Commerce CITY

Intelligent Railroad Systems:
Measuring & Mitigating Traffic Delays At Railroad Crossings In Commerce City

Overview

- Purpose and Need

- Technology

- How It Works

- Notional Study Locations

- Cost Estimate

- Funding

- Next Steps

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Purpose and Need

- Implement a project to measure & mitigate traffic delays at railroad crossings in Commerce City
  - Possible crossings include;
    - UPRR - At 120th, 104th, 96th, 88th, 72nd, 69th, 64th, 60th, & 56th
      - ❖ 64th, 60th, 56th - Suncor
    - BNSF – At 104th, 96th, 88th, Rosemary, & 72nd
- Investigate options to address traffic delays
  - Driver information systems
  - Signal timing
  - Grade separation
- Initiate Pilot Program at designated crossing(s)
 - Based on initial traffic delay data

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Innovative Technology

- Use Bluetooth detection system to count cars
  - Roadside locations
- Radar detection to determine train blockages
  - Offset from railroad property
- Relatively inexpensive / mobile system
  - Flexible & portable
- Traffic data can be directed to integrative driver information / messaging systems
  - Provides real-time updates to drivers

How It Works

- A trackside sensor is installed at the railroad crossing
  - Measures when/how long the crossing is blocked

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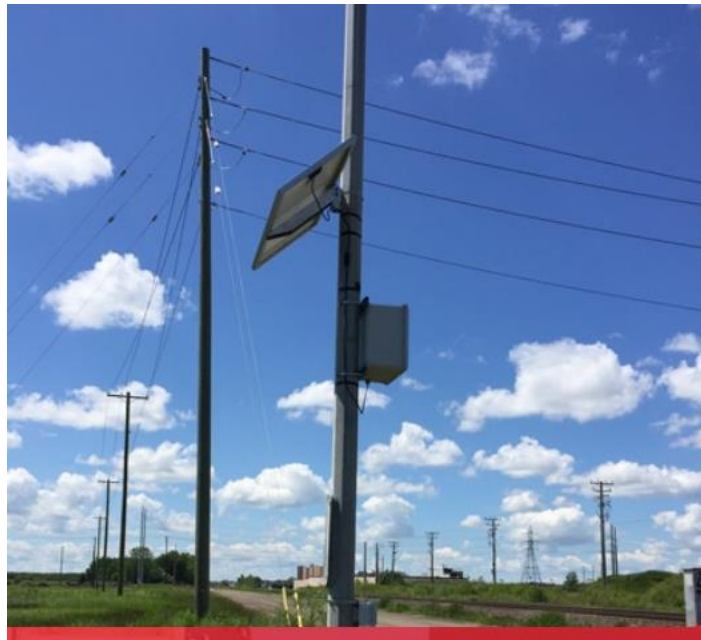
How It Works

