

Financial Overview: A.C.E. Strategy

1. Executive Summary

The proposed Traffic Control Optimization project addresses critical congestion in Bentonville arising from population growth and limited public transit. The core financial value proposition of this proposal is the **minimization of Capital Expenditures (CapEx)**. By leveraging existing infrastructure through the A.C.E. Strategy (Artificial Intelligence, Calibrated Capacity, Enhanced Synchronization), we project significant congestion relief with minimal hardware investment.

2. Cost Structure Analysis by Phase

Our solution prioritizes low-cost software and logic updates over expensive infrastructure expansion. The budget is allocated across three strategic pillars:

Phase A: Artificial Intelligence Scheduling (Low CapEx)

- **Cost Driver:** Programming and Data Analysis.
- **Financial Advantage:** This phase specifically relies on reprogramming existing signal timers to match traffic surges identified in our data.
- **Hard Cost Savings:** Crucially, this solution is designed to eliminate delays **"without the cost of purchasing new sensor hardware"**. This represents a 100% savings on hardware acquisition for this phase compared to traditional sensor-based adaptive systems.

Phase C: Calibrated Capacity (Targeted Infrastructure Investment)

- **Cost Driver:** Civil Engineering and Roadwork (Materials & Labor).
- **Specific Allocation:** Budget is required only for specific bottlenecks, specifically the extension of short left-turn lanes at **SW 14th St.**
- **Rationale:** This targeted investment prevents vehicle spillover from blocking through-lanes. By isolating construction costs to a single high-impact intersection rather than widening the entire corridor, we maximize the impact of every construction dollar spent.

Phase E: Enhanced Synchronization (Operational Expense)

- **Cost Driver:** Systems Engineering and Signal Calibration.
- **Scope:** Synchronization of signal clocks along **SE Walton Blvd** to create a "Green Wave".
- **Financial Impact:** This is a software-level intervention. It requires labor hours for synchronization but avoids the high material costs associated with building new overpasses or additional lanes.

3. Economic Impact & ROI

The "Return on Investment" for the City of Bentonville is measured in regained economic productivity and reduced vehicle operating costs.

- **Reduction in Economic Loss:** Current "forced flow conditions" (Level of Service F) at intersections like **Greenhouse & E Centeron Blvd** result in significant fuel waste and lost labor hours.
- **Commercial Efficiency:** With major employers like **Walmart and Tyson** operating in the region, improving corridor flow directly benefits the logistics and commuter efficiency essential for these economic hubs.
- **Asset Utilization:** The strategy improves the Level of Service (LOS) for the *entire* corridor rather than just one intersection, extending the useful life of the current roadway infrastructure without needing major highway expansion.

4. Financial Conclusion

The A.C.E. Strategy represents a **high-efficiency, low-overhead investment**. By focusing on "Corridor-wide adaptive signal timing" rather than hardware overhaul, the city can upgrade failing intersections (graded E) to acceptable standards using primarily operational funds rather than large-scale capital debt.