FIVE STAGES: DEFINE

**Define**
- Executive Summary
- Charter

**Measure**
- Approach
- Establish Baseline

**Analyze**
- Ishikawa Analysis
- Cycle Time Analysis

**Improve**
- Kaizen Event
- Recommendations

**Control**
- Education Awareness
- Continuous Improvement

- Lean Six Sigma Rollout Summary
- Current State Value Stream Map
- Pareto Analysis
- Waste Analysis
- Detailed Value Stream Map
- Future Value Stream Map
EXECUTIVE SUMMARY

Objectives
• Reduce the overall cycle time for liens process
• Focus on reducing waste: waiting time, defects and motion
• Improve quality and efficiency throughout the process

Scope
• Finance department-related liens processes, including: requests, payments, maintenance/updates, and release of liens

Deliverables
• Current State Assessment
• Ideal State Assessment
• Pareto Analysis
• Cycle Time Analysis
• Recommendations
• Transition Plan
• Continual Improvement & Education Plan

Result
• Cycle Time decrease by 75% to goal of 262 minutes or ~4 hours
  • By removing five steps from current liens processing cycle
  • By improving the Preparing and Sending Release of Lien steps
  • By decreasing the number of people involved in the Post Payment (SAP) step and reducing that cycle time
  • By reducing the cycle time (estimated 10 minutes) in the Locate the Project File step
  • Establish buy-in from COH liens processors on improved processes and ensure better quality of work
GREEN BELT PROJECT CHARTER

Background:
The Finance department of the City of Houston has expressed interest in improving its’ Liens process, and Lean Six Sigma tools and techniques will be used for the analysis. There are three phases to the Liens process flow: Lien Request, Lien Payment and Release of Lien. The current issues in the process include high levels of variability and waste in searching for the lien assessment.

Objective:
• Reduce the overall cycle time of the liens process by 75%
• Focus on reducing waste: waiting time, defects and motion
• Apply Lean Six Sigma tools and concepts to drive significant improvements via focused Lean Six Sigma tool education and implementation

In Scope:
• Lien Request Phase
  • Searching for assessment of Lien
• Payment Phase
• Release of Lien Phase
• Paving - Asphalt Liens
• Paving - Concrete Liens
• Lamar Terrace I Liens
• COH Finance Department
  • Accounts Receivable Division
• WALS system

Out of Scope:
• COH Department of Neighborhoods (CHIPS)
• Linebarger, Goggan, Blair, and Sampson, LLP
• COH – Housing and Community Development
• COH – Public Works and Engineering

Deliverables: Use of DMAIC LSS methodology

• Define:
  • Gather data
  • Completed project charter
  • Create a LSS Pilot Rollout Schedule
  • Conduct Interviews with Stakeholders
• Measure:
  • High level process map
  • Fully developed current value stream map
    • Assess the gaps in the process
  • Current State Assessment summary
• Analyze:
  • Identify and validate potential root causes
  • Pareto analysis
  • Waste analysis
  • Cycle time analysis
• Improve:
  • Recommendations
  • An improved process that is stable, predictable and meets client requirements
• Control:
  • Documented plan to transition improved process back to process owner, participants and sponsor (Continuous education awareness)
  • Design controls within the process for continuous improvement

Target Benefits:
• Cycle Time decrease by 75% to goal of 262 minutes or ~4 hours
• Improved quality of liens request process
• Increased throughput
• Clearly defined roles, responsibilities and requirements for new liens request process

Roles:
• Green Belt Candidate (Will Chisholm and Bethany Ackeret) to provide customized LSS training materials
• Green Belt Candidate (Will Chisholm and Bethany Ackeret) to provide approach to apply LSS tools and perform corresponding design/implementation
• Black Belt Sponsor (Jay Campbell) to provide mentorship and assistance
• Liens sponsor to provide data required to support LSS tool application
• Liens sponsor to ensure resource availability and involvement as required