- Bluetooth sensors are installed on either side of the railroad track
  - Measures vehicle travel time with and without a crossing blockage
- Software analyzes data from Bluetooth & train detection sensors - producing detailed traffic congestion report
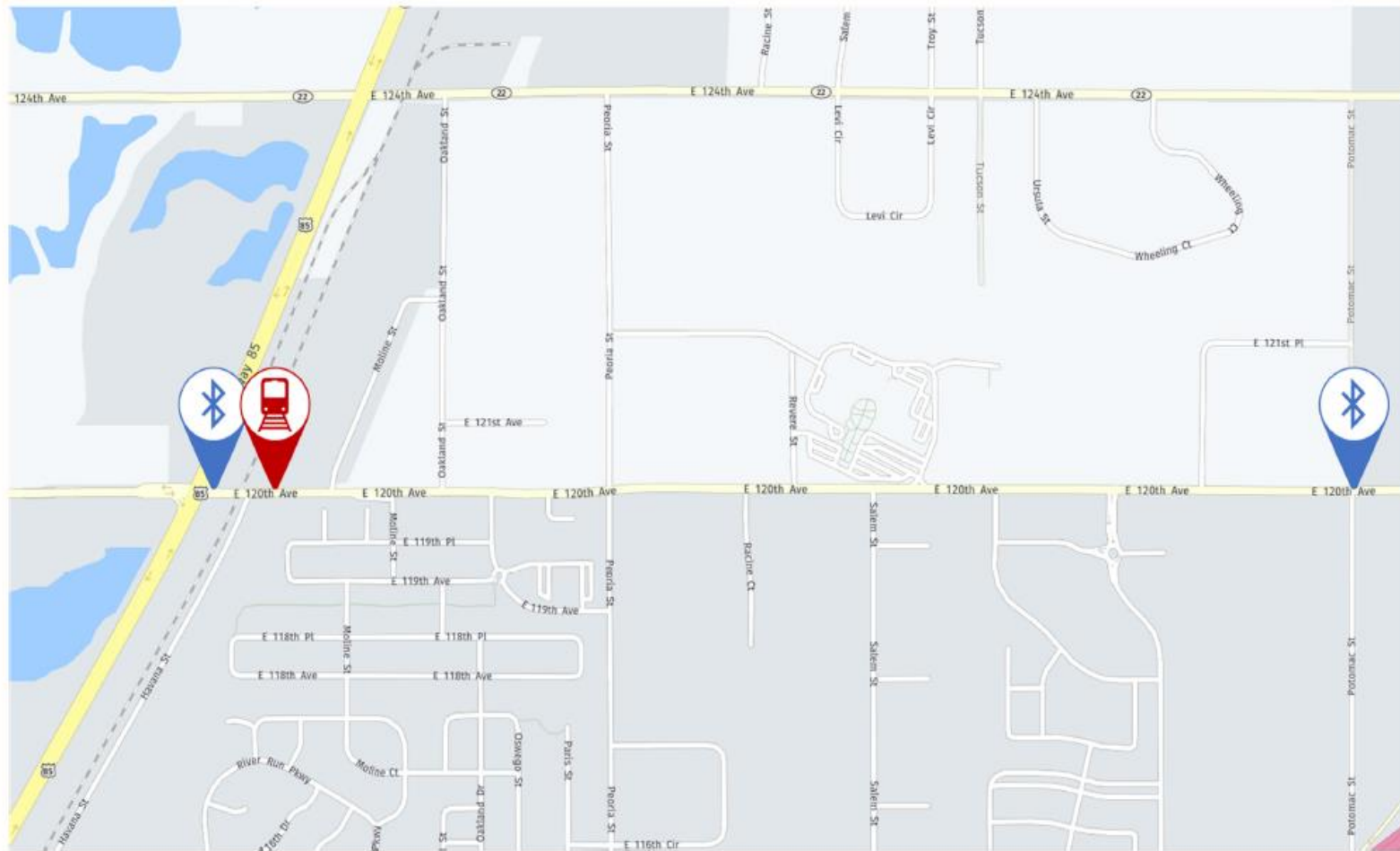
Notional Locations

Table 1: UPRR – Notional Rail Crossing Locations

Location #	Roadway Name	No of OD Pairs	Origin-Destination Pair*
1	120th Ave	1	US 85 - Potomac Street
2	104th Ave	2	Brighton Rd - 104th Ave
			Belle Creek Blvd - 106th Place
3	96th Ave	1	I-76 - Alton Street
4	88th Ave	2	Brighton Rd - Ulster Street
			I-76 - Rosemary Street
5	72nd Ave	2	Dahlia Street - Hwy 2
			Dahlia Street - Ivy Street

