



Six Sigma DMAIC Improvement Story

Green Belt Project Objective:
To Reduce Cycle Time For Issuing Tree Permits

Last Updated: 8-28-13

Team: ***Bend But Don't Break***

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Six Sigma Problem Solving Process

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

DMAIC Performance Improvement Process

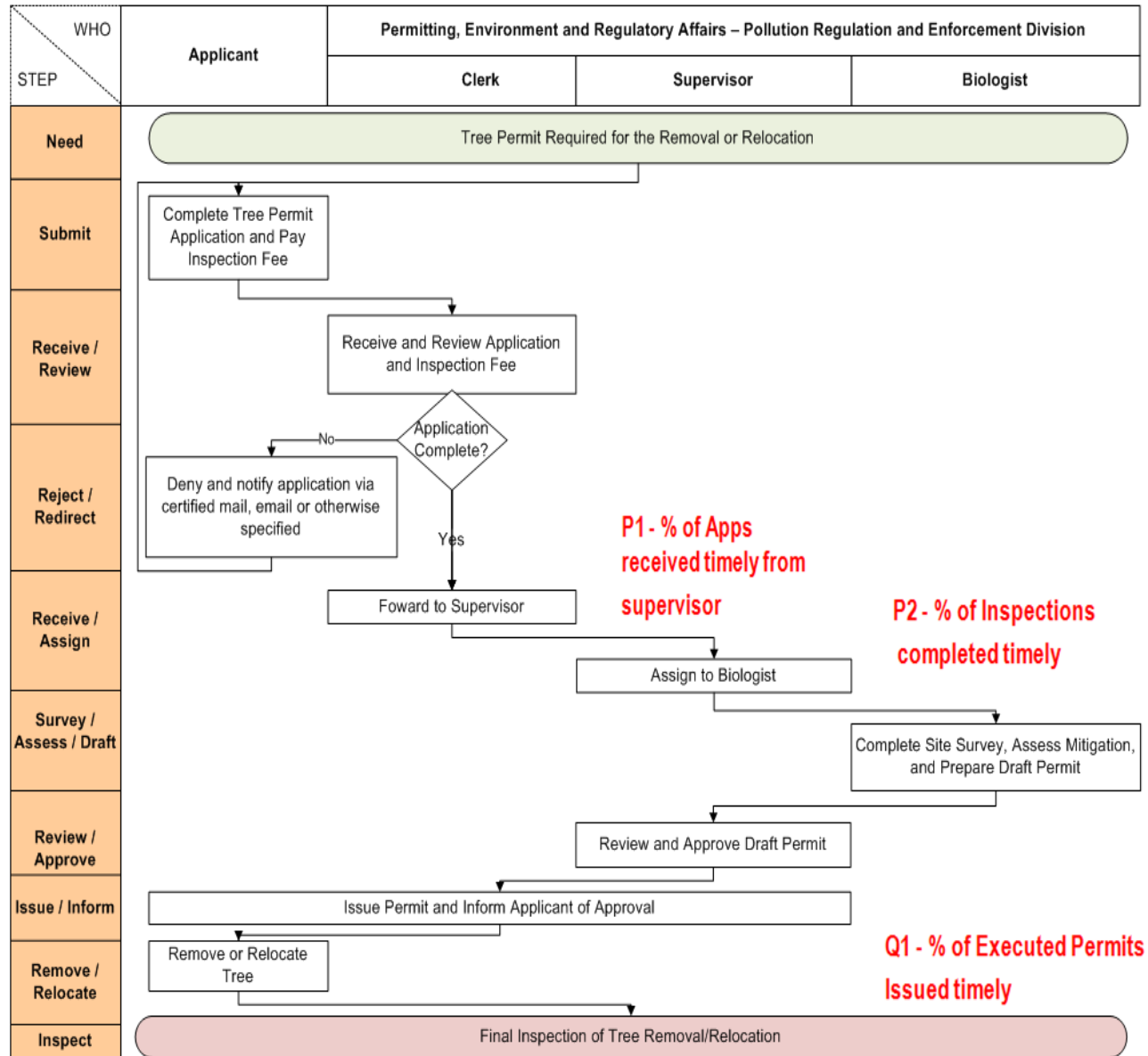
Process Step		Description of Team Activities
Number	Name	
1	DEFINE	<ul style="list-style-type: none">• Select Problem• Identify Project Charter• Develop Project Timeline• Establish Method to Monitor Team Progress• Construct Process Flowchart• Develop Data Collection Plan• Display Indicator Performance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



