<b>DMAIC Story Checkpoints</b>		
<b>PLAN</b>	<b>Step 1 Define</b>	<b>Objective: Demonstrate the importance of improvement needs in measurable terms.</b>		
		1. The stakeholders' need(s) were identified.	✓	
		2. The problem can be described as an "object" with a "defect" with unknown cause(s) that need to be identified.	✓	
		3. A line graph outcome indicator was constructed that appropriately measures the problem (or gap).	✓	
			4. A schedule for completing the five DMAIC Story steps was developed.	✓
	<b>Step 2 Measure</b>	<b>Objective: Investigate the features of the indicator, stratify the problem and set a target for improvement.</b>		
		5. Data contained or directly linked to the indicator were stratified from various viewpoints (i.e., what, where, when and who) and a significant dataset was chosen.	✓	<ul style="list-style-type: none"> <li>▪ Team identified an indicator; developed a Flowchart and a Spreadsheet</li> <li>▪ Sample Size Calculator</li> <li>▪ Histograms and Paretos</li> <li>▪ Fishbone</li> <li>▪ Countermeasures Matrix, Barriers and Aids, Action Plan</li> <li>▪ Process Control Chart</li> </ul>
		6. A target for improvement was established based on the stakeholders' need.	✓	
		7. The impact of the target on the indicator was determined.	✓	
	8. A problem statement that describes the "remaining dataset" was developed.	✓		
	<b>Step 3 Analyze</b>	<b>Objective: Analyze the stratified data to identify and verify the root causes.</b>		
		9. Cause and effect analysis was taken to the root level.	✓	
10. Potential causes most likely to have the greatest impact on the problem were selected.		✓		
11. A relationship between the root causes and the problem was verified with data.		✓		
		12. The impact of each root cause on the gap was determined.	✓	
<b>DO</b>	<b>Step 4 Improve</b>	<b>Objective: Develop and implement countermeasures to eliminate the verified root causes of the problem.</b>		
		13. Countermeasures were selected to address verified root causes.	✓	
		14. The method for selecting the appropriate countermeasures was clear and considered effectiveness and feasibility.	✓	
		15. Barriers and aids were determined for countermeasures worth implementing.	✓	
			16. The action plan reflected accountability and schedule.	✓
	<b>Step 5 Control</b>	<b>Objective: Confirm that the countermeasures taken impacted the root causes and the problem; and that the target has been met.</b>		
		17. The effect of countermeasures on the root causes was demonstrated.	✓	
		18. The effect of countermeasures on the problem (or indicator) was demonstrated.	✓	
19. The improvement target was achieved and causes of significant variation were addressed.		✓		
		20. The effect of countermeasures on the indicator representing the stakeholders' need was demonstrated.	✓	
<b>CHECK</b>	<b>Step 5 Control</b>	<b>Objective: Prevent the problem and its root causes from recurring. Maintain and share the gains.</b>		
		21. A method was established to document, permanently change, and communicate the revised process or standard.	✓	
		22. Responsibility was assigned and periodic checks scheduled to ensure compliance with the revised process or standard.	✓	
		23. Specific areas for replication were identified.	✓	
		<b>Objective: Evaluate the team's effectiveness and plan future activities.</b>		
<b>ACT</b>		24. Any remaining problems (or gaps) were addressed.	✓	
		25. Lessons learned, P-D-C-A of the Story process, & team growth were assessed & documented.	✓	



# Develop Project Timeline Plan

The team developed a timeline plan to complete the Project.

<b>Legend:</b>	
	= Actual
	= Proposed

WHAT: Complete DMAIC Story Project by Aug. 30, 2013						
DMAIC Story Process Step	WHEN					
	2013					
	Mar	Apr	May	June	July	Aug
1 Define	 		Completed 4/19/13			
2 Measure		 		Completed 5/10/13		
3 Analyze			 		Completed 6/25/13	
4 Improve				 		
5 Control					 	



# Costs of Untimely Refunds

The team collected info on costs of untimely refunds and found .....