*NOTE: Traffic delay is measured in both directions of the OD Pair
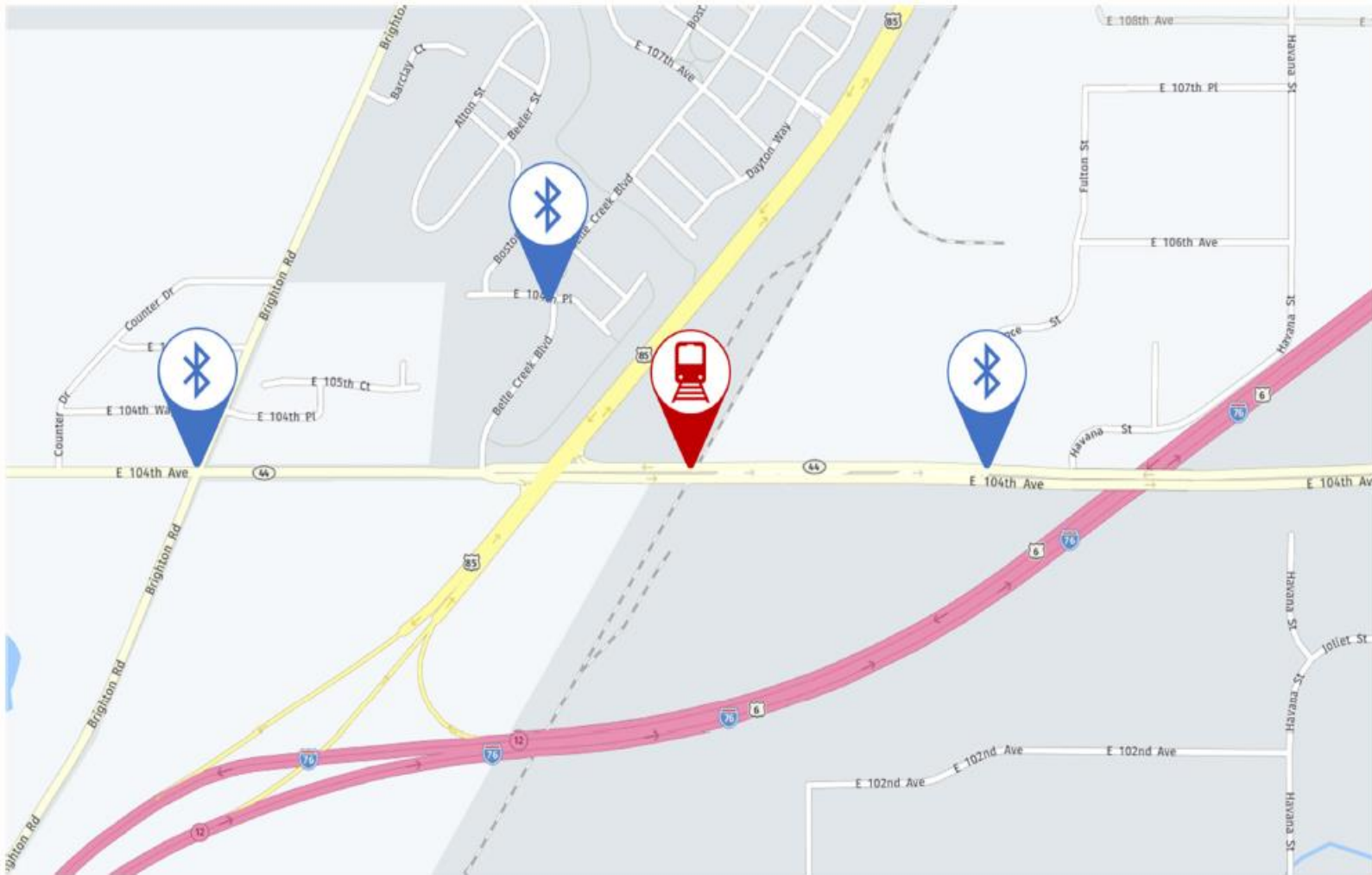
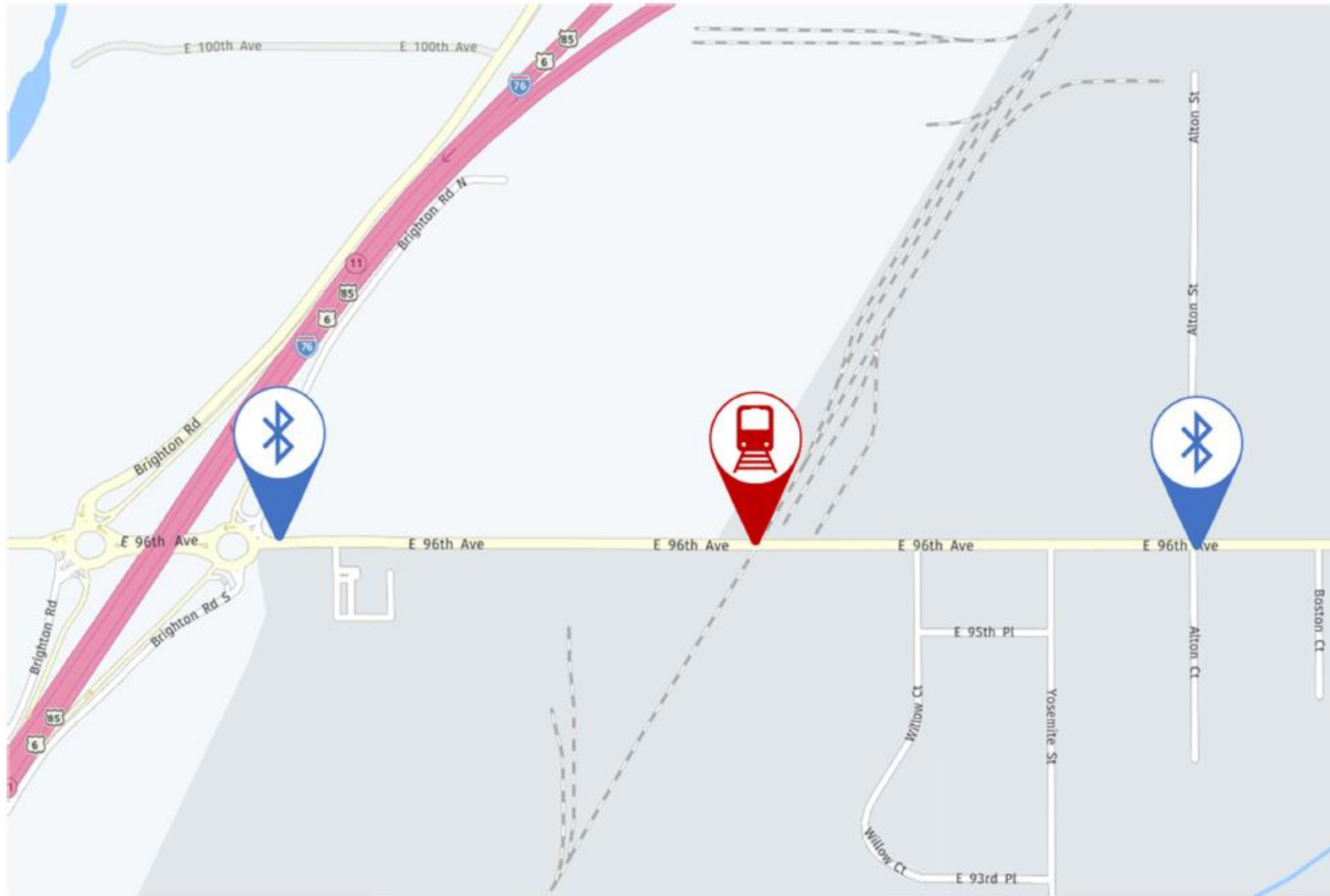Commerce CITY

