



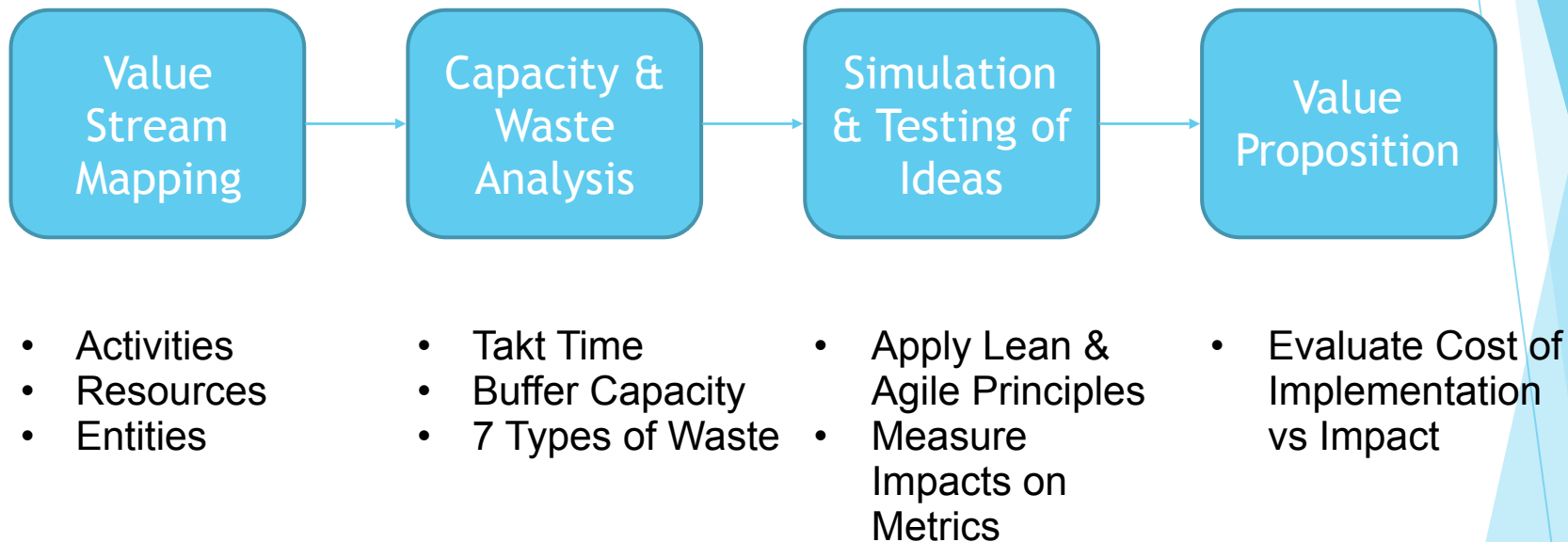
# Lean Analysis for Smart Border Development

A Systematic Approach

Zacheriah Cole

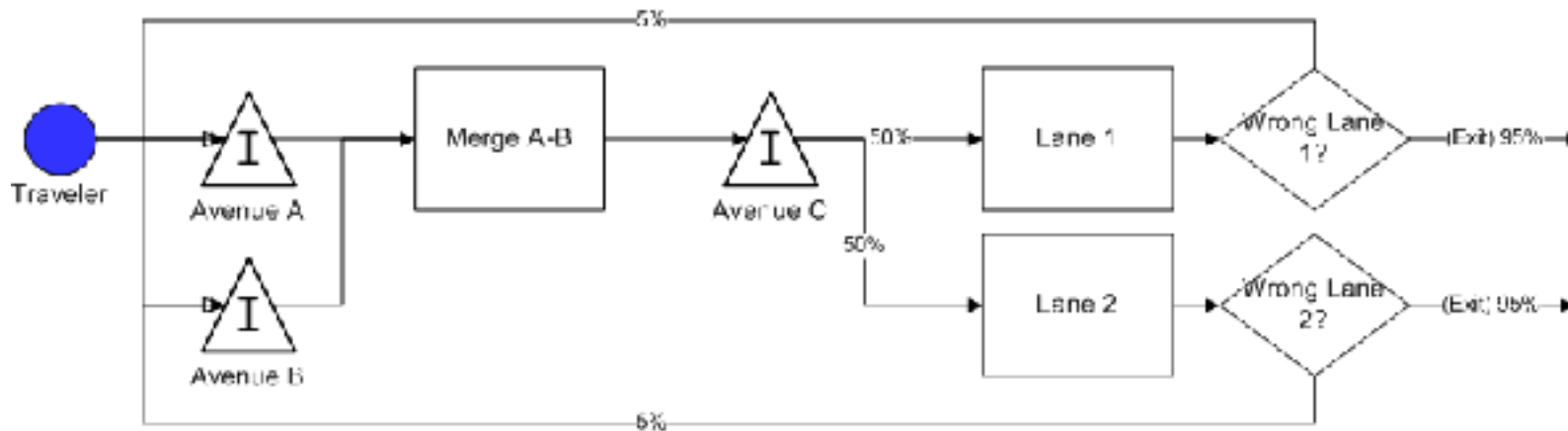
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# The Investigation Process