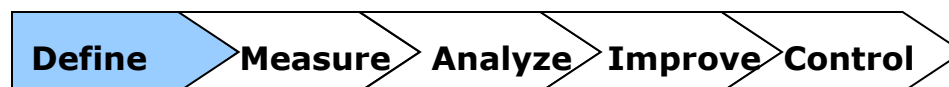
## Annual Cost

### 1. Overall personnel costs

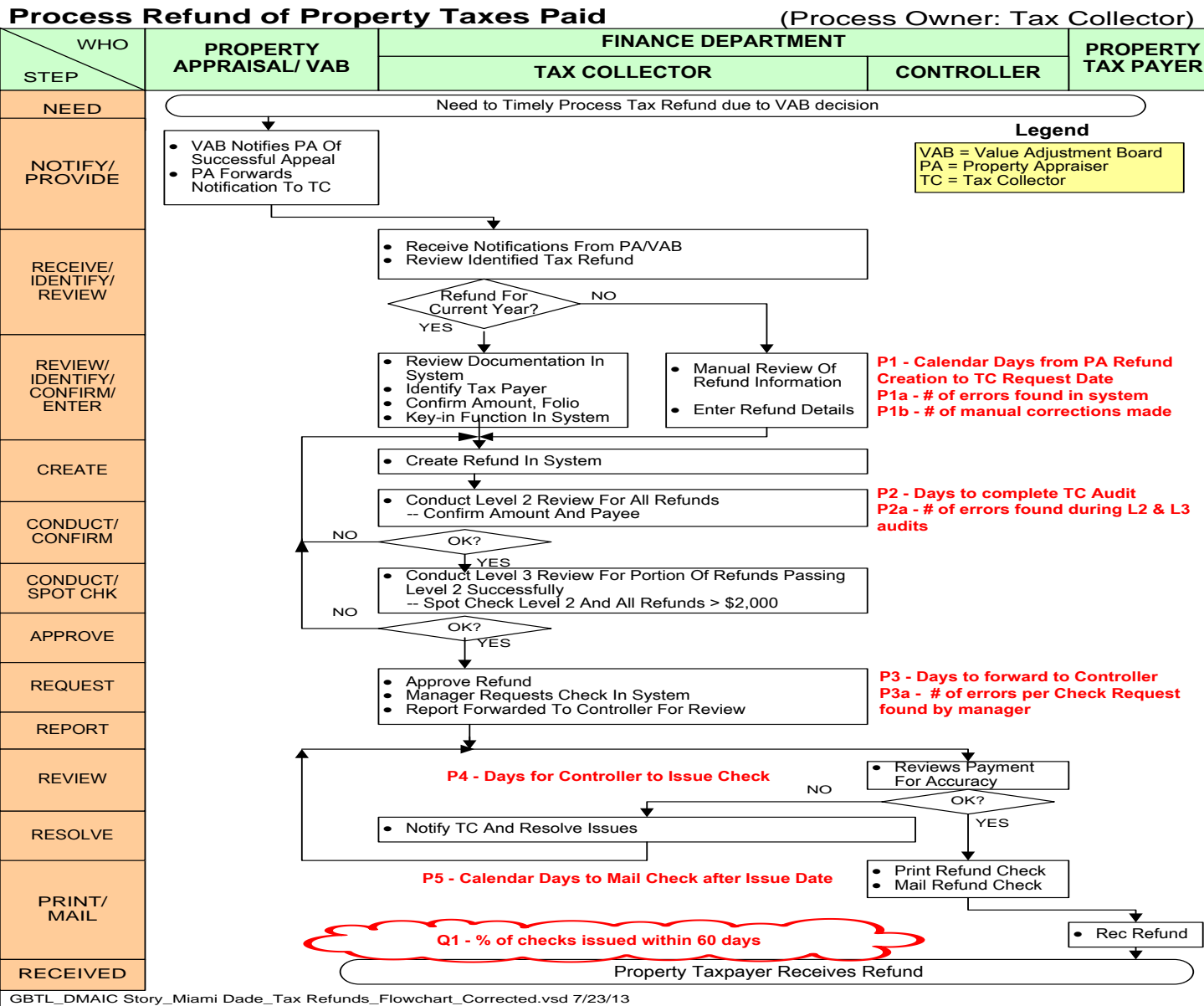
1a. Unit personnel costs.....	\$746,802
1b. Personnel costs attributable to Property Tax Refund process .....	\$428,176

### 2. Estimated handling costs for inquiries about untimely refunds. (This includes all refunds, not just VAB-related refunds)

2a. 180 “easy” calls per month, per employee (5 mins per call).....	\$72,426
2b. 20 “complex” calls and two drop-ins per month per employee (20 mins each).....	\$35,408
Total.....	<u>\$107,870</u>



# Review Process Flow Chart



The team constructed a flow chart describing the process.

The team next looked at data needed to display the P and Q Indicators.



# Identify Data Collection Needs

The team developed a data collection spreadsheet to collect indicator and demographic data...

## Property Tax Refund Processing Data

Line #	DEMOGRAPHICS										MILESTONE DATES									
	B	C	D	E	F	G	H	I	N	O	P	Q	S	T	U	V	W	X	AA	AB
	Mun	Folio	MtgCo	Refund amt	Interest Amt	INT %	Refund Size \$2000 or larger	Days based on mrtg. co. code 30 days for non-000, 60 days for 000	1- Tax Refund Identified (Created) Date	Day	2- Request Date Date	Day	3- Audit Date Date	Day	4 Forward to Controller Date	Day	5- Issued Check Date	Day	6- Mail Date (No earlier than 3 days after issue date) Date	Day
			Avg				>2000		%Mo		%Mo		%Mo		%Mo		%Mo		%Mo	
			\$1,380	\$151	0.108	414	13.7%		15.1		16.6		0.5		0.9		0.0		100.0	
1	30	50070630080	000	\$ 317	\$ 34	0.1073	Small	60	01/17/2013	Th	02/04/2013	Mo	2/7/13	Th	2/20/13	We	02/22/2013	Fr	2/25/13	Mo
2	01	41211320850	000	\$ 581	\$ 63	0.1084	Small	60	12/21/2012	Fr	01/30/2013	We	2/4/13	Mo	2/7/13	Th	02/15/2013	Fr	2/18/13	Mo
3	01	41150061760	000	\$ 1,737	\$ 191	0.11	Small	60	12/12/2012	We	01/17/2013	Th	1/23/13	We	1/30/13	We	02/01/2013	Fr	2/4/13	Mo