Review Process Flow Chart

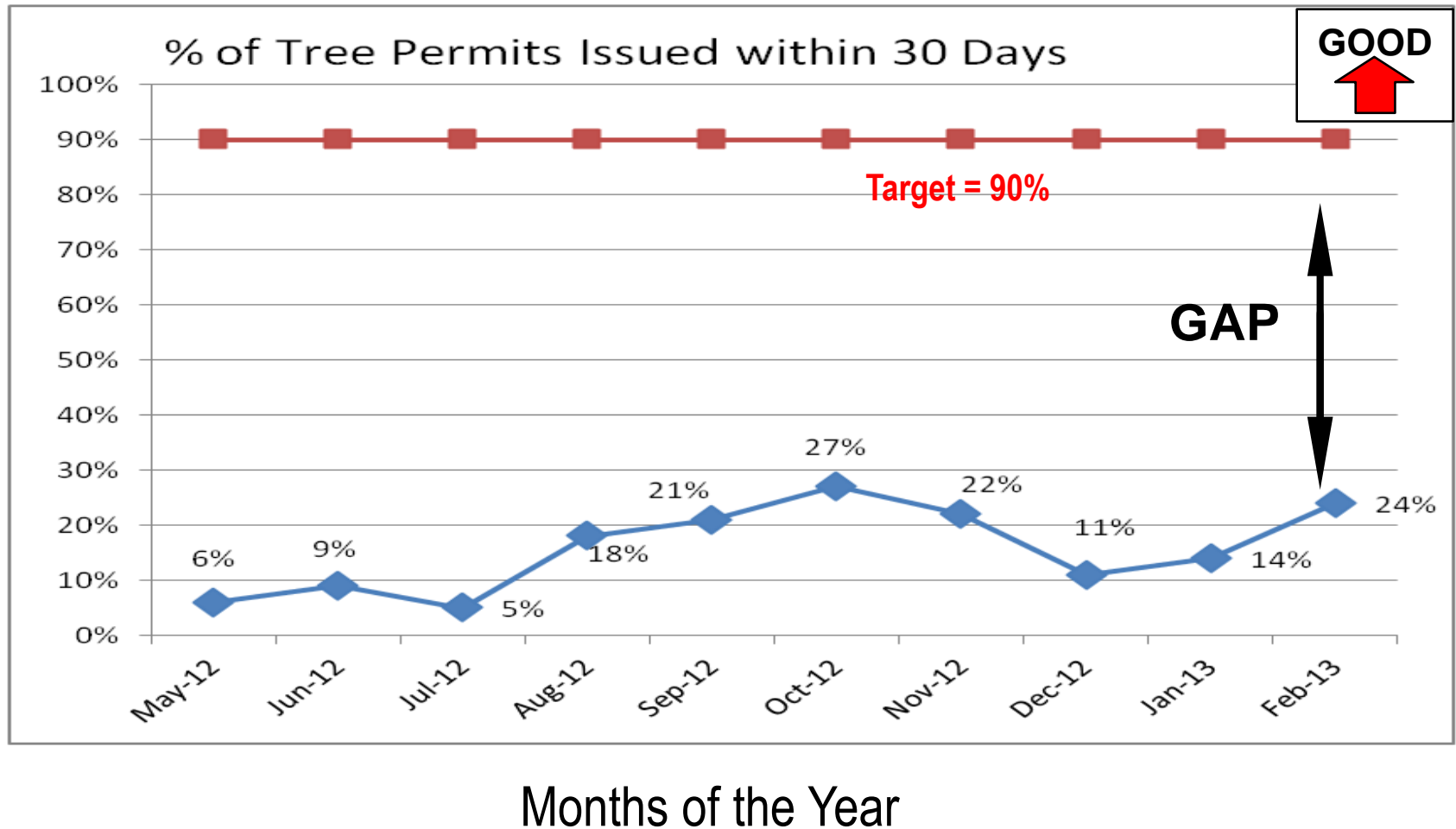
The team constructed a flowchart for the Tree Permit Process.

The team developed **Outcome Indicators** from **SIPOC** and **Customer Rqmts analysis** (see Appendices A and B)



Review Selected Indicator

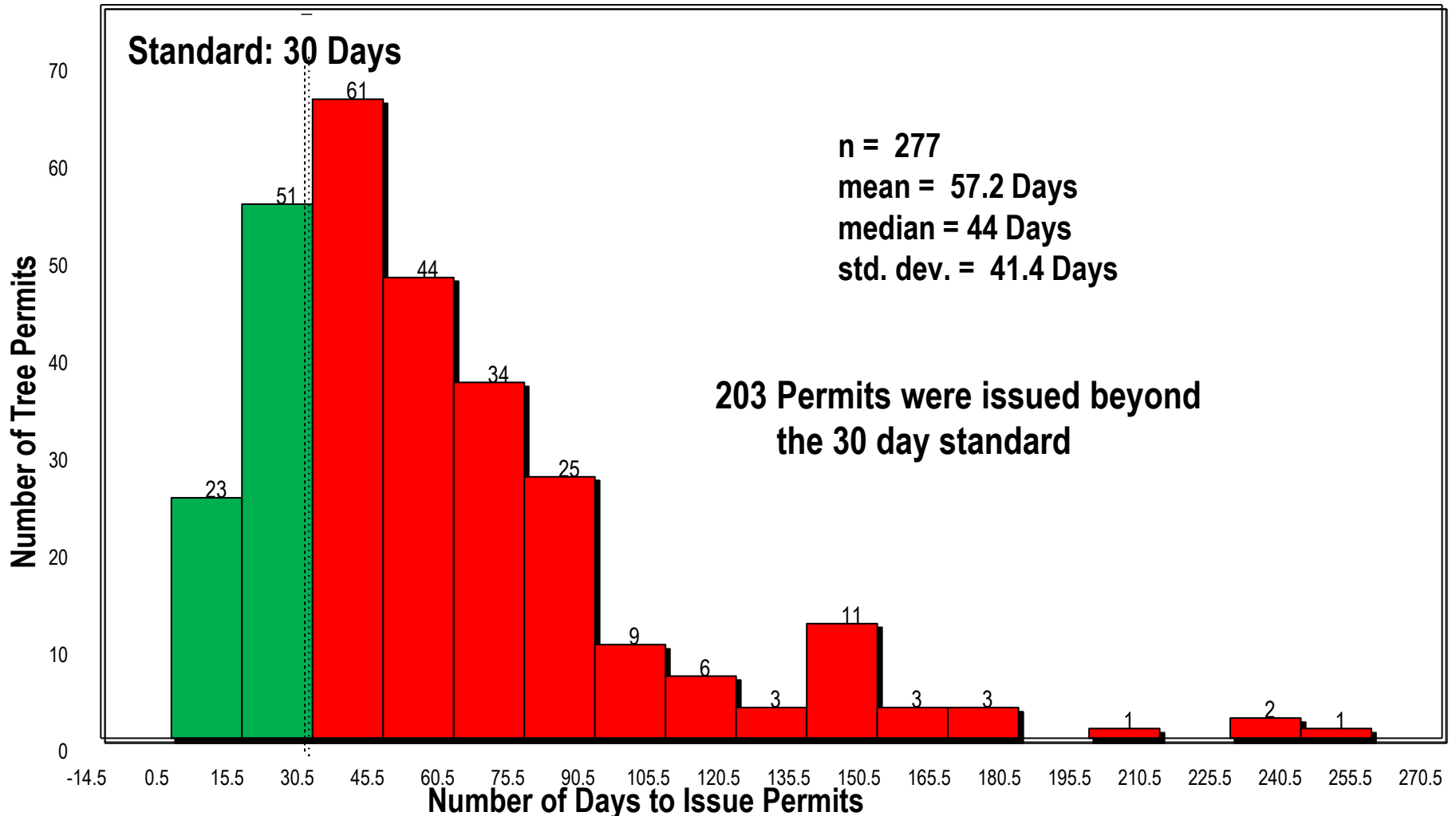
The team collected indicator data and reviewed performance trends:



Stratify the Problem

The team stratified the 277 permits many ways and found...

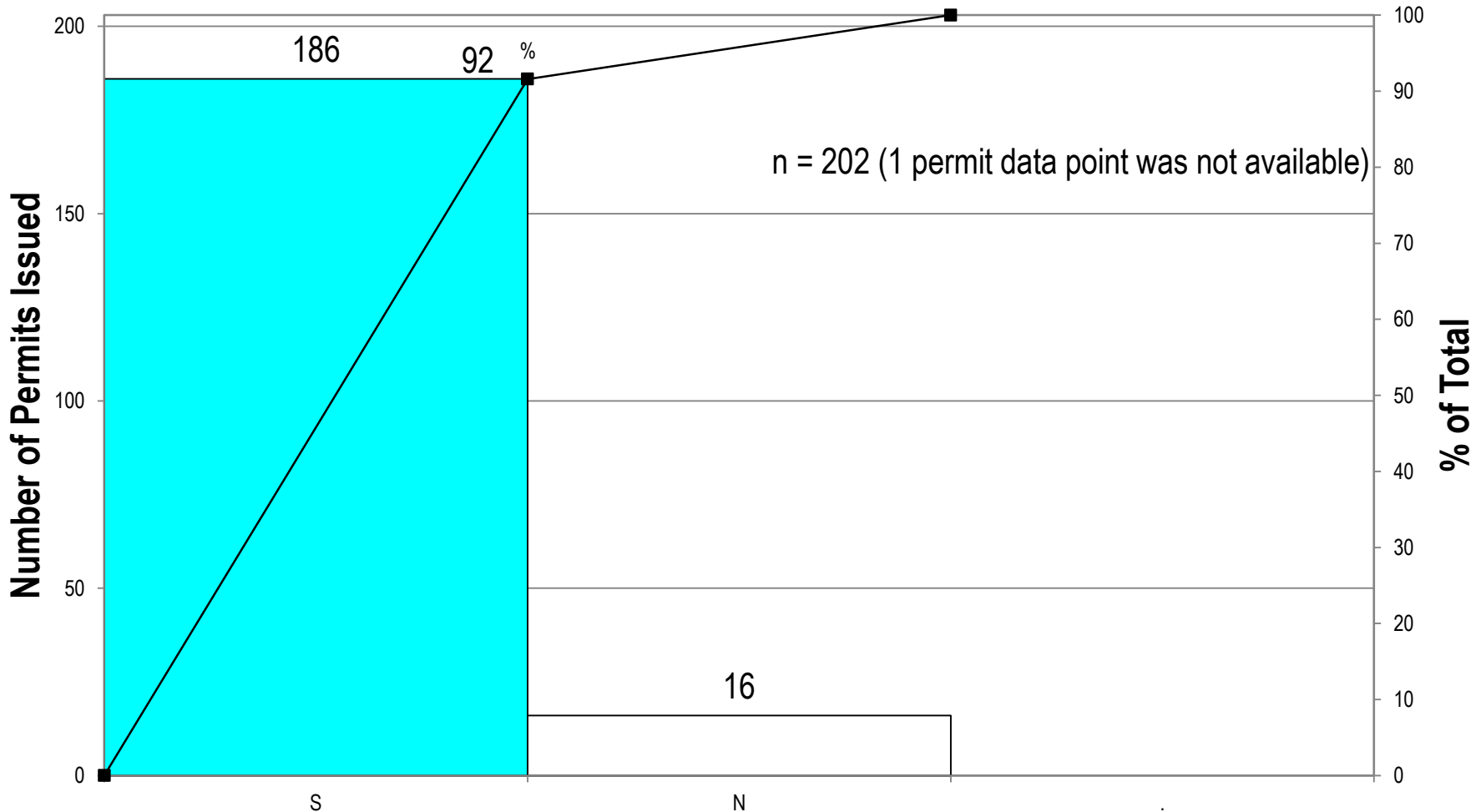
Total Tree Permits Issued: May 2012 - February 2013



Stratify the Problem

The team stratified 202 permits issued beyond the 30 day standard many ways and found...