Key Stakeholders:
• Will Chisholm (Green Belt Candidate)
• Bethany Ackeret (Green Belt Candidate)
• Jay Campbell (Certified Black Belt)
• LaToya Jasper (Project Sponsor)
<table>
<thead>
<tr>
<th>Tasks</th>
<th>Activities</th>
<th>Wk 1</th>
<th>Wk 2</th>
<th>Wk 3</th>
<th>Wk 4</th>
<th>Wk 5</th>
<th>Wk 6</th>
<th>Wk 7</th>
<th>Wk 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preparation</td>
<td>Gather Data</td>
<td>6/30</td>
<td>7/7</td>
<td>7/14</td>
<td>7/21</td>
<td>7/28</td>
<td>8/11</td>
<td>8/18</td>
<td>8/25</td>
</tr>
<tr>
<td>Assessment</td>
<td>Conduct Interviews</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Compile Detailed Current State Value Stream Map</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Conduct Cycle Time Analysis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Define Opportunities and Benefits for Findings</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Prioritize Opportunities with Stakeholders – create future state VSM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Develop New Process</td>
<td>Develop improved process that is stable, predictable and meets client requirements</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Support/Education</td>
<td>Ongoing recommendation implementation; support and continued education</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
FIVE STAGES: MEASURE

**Define**
- Executive Summary
- Charter

**Measure**
- Define Approach
- Establish Baseline for Analysis

**Analyze**
- Ishikawa Analysis
- Cycle Time Analysis

**Improve**
- Kaizen Event
- Recommendations

**Control**
- Education Awareness
- Continuous Improvement

Lean Six Sigma Rollout Summary
Current State Value Stream Map
Pareto Analysis
Waste Analysis
Detailed Value Stream Map
Future Value Stream Map
EVALUATING CURRENT STATE PROCESSES

Conduct Interviews

- Interviewed key users in the liens request process
- Documented their role and any issues

Create Current State Baseline

- Created current state value stream map
- Established high-level current state operational baseline through existing process documentation and interviews

Develop Future State Conceptual Model

- Selected and defined scope of opportunities to be developed
- Mapped ideal value stream

Deliverables

- High level value stream map
- Current State Value Stream Map
- Process Assessment Findings
- Future State Value Stream Map
FIVE STAGES: ANALYZE

**Define**
- Executive Summary
- Charter

**Measure**
- Approach
- Establish Baseline

**Analyze**
- Ishikawa Analysis
- Cycle Time Analysis

**Improve**
- Kaizen Event
- Recommendations

**Control**
- Education Awareness
- Continuous Improvement

- Lean Six Sigma Rollout Summary
- Current State Value Stream Map
- Pareto Analysis
- Waste Analysis
- Detailed Value Stream Map
- Future Value Stream Map
ISHIKAWA: FISH BONE DIAGRAM

REQUESTOR

- Requests sent to wrong department
- Payments sent late/never
- Lien request is incomplete

L HIGHER LIEN CYCLE TIME

HIGHER LIEN CYCLE TIME

RESEARCH

- Research using project filing room
- Research stops
- Research using Google
- Research in WALS
- Research due to sub-division of property
- Research in HCAD

WALS

- Missing or incomplete lien assessment
- Principle and interest not auto-generated
- Principle and interest amounts manually calculated, entered
- Lien information not in WALS
- Research street cards
CYCLE TIME ANALYSIS

<table>
<thead>
<tr>
<th>Pre-Payment Cycle Time (minutes)</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Average</td>
<td>Minimum</td>
<td>Maximum</td>
<td>Processing Time</td>
<td>Waiting Time</td>
</tr>
<tr>
<td>77.40</td>
<td>44.00</td>
<td>136.00</td>
<td>40</td>
<td>38</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Post-Payment Cycle Time (minutes)</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Average</td>
<td>Minimum</td>
<td>Maximum</td>
<td>Processing Time</td>
<td>Waiting Time</td>
</tr>
<tr>
<td>961.33</td>
<td>804.00</td>
<td>1181.00</td>
<td>15</td>
<td>947</td>
</tr>
</tbody>
</table>