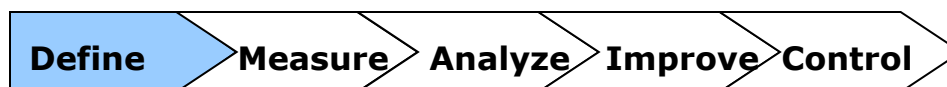
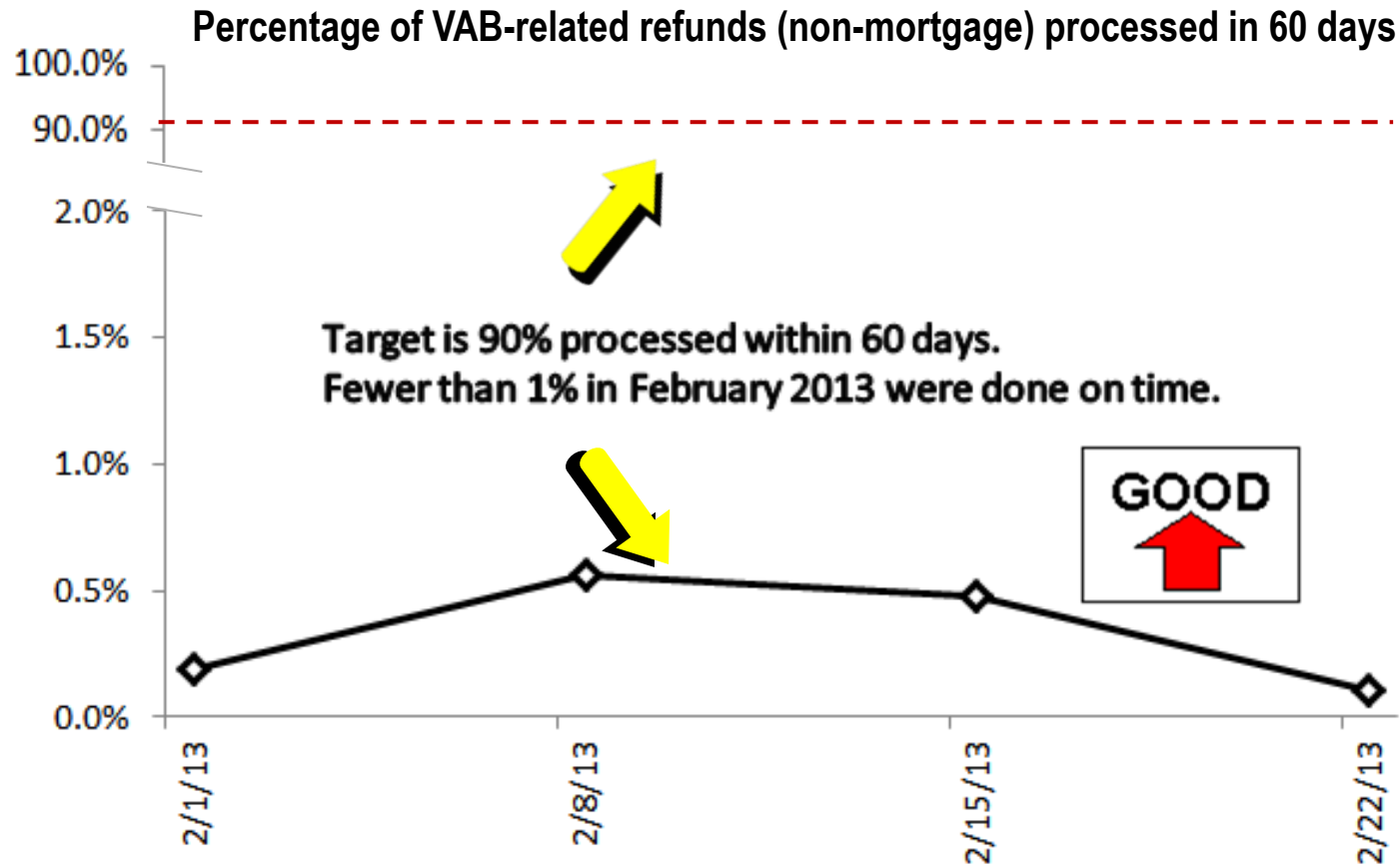
DURATION								OUTCOMES	
AC= P-N	AD= S-P	AE= U-S	AF= W-U	AG= W-P	AG= AA-W	AI= AA-N	AI= AA-N	AO= AI-I	AQ='Y' if AP<=0
Tax Refund Created TO Request Date	Request Date TO Audit Date	Audit Date TO Controller Date	Controller to Issue Date	Request Date to Issue Date (for those w/o interim steps)	Issue Date to Mail Date	Tax Refund Created TO Check Issued (for those w/o interim steps)	Tax Refund Created TO Check Mailed (for those w/o interim steps)	# of Days Check issued Late	Check Issued On-Time?
Avg # of Days									%Y
147.6	7.7	5.7	3.9	17.9	3.0	165.5	168.5	111.4	0.33
P1	P2	P3	P4	P5			Q1		
18	3	13	2	18	3	36	39	-24	Y
40	5	3	8	16	3	56	59	-4	Y
36	6	7	2	15	3	51	54	-9	Y





# What is the gap?

The team found that a tiny percentage of VAB non-mortgage related refunds issued in February were processed in fewer than 60 days from the date the Property Appraiser notified the Tax Collector....

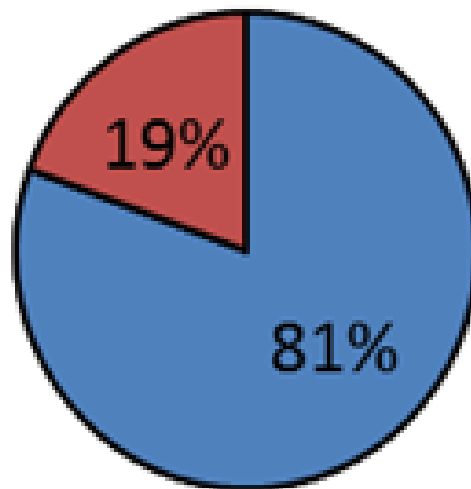


# Stratify the Problem

The team considered only VAB-related refunds that were NOT paid through a mortgage company.

Share of Feb. 2013 VAB-related refunds paid through a mortgage company

■ Non-Mortgage ■ Mortgage



81% (2,426) of refunds issued in February were to non-mortgage company entities

Non-mortgage related refunds require additional research to determine original payer of property tax

