



Lean 6-Sigma Program



State Water Resources Control Board

Aylin Mentesh
(Project Greenbelt)

Timothy O'Brien
(Project Champion)

Victoria Whitney
(Executive Sponsor)



Control General Order Defect Delays

- ❖ **Problem Statement:** *Development of a general waste discharge requirement order (General Order) is a time consuming and resource intensive process, averaging 1,047 days to complete*
- ❖ **Objective:** *To reduce development time, on average, to 332 days*
- ❖ **Project Team:**
 - ❖ Timothy O'Brien – Champion
 - ❖ Aylin Mentesh – Green Belt
 - ❖ Annalisa Kihara – Team Member
 - ❖ Tim Regan – Team Member
 - ❖ Lonnie Wass – Team Member & Customer

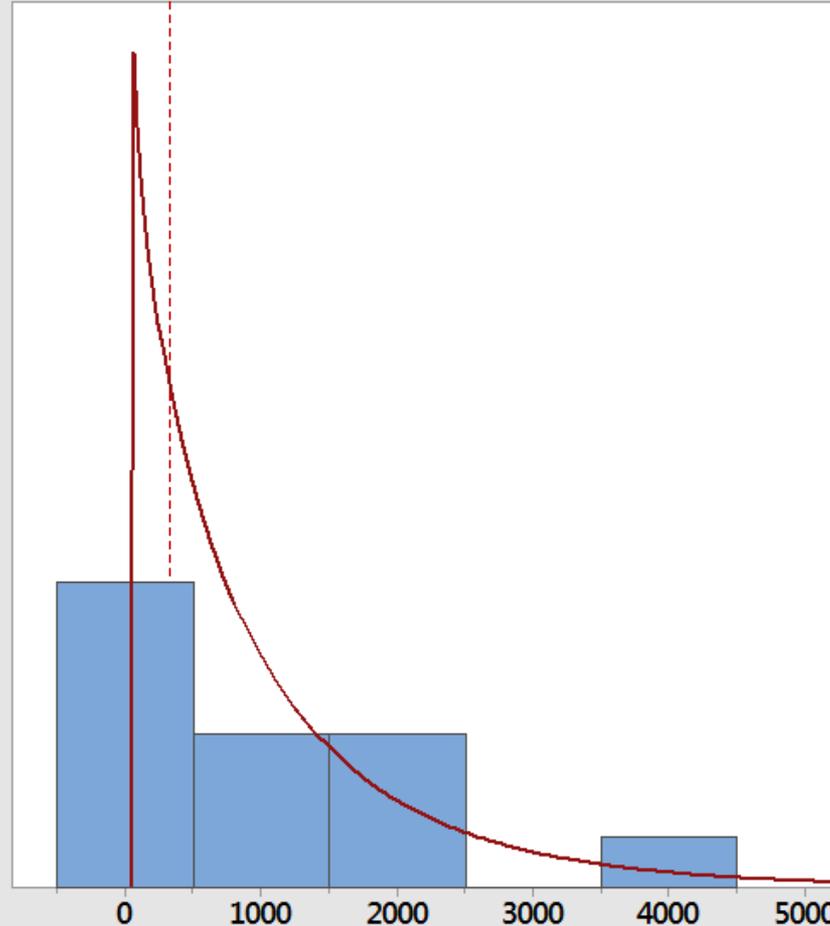


Baseline Capability

Total Elapsed Time

Process Data	
LSL	*
Target	*
USL	332
Sample Mean	1047.31
Sample N	13
Shape	0.910838
Scale	962.613
Threshold	37.7782