Total Number of Permits Issued Beyond 30 days



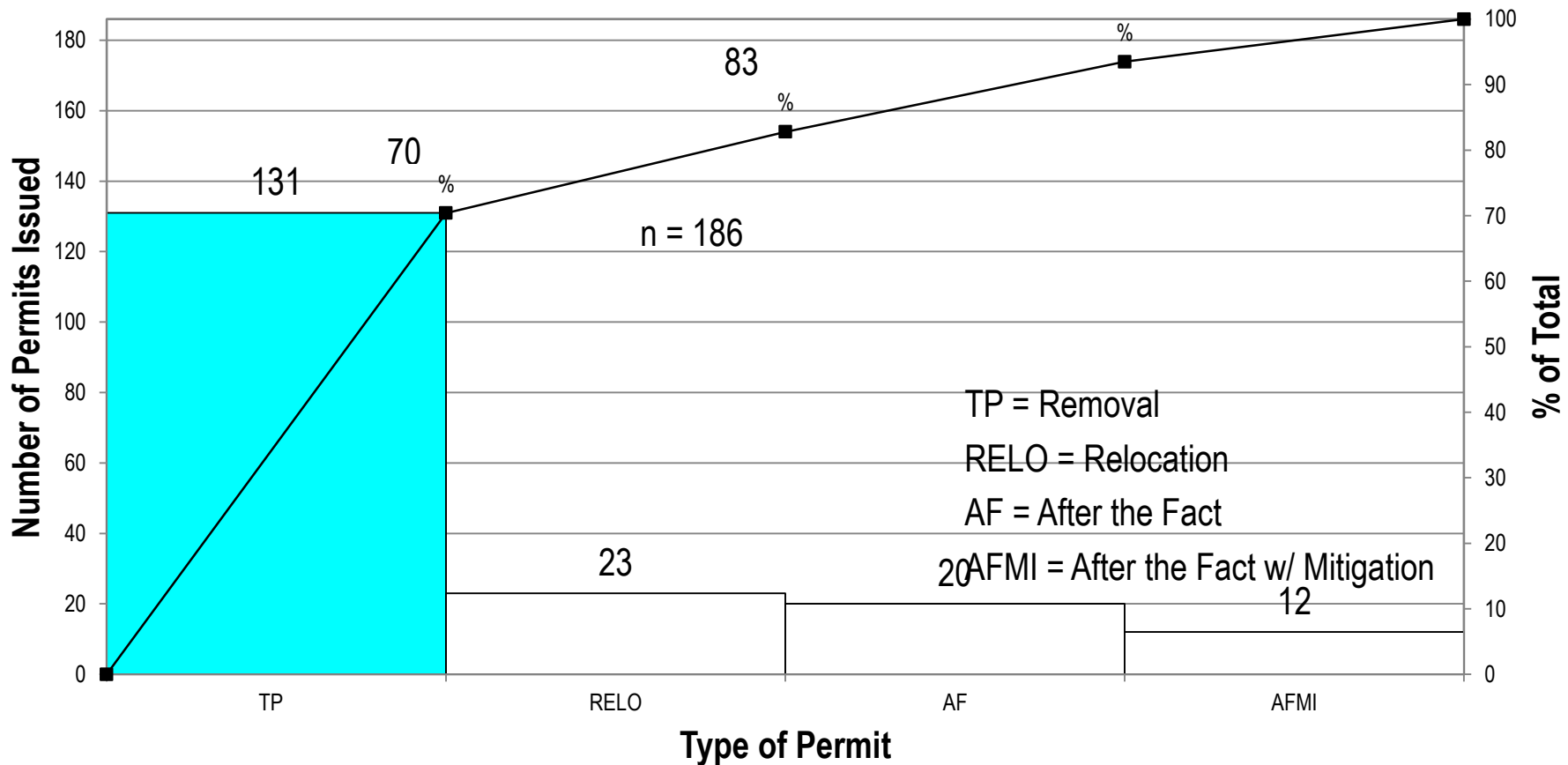
n = 202 (1 permit data point was not available)



Stratify the Problem

The team stratified the 186 specimen permits many ways and found...

Total Number of Specimen Permits Issued Beyond the 30 day Standard



Problem Statement: “Of the 277 tree permits issued from May 2012 to February 2013, 131 tree removal permits involving specimen trees were issued beyond the standard of 30 days from receipt of permit application.”