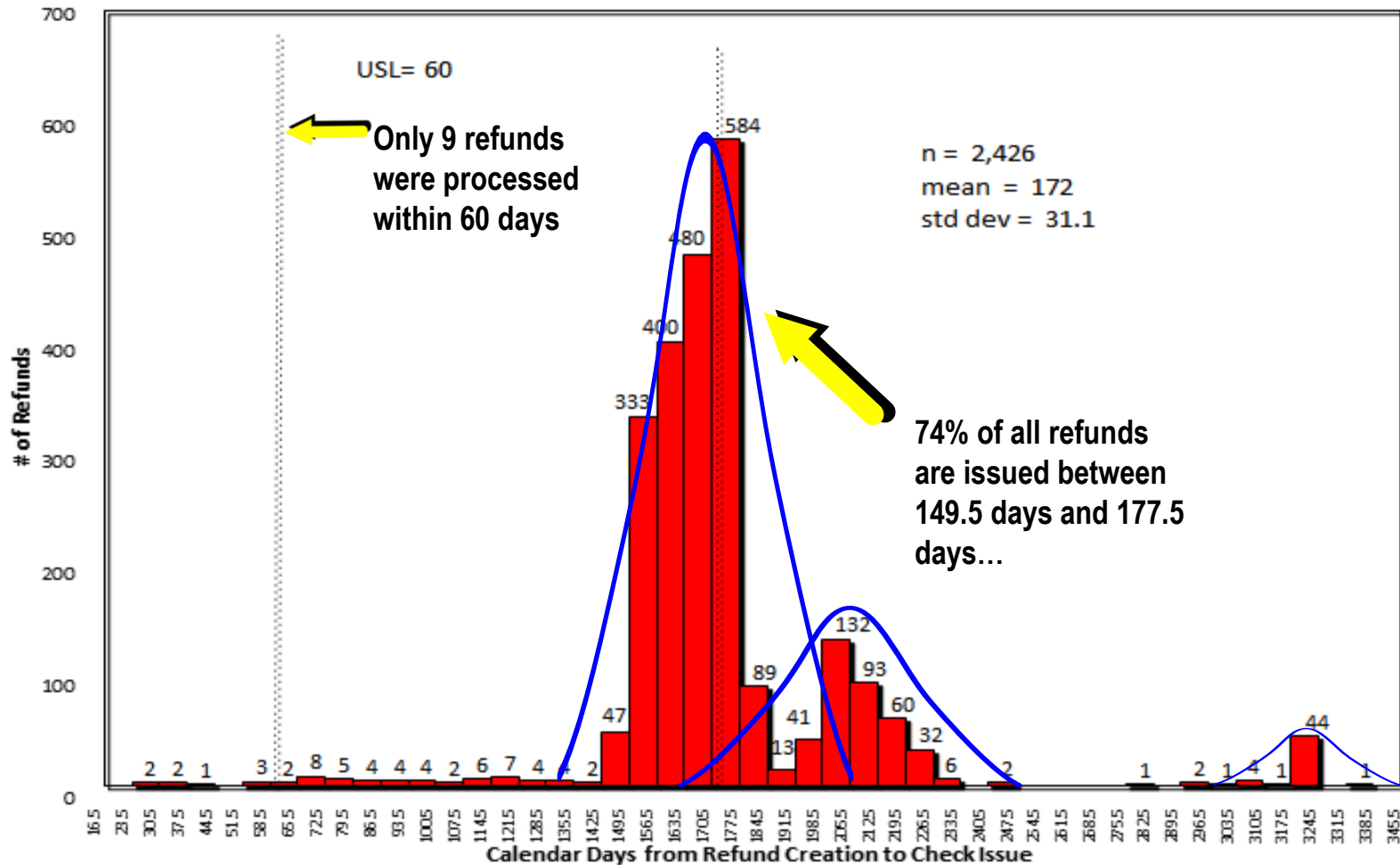
The time to issue these 2,426 refunds was shown on a histogram...



# Stratify the Problem

The team stratified the 2,426 VAB-related refunds using a histogram and found.....

VAB Related Refunds Issued in February 2013 (with no associated mortgage company)



# Stratify the Problem

The team sampled the data to review the time taken for the refunds to move through several interim milestones not readily available in their systems.

Discrete Data Sample Size	
Input Section	
"N" = Population Size	2426
"p" = % Occurrence In Population	99%
"E" = Sampling Error	3%
"CL" = Confidence Level	99%
"Z" = Z Value (based on CL)	2.58
Output Section	
Required Sample Size for Large Population of Unknown Size	73
Required Sample Size for Small Population of Known Size	71

Data sampled to obtain additional refund milestone dates.

9 timely and 76 non-timely refunds were sampled.



# Stratify the Problem

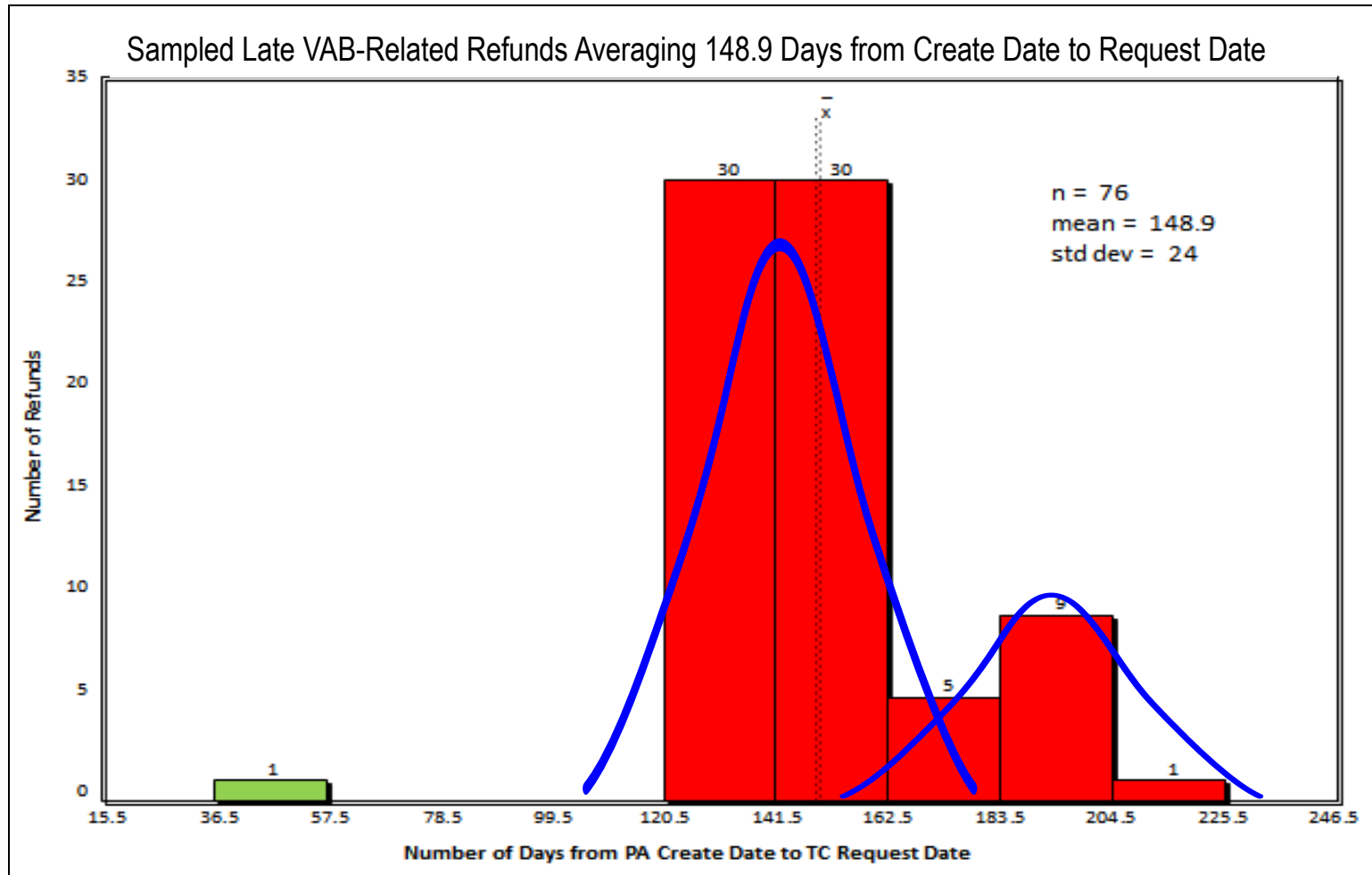
The team compared the timely and the untimely refunds and found .....