**Pre-Payment Cycle Time**
- 51% Processing Time
- 49% Waiting Time

**Post-Payment Cycle Time**
- 98% Waiting Time
- 2% Processing Time
## CYCLE TIME ANALYSIS – TIMESTAMP EXAMPLES

<table>
<thead>
<tr>
<th>Request 1</th>
<th>Request 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Start</strong></td>
<td><strong>Start</strong></td>
</tr>
<tr>
<td><strong>Stop</strong></td>
<td><strong>Stop</strong></td>
</tr>
<tr>
<td><strong>Cycle</strong></td>
<td><strong>Cycle</strong></td>
</tr>
<tr>
<td>Receive the Lien Request</td>
<td>1:00:00 PM</td>
</tr>
<tr>
<td>Log the Lien Request</td>
<td>1:01:00 PM</td>
</tr>
<tr>
<td>Locate the Liens Assessment in WALS</td>
<td>1:02:00 PM</td>
</tr>
<tr>
<td>Locate the Lien Street Card</td>
<td>1:03:00 PM</td>
</tr>
<tr>
<td>Locate the Project File</td>
<td>1:08:00 PM</td>
</tr>
<tr>
<td>Locate the Assessment Role</td>
<td>1:08:00 PM</td>
</tr>
<tr>
<td>Liens Assessment Receipt</td>
<td>1:30:00 PM</td>
</tr>
<tr>
<td>Update WALS</td>
<td>1:30:00 PM</td>
</tr>
<tr>
<td>Print Invoice</td>
<td>2:35:00 PM</td>
</tr>
<tr>
<td>Send Invoice</td>
<td>2:36:00 PM</td>
</tr>
<tr>
<td><strong>Total Prepayment Cycle Time</strong></td>
<td><strong>Total Prepayment Cycle Time</strong></td>
</tr>
<tr>
<td></td>
<td><strong>103.00</strong></td>
</tr>
<tr>
<td>Receive Payment</td>
<td>2:58:00 PM</td>
</tr>
<tr>
<td>Deposit/Post Payment (WALS)</td>
<td>2:59:00 PM</td>
</tr>
<tr>
<td>Check Clears (SAP)</td>
<td>2:59:00 PM</td>
</tr>
<tr>
<td>Prepare Release of Liens</td>
<td>3:05:00 PM</td>
</tr>
<tr>
<td>Send Release of Liens</td>
<td>11:29:00 AM</td>
</tr>
<tr>
<td><strong>Total Post Payment Cycle Time</strong></td>
<td><strong>805.00</strong></td>
</tr>
<tr>
<td><strong>Total Cycle Time</strong></td>
<td><strong>908.00</strong></td>
</tr>
</tbody>
</table>
DEFECTS: PARETO ANALYSIS

- Sample size = 44
- 73% overall defect rate in the process
- 32 out of 44 lien requests were defects

Key areas drive highest amount of defects (~80%)
PRIMARY WASTE IN CURRENT STATE – LIENS PROCESSING
FIVE STAGES: IMPROVE

**Define**
- Executive Summary
- Charter

**Measure**
- Approach
- Establish Baseline

**Analyze**
- Ishikawa Analysis
- Cycle Time Analysis

**Improve**
- Kaizen Event
- Recommendations

**Control**
- Education Awareness
- Continuous Improvement
<table>
<thead>
<tr>
<th>Defects</th>
<th>Finding</th>
<th>Recommendation</th>
<th>Potential Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) On average, it takes nearly 30 minutes to update WALS because liens data is absent in WALS.</td>
<td>To internally create a Microsoft Access database to house all the WALS information. Hire a temporary employee to enter all of the lien information on file.</td>
<td>Decrease the cycle time by reducing over-processing and inventory waste.</td>
<td></td>
</tr>
<tr>
<td>2) Liens are being sent to the wrong department and are incomplete because the information on City of Houston liens website is unclear and confusing.</td>
<td>Revise the City of Houston liens website to better present the liens instructions and information.</td>
<td>Reduce the number of out of scope liens and incomplete liens (defects).</td>
<td></td>
</tr>
<tr>
<td>Waiting Time</td>
<td>3) Preparing and sending the release of liens takes 1-2 business days due to the waiting time.</td>
<td>Streamline and standardize the signature and notarization process by creating daily office hours with signer/notary.</td>
<td>Reduce the cycle time by decreasing waiting time.</td>
</tr>
<tr>
<td></td>
<td>4) Posting payments in SAP takes between 1-2 hours due to the involvement of multiple people in the process.</td>
<td>Train the liens processor to park the journal entries in SAP.</td>
<td>Reduce the cycle time by decreasing waiting time and motion.</td>
</tr>
<tr>
<td>Motion</td>
<td>5) Liens research takes excessive time because there are no indicators in the liens filing room to locate a project folder.</td>
<td>Create visual cues in liens project filing room.</td>
<td>Reduce cycle time by clear signals to project file location.</td>
</tr>
<tr>
<td></td>
<td>6) Liens research takes excessive time because there are missing project folders that don’t match to a street card.</td>
<td>Create a spreadsheet that captures all project folders on file and that are missing.</td>
<td>Reduce the number of defects and eliminate motion waste.</td>
</tr>
</tbody>
</table>
## IMPLEMENTATION STATUS