Observed Performance	
% < LSL	*
% > USL	69.23
% Total	69.23



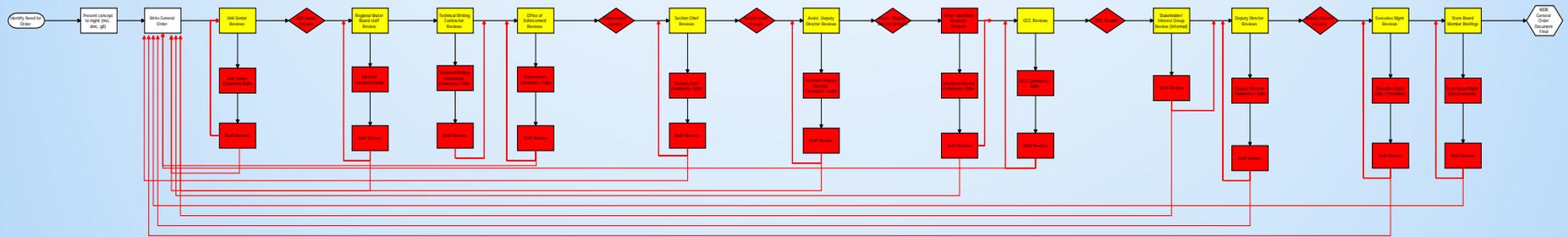
Overall Capability	
Pp	*
PPL	*
PPU	-0.05
Ppk	-0.05

Exp. Overall Performance	
% < LSL	*
% > USL	71.20
% Total	71.20

❖ Average completion time 1,047 days

- ❖ 31% Within target specification of 332 days
- ❖ 69% Outside spec limit (several exceed 2 years)

Initial Process Map



-  Value added steps
-  Non value added steps
-  Non value added steps due to sequencing issues
-  Rework Loop

- ❖ Opportunity to:
 - ❖ Remove excessive rework loops
 - ❖ Limit review and sign off steps

Analysis Tools

- ❖ Process Map
- ❖ Fishbone Diagram
- ❖ Fitted Line Plot Graph
- ❖ Failure Modes Effect Analysis (FMEA)
- ❖ Value Stream Diagram



Key Analytical Finding 2

- ❖ The leading cause of delay and rework is the timing of stakeholder and critical staff engagement

Step #	Process Map Activity	Key Process Input	Potential Failure Mode	Potential Failure Effects	SEV	Potential Causes	OCC	Current Controls	DET	RPN
2	Present Issue Paper to Regional Boards	Stakeholder Engagement	Incorrectly Scope Order (technical requirements)	Delay and Rework	8	Lack of agreement on principles	10	Meetings	9	720
12	Stakeholder Interest Group Review	Stakeholder Engagement	Significant changes to order	Delay and Rework	8	Controversial	9	none	10	720
4-11 & 13g	Review	Staff Engagement	Meetings	Delay & Rework	8	Attendance & Scheduling	9	none	8	576
15b	State Board Briefing	Stakeholder Engagement	Changes requested	Delay & Rework	9	External Influences	9	none	7	567
4-11 & 13n	Review	Staff Engagement	Approval deferred to meeting / higher level staff	Excessive Delay	7	Decision Making Procedures	9	none	8	504

Failure Modes Effect Analysis



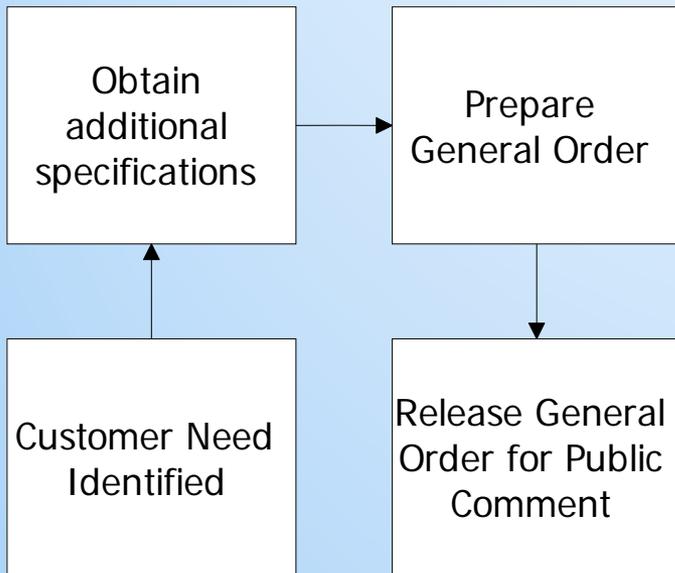
Critical Project Inputs (X's)

- ❖ Stakeholder Engagement
 - ❖ Sequencing – when it occurs in the process
 - ❖ Level of controversy
- ❖ Critical Staff Engagement
 - ❖ Sequencing – when it occurs in the process
 - ❖ Roles and Responsibilities
- ❖ Workload Prioritization
- ❖ Number of Reviews and Approvals Required