Process Step	76 refunds exceed 60-day spec	9 refunds meet 60-day spec	Difference	Summary Flowchart		
				Property Appraiser / VAB	Tax Collector	Finance Controller
Create Date-Request Date	148.9	22.1	126.8	<pre> graph TD     Start([Need Refund Processed]) --&gt; PA[PA Notifies TC Refund is Required]     PA --&gt; TC[TC Conducts Research TC Requests Refund In System]     TC --&gt; Audit[TC Staff Audits Refund For Accuracy]     Audit --&gt; Forward[TC Staff Forwards Refund To Controller For Payment]     Forward --&gt; Controller[Controller System Generates Check Checks Printed Fridays]     Controller --&gt; Mail[Checks Prepared For Mail]     Mail --&gt; End([Refund Check Mailed])                     </pre> <p><b>Legend</b>                      PA= Property Appraiser                      TC= Tax Collector                      VAB= Value Adjustment Board</p>		
Request Date - Audit Complete	7.8	6.7	1.1	<p>76 sampled untimely refunds took an average of <u>149 days</u> to have a refund request entered in the system whereas the timely ones took an average of <u>22 days</u>. The difference in the other process steps was negligible.</p>		
Audit Complete - Sent to Controller	5.7	5.4	0.3			
Controller Received to Check Issue Date	3.9	4.7	-0.8			
Check Issue Date to Earliest Mail Date	3.0	3.0	0.0			
<b>Total Average Days</b>	<b>169.3</b>	<b>41.9</b>	<b>127.4</b>			



# Stratify the Problem

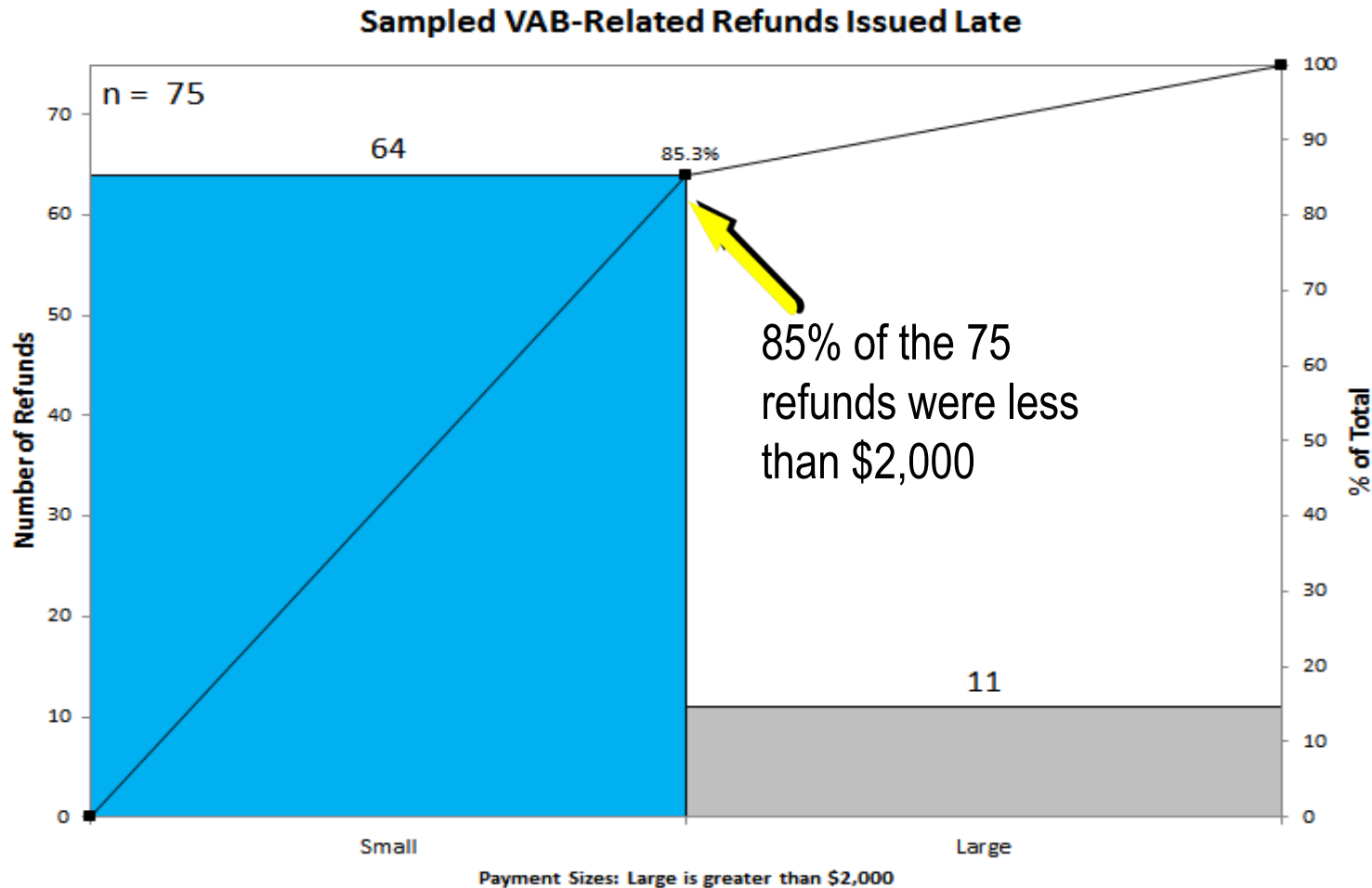
The team built a histogram for refunds in the first step of the process and found 75 of the 76 refunds took more than 120 days in the first step of the process.....