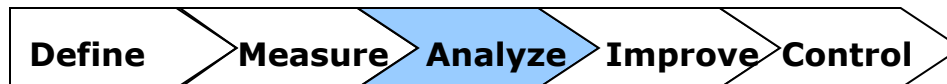
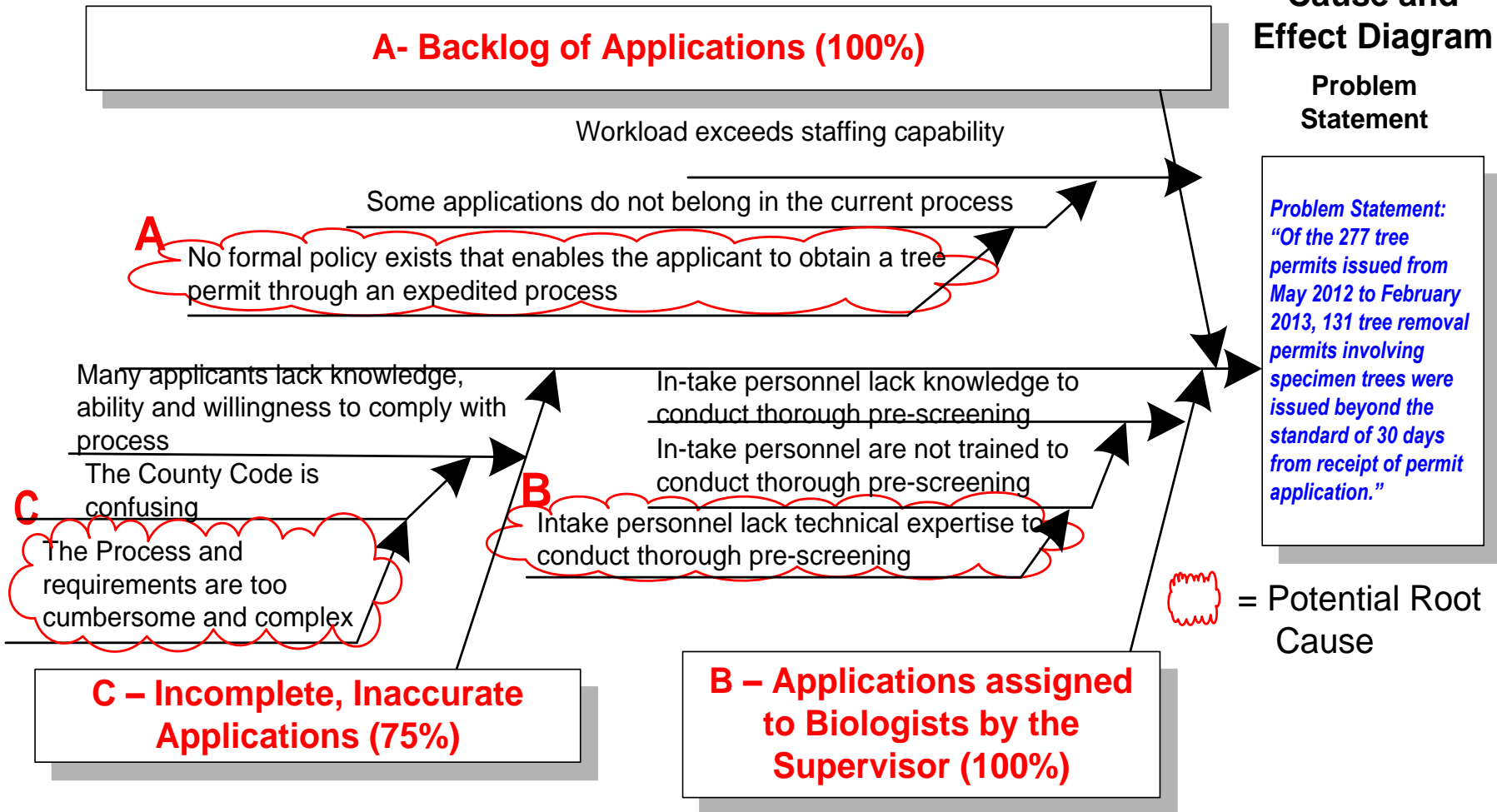
Identify Potential Root Causes

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

Fishbone Cause and Effect Diagram

Problem Statement

*Problem Statement:
"Of the 277 tree permits issued from May 2012 to February 2013, 131 tree removal permits involving specimen trees were issued beyond the standard of 30 days from receipt of permit application."*



Identify and Select Countermeasures

13.,14. 

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

Countermeasures Matrix						
Problem Statement	Verified Root Causes	Countermeasures	Legend:			
			Effective Index	Feasibility	Overall	
			5-Extremely	3-Moderately	Take Action? Yes/No	
			4-Very	2-Somewhat	1-Little or None	
<p>“Of the 277 tree permits issued from May 2012 to February 2013, 131 tree removal permits were issued beyond the standard of 30 days from receipt of permit application.”</p>	<p>A - No formal policy exists that enables the applicant to obtain a tree permit through an expedited process.</p>	<p>A1- For non specimen trees, give applicants the option up front to obtain permits through an expedited process</p>	5	4	20	Y
		<p>A2- For selected specimen trees and selected projects, give applicants the option up front to obtain permits through an expedited process</p>	5	3	15	Y
		<p>A3- Establish and track cycle time standards for the revised process (See Appendix C)</p>	5	4	20	Y
	<p>B - Intake personnel lack technical expertise to conduct thorough pre-screening.</p>	<p>B1- Have technical staff at DERM and at the PIC provide thorough pre-screening and plan review at point of intake</p>	4	4	16	Y
	<p>C - The process and requirements are too cumbersome and complex.</p>	<p>C1- Implement system upgrades to enable on-line processing and staff/applicant interaction</p>	4	3	12	Y
		<p>C2- Remove the signature requirement, thus eliminating the draft permit and facilitating the possibility of issuing permits at job sites</p>	5	4	20	Y
		<p>C3- Simplify application forms and the permit document</p>	5	4	20	Y