Improvement Techniques

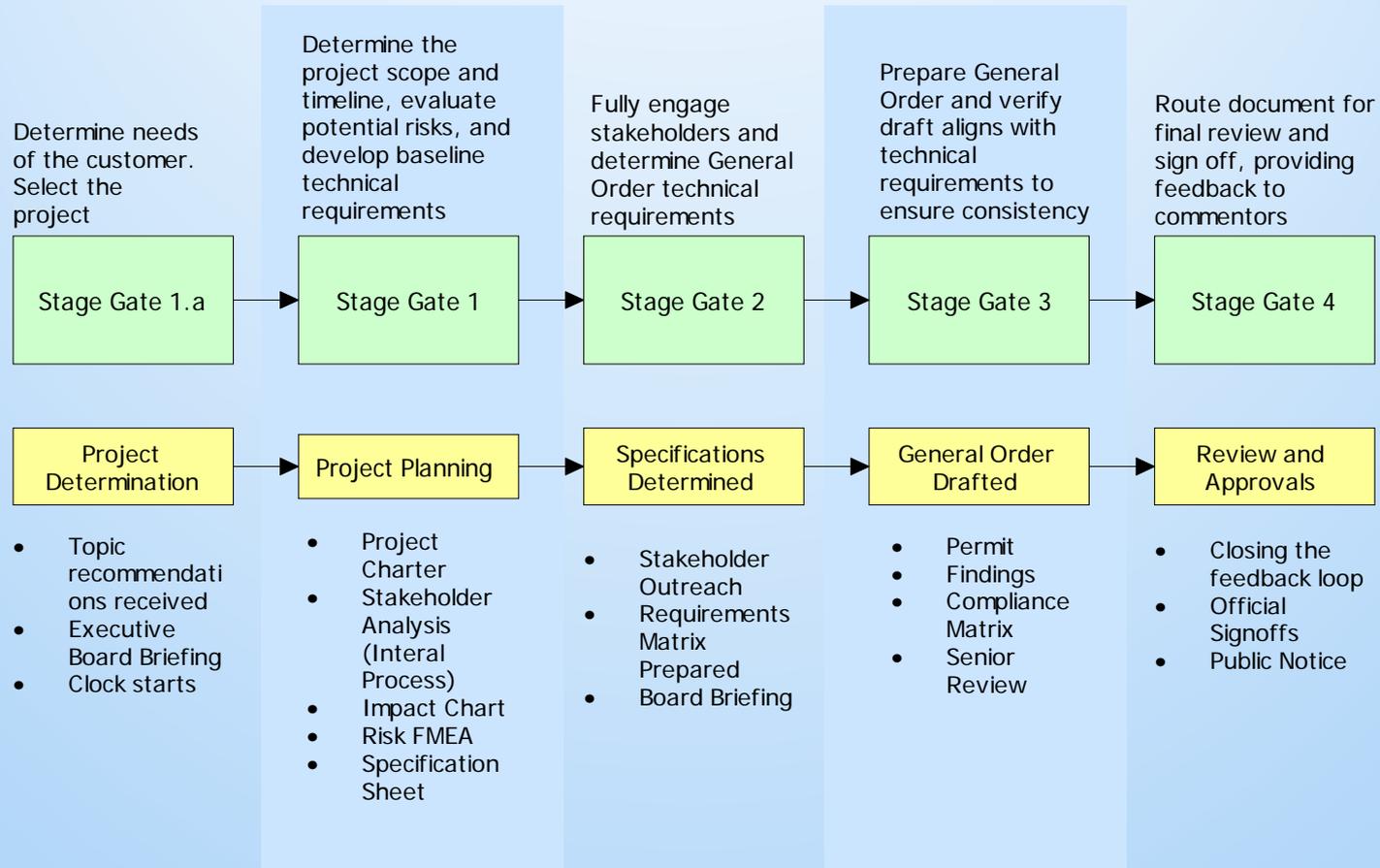
Value Stream



- ❖ Revised Process Map
 - ❖ Front loads specifications
 - ❖ Builds project mgmt tools into process
 - ❖ Utilizes stage gates
- ❖ Standard Operating Procedures
- ❖ Measurement system tracks critical X's
- ❖ Mistake Proofing
- ❖ Visual Management