Define Measure Analyze Improve Control

# Stratify the Problem

The team stratified the 75 refunds further and found...

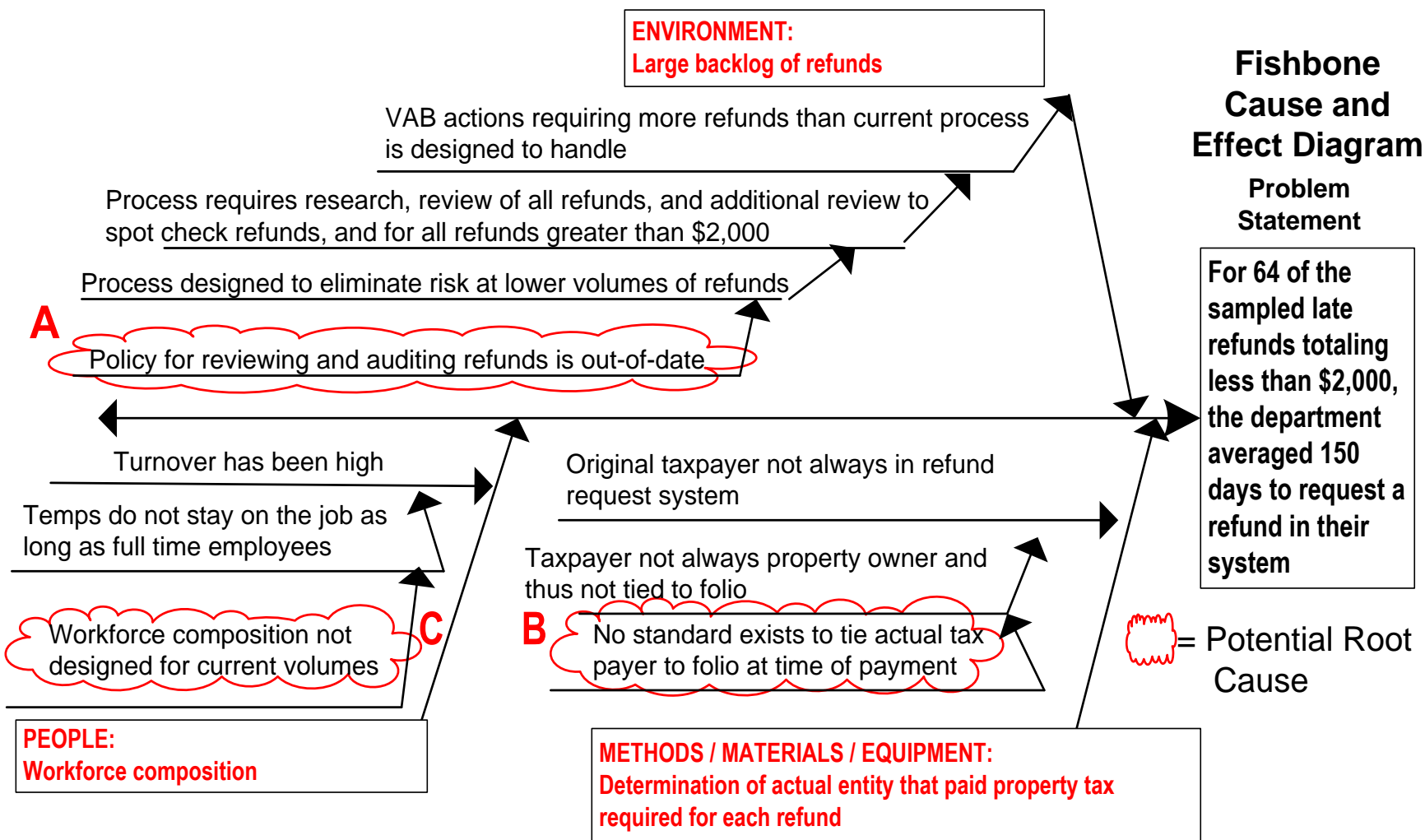


**Problem Statement:** For 64 of the sampled late refunds totaling less than \$2,000, the department averaged 150 days to request a refund in their system



# Identify Potential Root Causes

The team completed Cause and Effect Analysis and found...





# Identify and Select Countermeasures

The team brainstormed many countermeasures and narrowed them down to these for evaluation:

**Countermeasures Matrix**

Problem Statement	Verified Root Causes	Countermeasures	Legend:			
			5-Extremely	3-Moderately	2-Somewhat	1-Little or None
			Rating			
			Effectiveness	Feasibility	Overall	Take Action? Yes/No
For 64 of the sampled late refunds totaling less than \$2,000, the department averaged 150 days to request a refund in their system	A - Policy for reviewing and auditing refunds is out-of-date	A1- Conduct L2 reviews only for refunds greater than \$500. Fast track smaller refunds.	4	5	20	Y
		A2- Increase automatic L3 review threshold from \$2,000 to \$10,000. L3 review will instead emphasize monitoring quality of production and L2.	4	5	20	Y
		A3- Develop reports to track performance of production and L2 reviews	4	5	20	Y
	B - Workforce composition not designed for current volumes	B1- Begin to transfer audit personnel into production	5	5	25	Y
		B2- Based on performance of staff recalibrate staffing ratios of production personnel to audit personnel	4	5	20	Y
		B3- Develop training materials and standard operating procedures	3	5	15	Y
	C - No standard exists to tie actual tax payer to folio at time of payment	C- Treat more payments as cash which allows TC to send refunds to the owner of record. Payment types include money orders, wire payments, cashier's checks and e-checking	5	5	25	Y

The team selected the countermeasures for implementation.



# Identify Barriers and Aids

The team performed Barriers and Aids analysis on the selected Countermeasures.