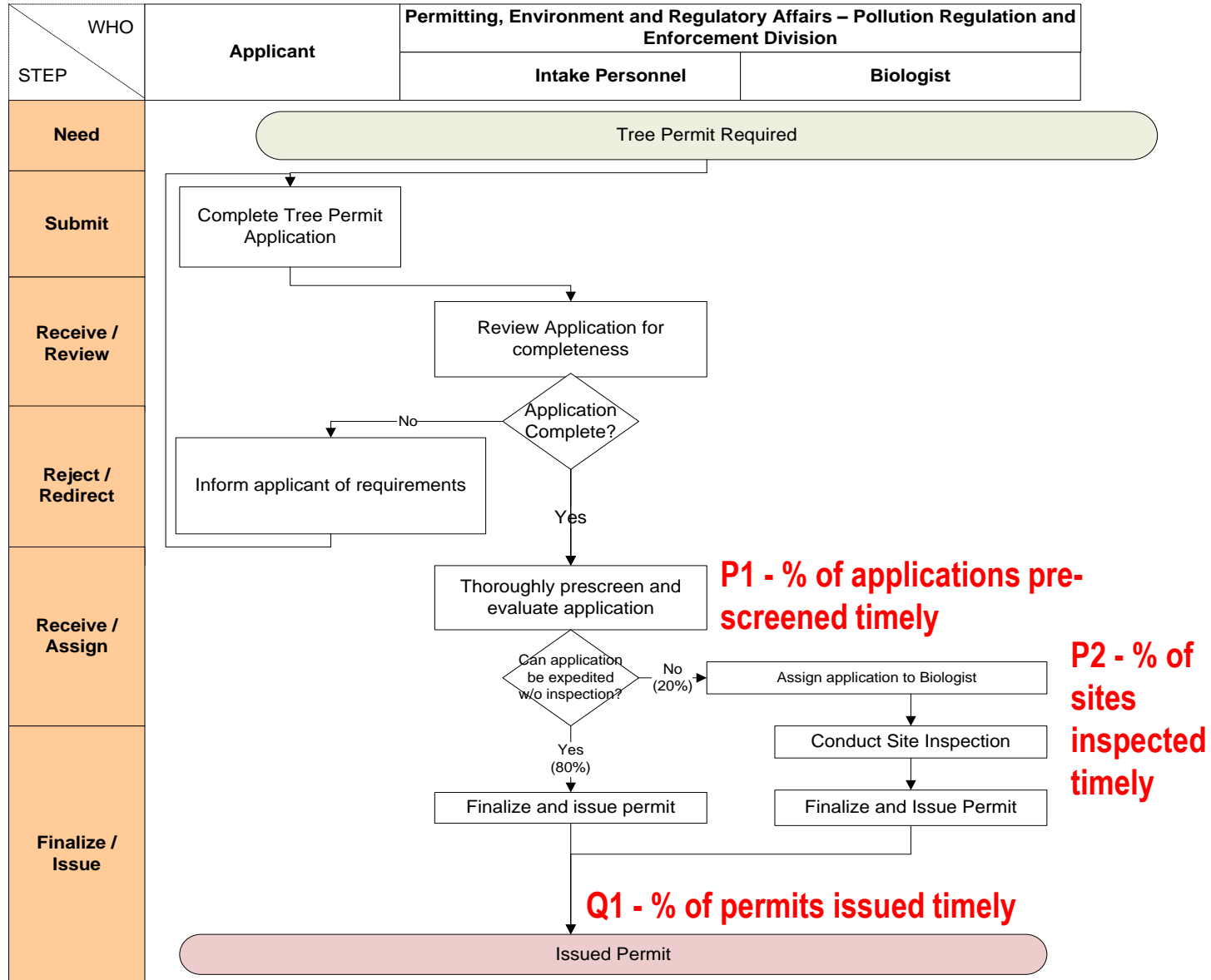
The team selected all countermeasures for implementation.



Revised Process Flow Chart

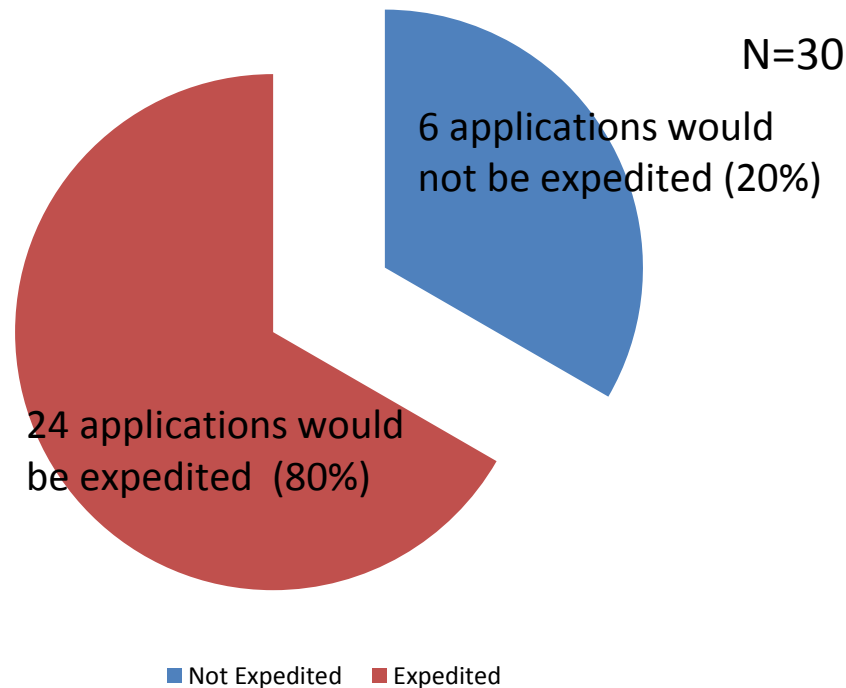
The team constructed a revised flowchart for the tree permit process.

80% of the sampled permit applications could be expedited!



To estimate the potential impact of the revised tree permitting process indicated by the countermeasures, the team analyzed a sample of recent tree permit applications and found

Tree Permits Issued: May 2012 – February 2013



80% of the tree permit applications in this sample could be expedited with the revised process!