# Value Stream Mapping

- ▶ Consider the WHOLE system
- ▶ Identify “Rework Loops”
- ▶ Benchmark Takt Times



# Capacity & Waste Analysis

## Takt Time

- ▶ Available Time vs Demanded Time

## 7 Types of Waste

- ▶ Delay
- ▶ Duplication
- ▶ Unnecessary Movement
- ▶ Unclear Communication
- ▶ Incorrect “Inventory”
- ▶ Opportunity Lost
- ▶ Errors

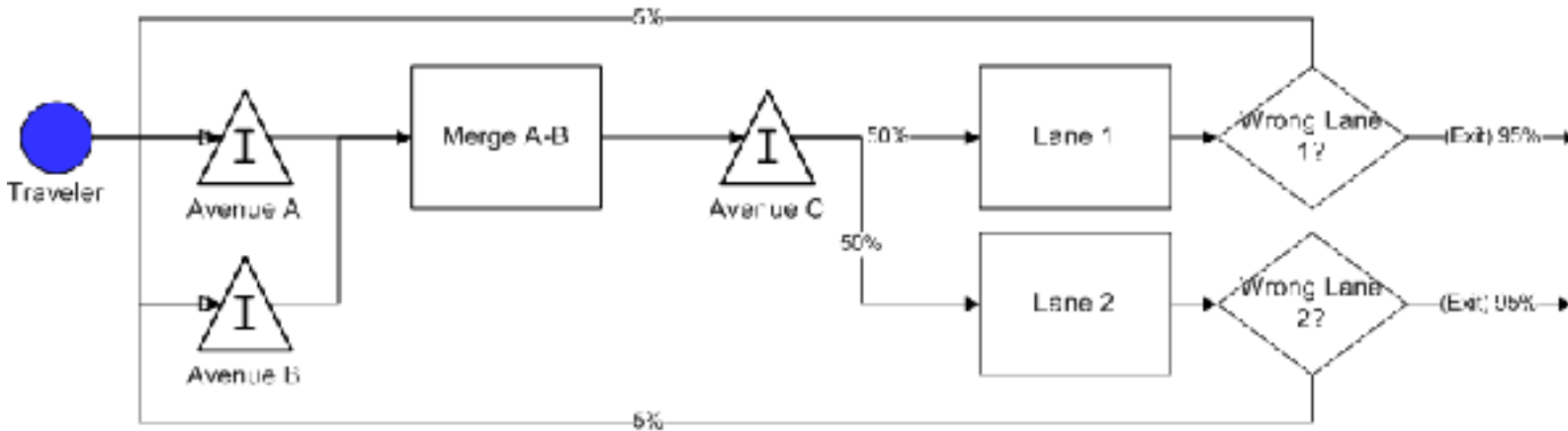
# Capacity & Waste Analysis

## Example Flow Improvements

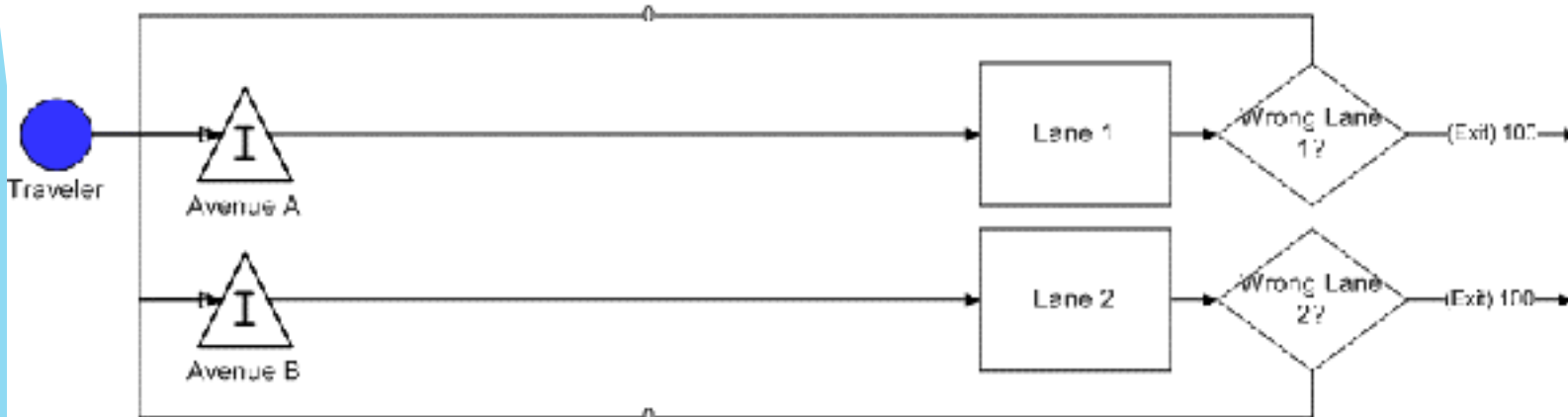
- ▶ Clear communication early in process
  - ▶ Signage and road paint
  - ▶ Universal starting points
- ▶ Triggers early in process
  - ▶ Sensors to indicate queue size by traveler type
- ▶ Flexibility to adjust resources
  - ▶ Agile capability of lanes
  - ▶ Agile capacity of lanes