Countermeasure(s): Implement Countermeasures to improve Tax Refund Processing

Barriers		Aids
Impact (H, M, L)	Forces against Implementation	Forces For Implementation
H	1) Delays in recruitment and staffing	A) Department management support for improving refund processing time
M	2) Addressing ongoing customer service demands due to existing backlog of refunds	B) Implementation of Taxsys system should expedite tax payment research requirements beginning with 2013 tax roll

The team next sought to incorporate this analysis into the team's Action Plan.

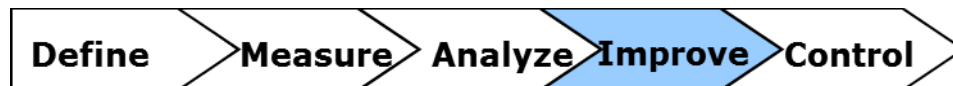


# Develop and Implement Action Plan

The team implemented an Action Plan for the team's Countermeasures.

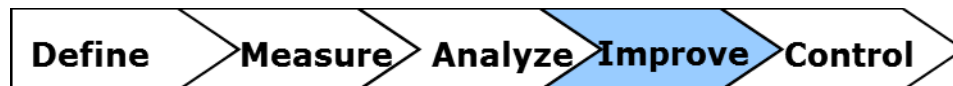
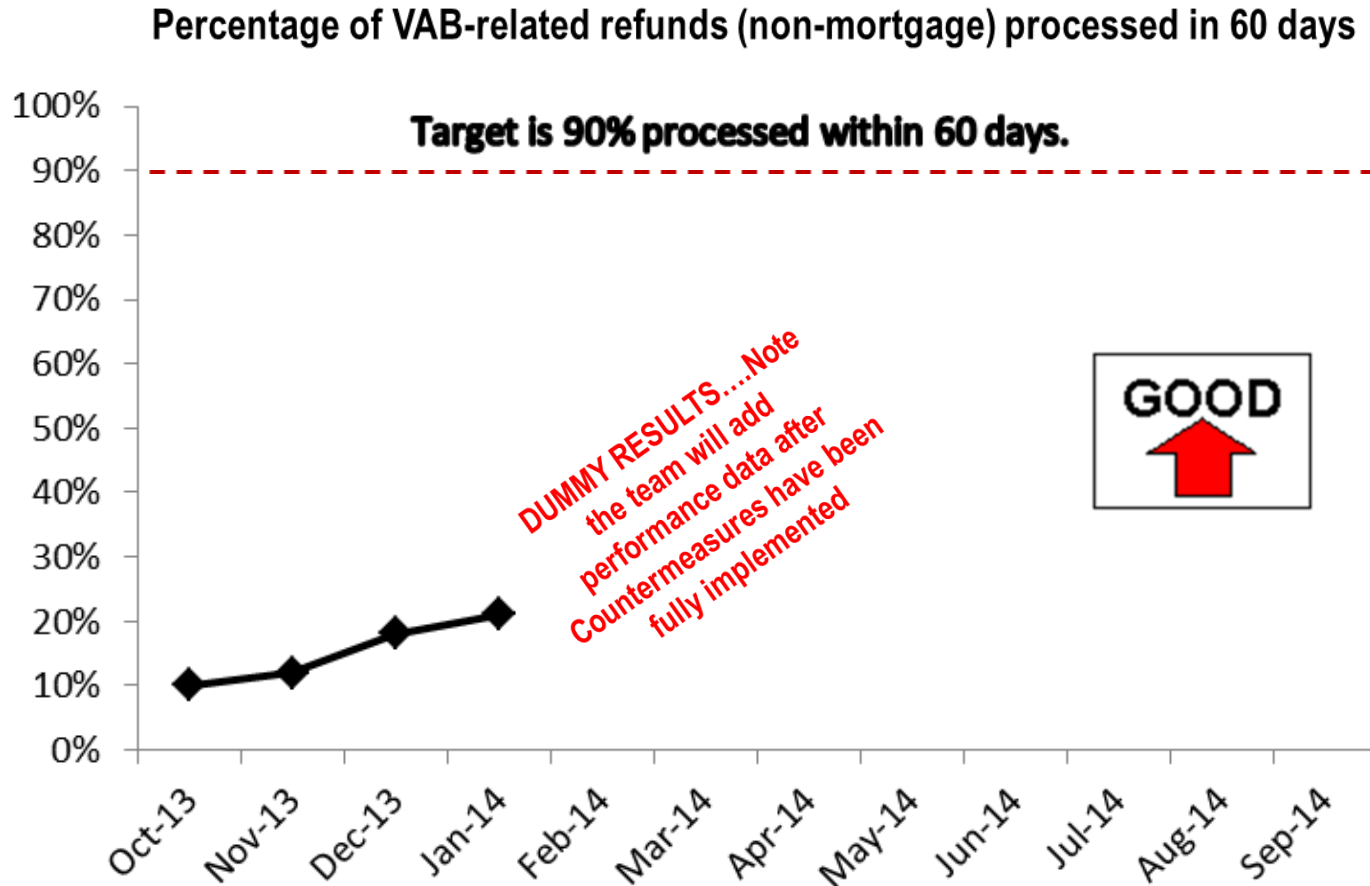
**WHAT: Implement countermeasures to improve timeliness of tax refunds**

HOW	WHO	WHEN					
		2013					
		July	Aug	Sept	Oct	Nov	Dec
1 Secure Management Approval of Countermeasures	TC		7/31/13				
2 Develop Detailed Countermeasures:	TC						
A - Change L2 and L3 review standards. Develop reports to assist with quality control				8/15/13			
B - Change mix of staff by moving personnel from review to production. Develop new training materials and standard operating procedures	TC			8/15/13			
C - Treat more payments like cash, allowing for refunds to go to the owner of record	TC			8/15/13			
3 Communicate and train staff in countermeasures and related policies/procedures	TC			8/31/13			
4 Implement pilot for countermeasures	TC				9/30/13		
5 Review pilot and determine benefits and adjust as necessary and present results to management	TC					10/30/13	
6 Establish on-going responsibilities and standardize countermeasures into operations	TC						On-going



# Review Results

The team collected indicator data and reviewed results of its countermeasures.