Potential Benefits of Countermeasures

- **Significant reductions in cycle time for processing tree permit applications will be achieved by eliminating the need for inspections when applicants provide sufficient information, and by eliminating the draft permit**
- **Of the 6.35 ERM FTE's currently deployed to the tree permitting process, approximately 2 to 4 FTE's could be reassigned to conduct follow-up activities or assume other responsibilities**
- **Reassigning tree permitting resources to conduct follow-up activities could more effectively foster the restoration and enhancement of the canopy**

Develop and Implement Action Plan

Legend:
 ■ = Actual
 □ = Proposed

The team developed an Action Plan for the Countermeasures.

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WHAT: Implement 6 Countermeasures to reduce tree permitting cycle time

HOW	WHO	WHEN												
		2013 - 2014												
		Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr				
1. Develop / Implement Countermeasures														
A1- For non-specimen trees, give applicant the option up front to obtain permits through an expedited process	Craig / Matt		■	□	10/31/13									
A2- For selected specimen trees and selected projects, give applicant the option up front to obtain permits quickly through an expedited process	Craig / Matt		■	□								□	3/31/14	
A3- Establish and track cycle time standards for the revised process	Craig / Matt		■	□	10/31/13									
B1- Have technical staff at DERM and PIC provide thorough pre-screening and plan review at point of intake	Lee / Crista		■	□						□	12/31/13			
C1- Identify / Implement system upgrades to enable more efficient processing and staff interactions	Craig		■	□								□	3/31/14	
C2/C3- Remove the signature requirement, thus eliminating the draft permit / Simplify application form and permit document	Craig Matt		■	□								□	3/31/14	
2. Secure Management Approval of Countermeasures			■	□								□	3/31/14	
3. Communicate/Train Staff in Countermeasures and related policies/procedures	Team		■	□									□	8/31/14
4. Implement Pilots where appropriate, determine benefits, adjust recommended processes if necessary, and present results to management	Craig		■	□								□	3/31/14	
5. Establish On-going responsibilities and standardize countermeasures	Matt		■	□								□	3/31/14 +	

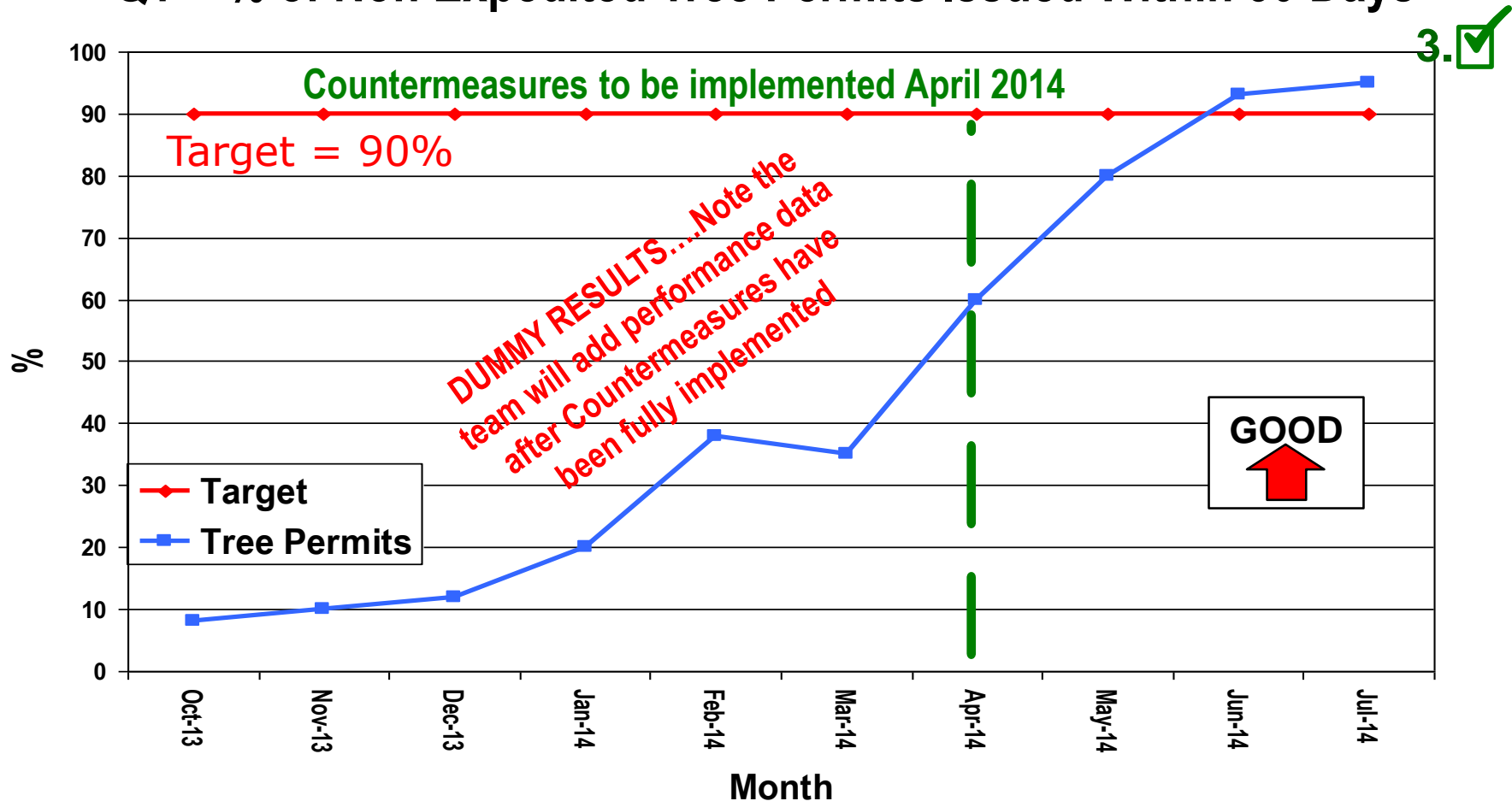


Review Results

17.,18.,19.,20. ✓

The team collected indicator data and reviewed results of its countermeasures

Q1 - % of Non Expedited Tree Permits Issued Within 30 Days



The team was encouraged by the results and will continue to monitor the countermeasures.