# Simulation Example

## Current State



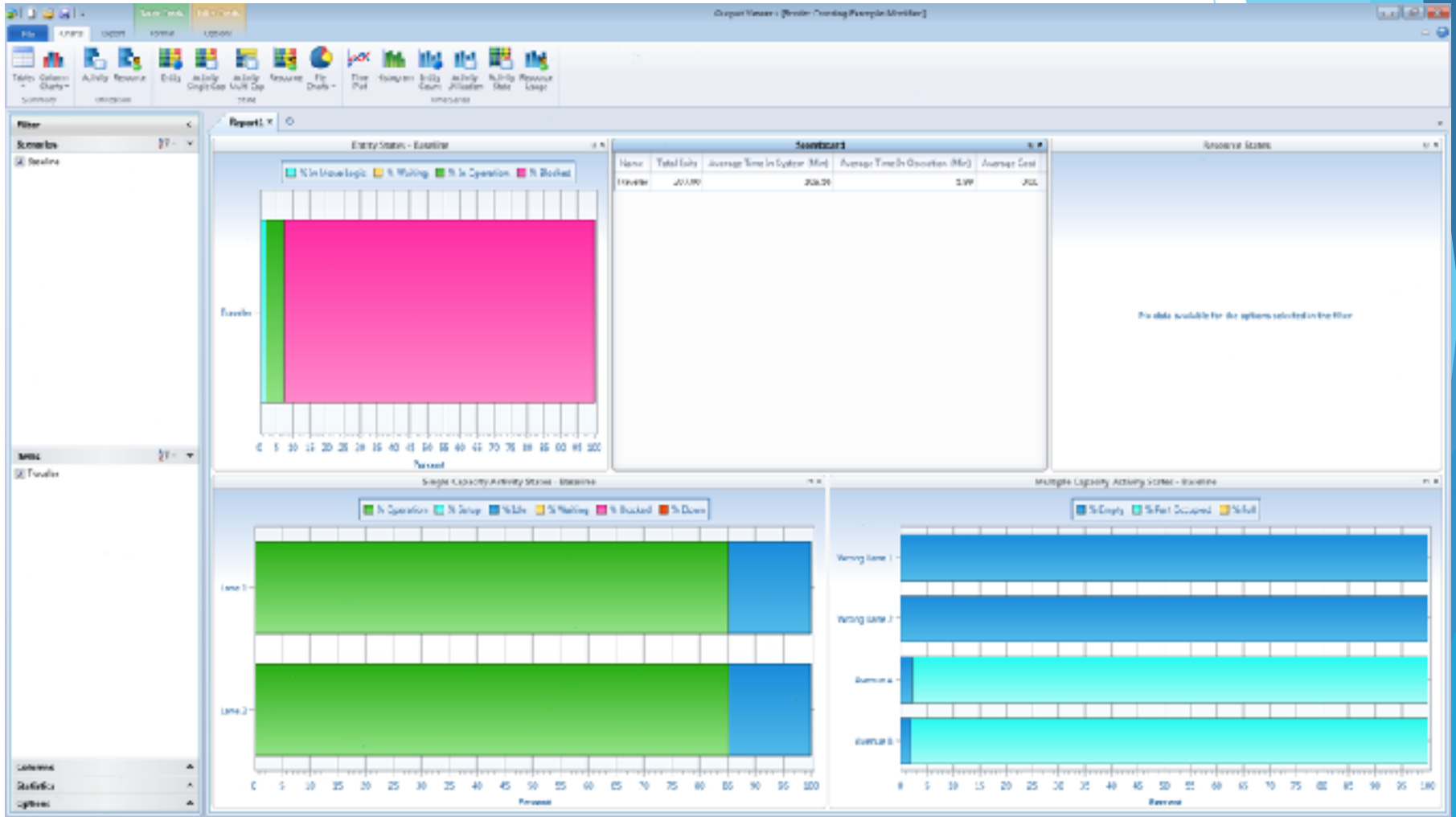
## Future State



# Simulation Example



# Simulation Example

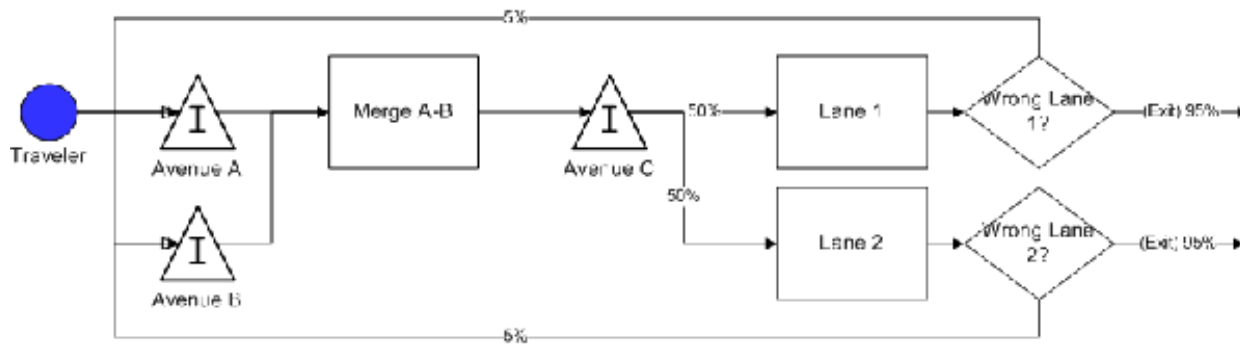




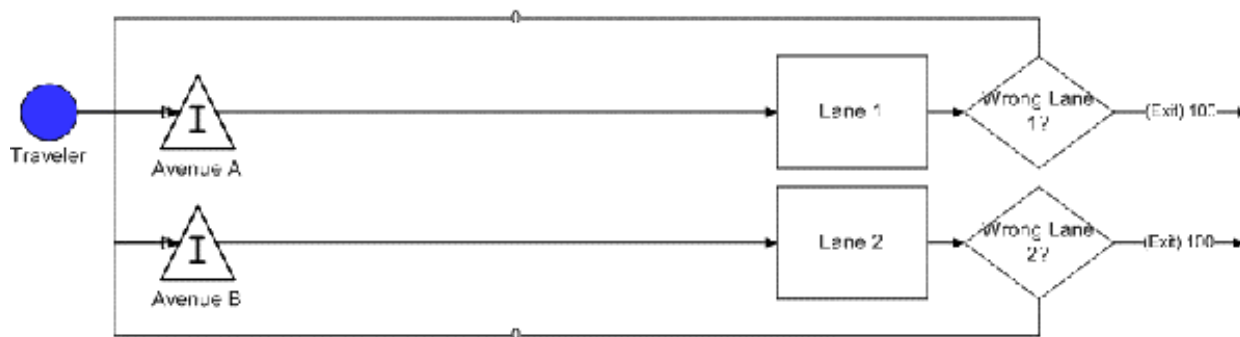
# Simulation Example

	Current State	Future State
Average Time In System	321 minutes	109 minutes

Current State



Future State



# Value Proposition

- ▶ Evaluate cost of implementation for each change
- ▶ Evaluate impact of implementation for each change
- ▶ Build the fly wheel – start with biggest incremental impact vs cost of implementation
- ▶ Layout stages of improvement and long term plan vs impact

*Demonstrating wholistic and systematic vision is key to securing funding and resources*