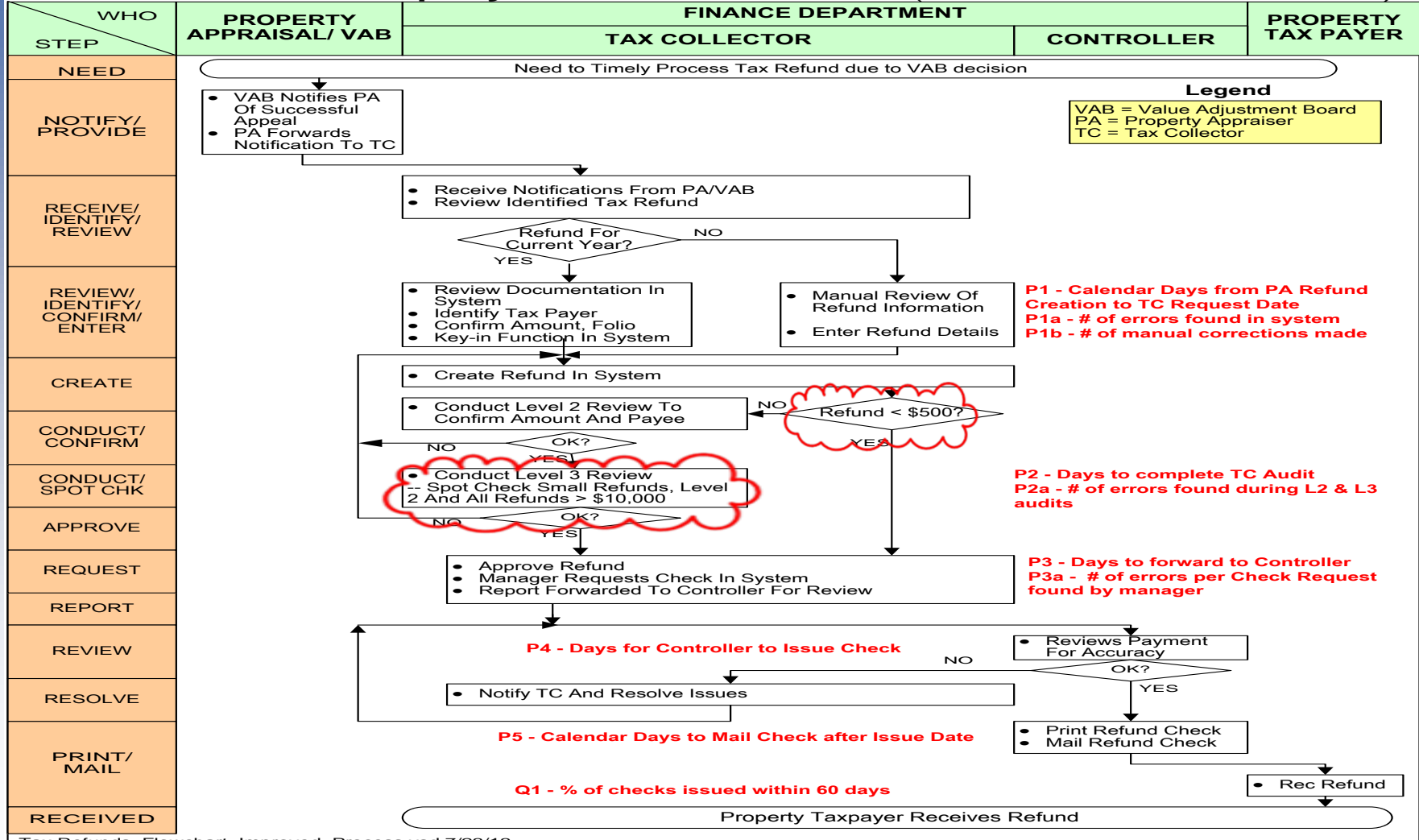


# Standardize Countermeasures

The team developed an updated process flow chart summarizing the changes in the refund production and review process.

## Process Refund of Property Taxes Paid

(Process Owner: Tax Collector)



Tax Refunds\_Flowchart\_Improved\_Process.vsd 7/23/13



# Standardize Countermeasures

The team Developed a Process Control System (PCS) to monitor the process on-going.

Process Control System						
<b>Process Name:</b> Process VAB-related Tax Refunds			<b>Process Owner:</b> Marcus Saiz			
<b>Process Customer:</b> Taxpayers			<b>Critical Customer Requirements:</b> Refund issued within statutory requirement of 30 days after the Property Appraiser notifies the Tax Collector a refund is required			
<b>Process Purpose:</b> Pay Vendors for Services Rendered			<b>Current Sigma Level:</b> TBD		<b>Outcome Indicators:</b> Q1	
Process and Quality Indicators			Checking / Indicator Monitoring			Contingency Plans / Misc. • Actions Required for Exceptions • Procedure References
Process Indicators And	Control Limits	Data to Collect	Timeframe (Frequency)	Responsibility		
Quality Indicators	Specs/ Targets	What is Checking Item or Indicator Calculation	When to Collect Data?	Who will Check?		
P1	Calendar days from PA refund creation to TC refund request date	TBD	Date of Refund request in TC system minus Date of notification from PA	Monthly	TC/Finance	TBD
P2	Errors found during L2 review	TBD	Count of errors found during L2 review divided total number of refunds reviewed during L2	Monthly	TC/Finance	TBD
P3	Errors found during L3 review	TBD	Count of errors found during L3 review divided total number of refunds reviewed during L3	Monthly	TC/Finance	TBD
Q1	% of checks issued on time	30	# of days to issue refund check	Monthly	TC/Finance	TBD



# Identify Lessons Learned

The team learned the following lessons.

Comparing on-time and late refunds by specific milestone showed delay is entirely at first step of the process, and that most refunds being delayed are less than \$2,000. Seeing this in the data made it easier to justify changes to the process.

Fishbone doesn't have to start with the results of a single case bore. Instead a fishbone with four dimensions: People, Environment, Methods, and Materials/Equipment can be used.

## Next Steps

1. Implement countermeasures and conduct training
2. Monitor the performance of the countermeasures
3. Adjust staffing composition as necessary