Standardize Countermeasures

Process Control System						
Process Name: Process Tree Permit Applications			Process Owner: Lee Hefty			
Process Customer: RER/Tree Permit Applicants/Public at Large			Critical Customer Requirements: Timely Review and Approval of Tree Permit Applications			
Process Purpose: Review & Approve Tree Permit Applications			Current Sigma Level: TBD			
			Outcome Indicators: P1, P2, Q1 (Revised Process)			
Process and Quality Indicators			Checking / Indicator Monitoring			Contingency Plans / Misc. • Actions Required for Exceptions • Procedure References
Process Indicators	Control Limits	Data to Collect	Timeframe (Frequency)	Responsibility		
And						
Quality Indicators	Specs/ Targets	What is Checking Item or Indicator Calculation	When to Collect Data?	Who will Check?		
P1	% of applications pre-screened within 2 days of receipt of application	90%	Pre-screened tree permit applications	Monthly	Tree Permit Supervisor (Lazaro Q.)	• Tree Permit Database
P2	% of sites requiring inspection that are inspected within 10 days of receipt of application	90%	Tree permit applications requiring site inspections	Monthly	Tree Permit Supervisor (Lazaro Q.)	• Tree Permit Database
Q1	% of tree permits issued timely (10 days for expedited permits, and 30 days for non-expedited permits)	90%	Issued tree permits	Monthly	Tree Permit Supervisor (Lazaro Q.)	• Tree Permit Database
Q2	Ratio of Canopy to be Planted (SQ.FT.) to Canopy Removed through Permitting and Enforcement	TBD	Issued tree permits	Monthly	Tree Permit Supervisor (Lazaro Q.)	• Tree Permit Database

Approved: _____ Date: _____ Rev #: _____ Rev Date: _____

The Team looked ahead to the future



Lessons Learned

- Including a combination of knowledge workers, high level decision makers and customers on the project team produced aggressive, creative countermeasures
- A significant effort at the beginning of the project to develop a reliable data set provided a sound launching point for subsequent analysis
- Assuring that all team members were thoroughly briefed prior to each work session fostered consensus and maximized team effectiveness

Next Steps

- Obtain a reliable carrying cost estimate
- Present project results to the project sponsor
- Assist with implementation planning as needed

Appendices

- **Appendix A**...S.I.P.O.C. Analysis
- **Appendix B**...Customer Requirements Matrix
- **Appendix C**...Time Standards For Revised Tree Permitting Process

Appendix A

S.I.P.O.C. Analysis

Process: *Tree Removal Permitting Process*

Process Owner: *Lee Hefty*

Date Approved: _____

Suppliers	Inputs	Process	Outputs*	Customers
Applicant	1. Plan Review Docs 2. Application 3. Tree Survey 4. Site Plan	1. Receive Application	Application with Tracking Number	Supervisor
Supervisor	1. Assignment of Applications 2. Application with Tracking number	2. Assign Application to Biologist	Assigned Application	Biologist
Biologist	1. Assigned Application 2. Initial Review 3. Aerial Review	3. Conduct Inspection	Permitting Decision Document Request Mitigation Calculation Completed Application	1. Supervisor 2. Applicant
Biologist	Completed Application	4. Prepare Draft Permit	Draft Permit	Supervisor
1. Supervisor 2. Biologist	Draft Permit	5. Issue Permit	Executed Permit	Applicant

* Outputs used to Identify Outcomes

Appendix B

Customer Requirements Matrix

Process: *Tree Removal Permitting Process*

Survey Voice of Customer		Process Output(s)	Customer Valid Requirement	Outcome Indicator
Quality Element	Example Question			
Accuracy	How accurate does the application need to be?	Application w/ tracking number	Accurate, complete application	P1 - % of accurate, complete applications
Timeliness	How quickly does the app. need to be sent to Sup.?		Timely receipt of application from Clerk	P2 - % of applications received timely from Clerk
Timeliness	How quickly does the app. need to be sent to Biologist.?	Assigned Application	Timely receipt of application from Supervisor	P3 - % of applications received timely from Supervisor
Timeliness	How quickly must the inspection be completed?	Completed Application	Timely completion of inspection and application	P4 - % of inspections completed timely
Timeliness	How quickly must the draft permit be completed?	Draft Permit	Timely completion of draft permit	P4 - % of draft permits completed timely
Timeliness	How quickly must the executed permit be issued?	Executed Permit	Timely issuance of executed permit	Q1 - % of executed permits issued timely

Appendix C

Time Standards for Revised Tree Permitting Process:

- Receipt of Application to Pre-screening and Evaluation: **2 Days**
- Receipt of Application to Site Inspection: **10 Days**
- Receipt of Application to Permit Issuance (expedited): **10 Days**
- Receipt of Application to Permit Issuance (non-expedited): **30 Days**