120th at Union Pacific Railroad
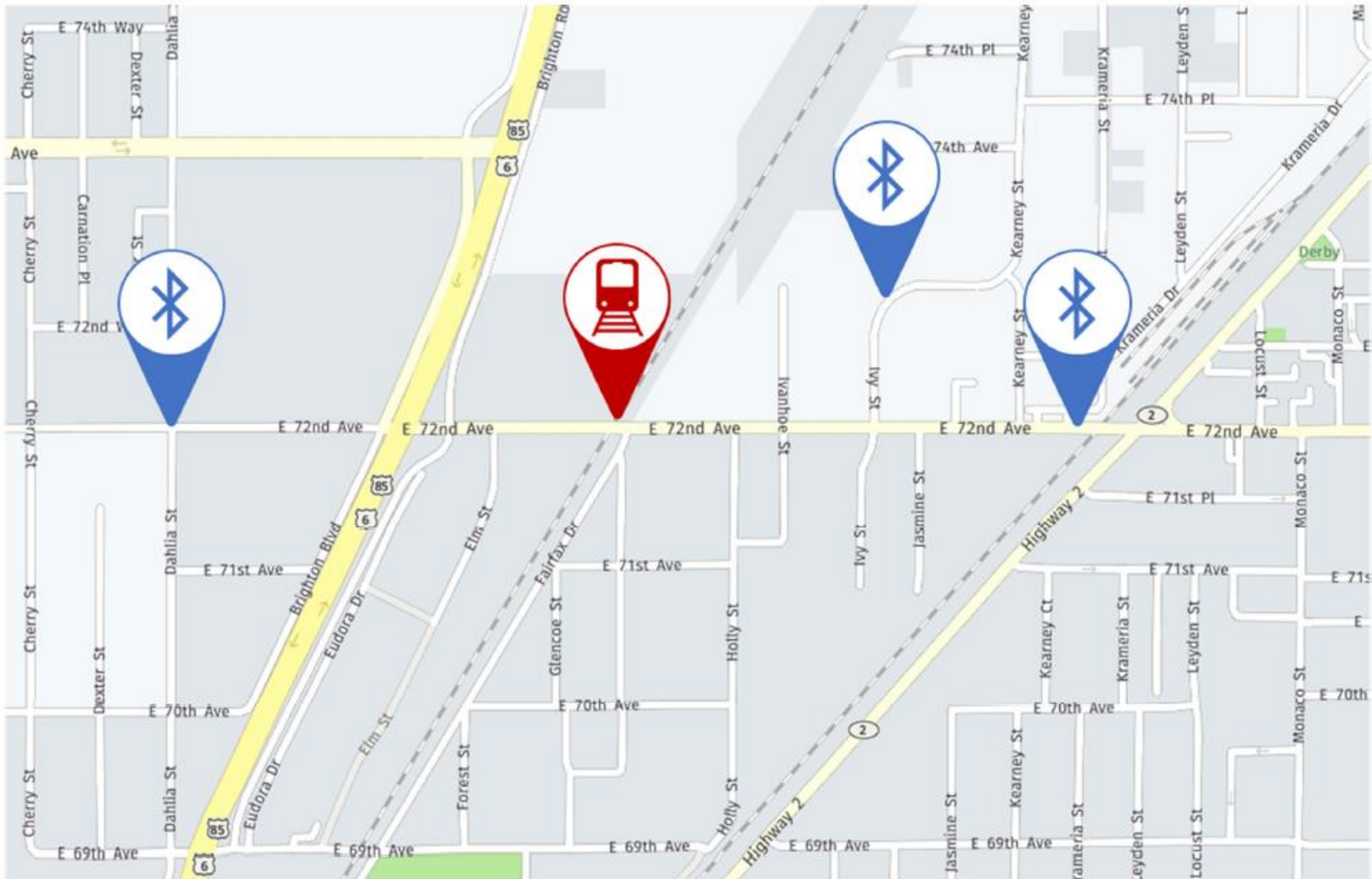

Bluetooth Sensor

Train Sensor

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104th at Union Pacific Railroad

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96th Ave at Union Pacific Railroad

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88ᵗʰ Ave. at Union Pacific Railroad

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72nd Ave. at Union Pacific Railroad

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Estimated Cost (Initial Phase)

Table 2: Fee Schedule

Item	Unit Cost	Qty	Payment Frequency	Price
Train Detection Sensor	$5,000	2	One-time	$10,000
Bluetooth Sensor	$5,000	6	One-time	$30,000
Solar Kit	$1,000	2	One-time	$2,000
Congestion Analytics Software License	$5,000	1	Annual	$5,000
Rail Crossing Locations	$2,500	6	Per Study	$15,000
Origin-Destination Pairs	$2,500	8	Per Study	$20,000
Wireless Data Plans	$600	8	Annual	$4,800
Shipping & Handling	$200	5	One-time	$1,000
SUB-TOTAL				$87,800
DISCOUNTS				
Complimentary Traffic Delay Study	$5,000	1		-5,000
TOTAL				$82,800

NOTE: Does not include installation - about $18,000 for six locations

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Funding

- Railroad Intelligent Transportation System budget is $160,000 for 2019
  - Equipment Purchase/Initial Data Collect Phase - $100K
  - Targeted Pilot Application - $50K
- Future year budget(s) to implement options addressing railroad crossing related delays – 2020/$100K
  - Driver Information Systems
    - Real-time Message Boards/Texts
  - Signal Timing
  - Grade Separation
    - At 120th , 104th , & 88th

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Next Steps

- Contract with provider
- Install two (2) Train Detector Sensors with Solar Kits and six (6) Bluetooth Sensors with Solar Kit
  - Train Detection Sensor will measure Railroad Crossings Blockages
  - Bluetooth Sensors will provide travel time delays between sensors
- Monitor Crossing(s) – 6 to 10 weeks per crossing
- Analyze data - determine mitigation options/tactics
- Implement pilot program at designated crossing(s)

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Questions & Discussion