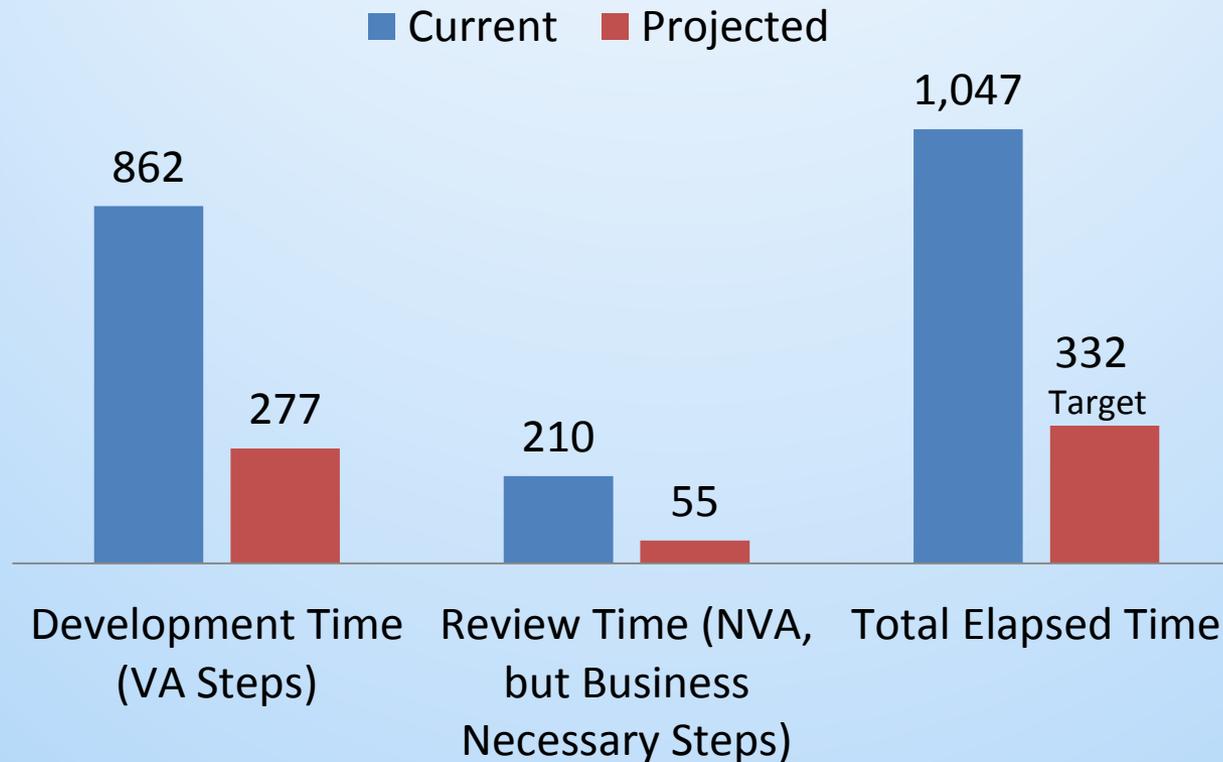
New Process Map

The General Order Development Process Roadmap



New Capability Analysis (Expected)

Comparison of Process Map Timeframes



❖ Continual evaluation of process capability as new data is gathered



Control Plan

- ❖ Green Belt consulting on first General Order project utilizing the Lean Six Sigma improved process:
 - ❖ Mentoring process owner and staff
 - ❖ Facilitating during Stage Gate 1
- ❖ Standard Operating Procedures, including Stage Gates, accompanied by templates
- ❖ Implemented measurement system to track critical X's
- ❖ Post project status and ongoing results
- ❖ Annual internal audits with statistical monitoring



Additional Benefits

- ❖ Clear process for staff accompanied by standard operating procedures and templates
- ❖ Less rework empowers staff
- ❖ Improved communication and accountability across the Water Board's regions, departments and committees
- ❖ Executive support for developing division-wide tracking mechanisms and metrics for future Lean Six Sigma projects



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