<table>
<thead>
<tr>
<th>Finding</th>
<th>Recommendation</th>
<th>Implementation Status</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Defects</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1) On average, it takes nearly 30 minutes to update WALS due to waiting time.</td>
<td>To internally create a Microsoft Access database to house all the WALS information. Hire a temporary employee to enter all of the lien information on file.</td>
<td>In Progress</td>
</tr>
<tr>
<td>2) Liens are being sent to the wrong department and are incomplete because the information on City of Houston liens website is unclear and confusing.</td>
<td>Revise the City of Houston liens website to better present the liens instructions and information.</td>
<td>Complete</td>
</tr>
<tr>
<td><strong>Waiting Time</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3) Preparing and sending the release of liens takes 1-2 business days due to the waiting time.</td>
<td>Streamline and standardize the signature and notarization process by creating daily office hours with signer/notary.</td>
<td>Complete</td>
</tr>
<tr>
<td>4) Posting payments in SAP takes between 1-2 hours due to the involvement of multiple people in the process.</td>
<td>Train the liens processor to park the journal entries in SAP.</td>
<td>Complete</td>
</tr>
<tr>
<td><strong>Motion</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5) Liens research takes excessive time because there are no indicators in the liens filing room to locate a project folder.</td>
<td>Create visual cues in liens project filing room.</td>
<td>Complete</td>
</tr>
<tr>
<td>6) Liens research takes excessive time because there are missing project folders that don’t match to a street card.</td>
<td>Create a spreadsheet that captures all project folders on file and that are missing.</td>
<td>Complete</td>
</tr>
</tbody>
</table>
VISUAL CUE IN LIENS FILING ROOM

BEFORE

AFTER
Recommendation #1 would remove five steps from the VSM:
- Locate the Lien Street Card
- Locate the Project File
- Locate the Assessment Roll
- Liens Assessment Receipt
- Update WALS

Recommendation #2 is not easily quantifiable at this time.

Recommendation #3 would reduce the cycle time in the Preparing and Sending Release of Lien steps by between 1 – 2 business days.

Recommendation #4 would reduce the cycle time (estimated 60 minutes) and decrease the number of people involved in the process in the Post Payment (SAP) step.

Recommendations #5 and #6 would reduce the cycle time (estimated 10 minutes) in the Locate the Project File step.

Ideal state would decrease cycle time about 800 minutes (~13 hours)!
CURRENT STATE VALUE STREAM MAP

Complete Lanes Process
Preparation Cycle Time: 14 minutes
Average Total Cycle Time: 55 minutes (7.5 hours)

Total Payment Cycle Time: 1 hour 32 minutes (~4 hours)
FUTURE VALUE STREAM MAP

Complete Liens Process Time: 28 minutes
Total Post Payment Cycle Time: 141 minutes (~2 hours)
Average Total Cycle Time: 169 minutes (~3 hours)
FIVE STAGES: CONTROL

**Define**
- Executive Summary
- Charter
- Lean Six Sigma Rollout Summary

**Measure**
- Approach
- Establish Baseline
- Current State Value Stream Map

**Analyze**
- Ishikawa Analysis
- Cycle Time Analysis
- Pareto Analysis
- Waste Analysis

**Improve**
- Kaizen Event
- Recommendations
- Detailed Value Stream Map
- Future Value Stream Map

**Control**
- Education Awareness
- Continuous Improvement
CONTINUOUS IMPROVEMENT

Add controls into the process

- Spreadsheet to track total pre-payment cycle time and post-payment cycle time
- Every two weeks, liens processor will track a liens request at the detailed level
- Build timestamps into the forthcoming database
It's QUESTION TIME!!