

APPLICATION OVERVIEW

What: The Call for Projects for the FY 2024-2027 Regional Transportation Operations and Technology Set-Aside

Funding Available: at least \$16,000,000

Call Dates: June 1, 2023 until July 7, 2023, 5 pm

Application Submittals: submit the items below to Jerry Luor (jluor@drcog.org)

1. REQUIRED: a **single PDF document** containing 1) this application (**before saving to PDF, press Ctrl-A to select all, and F9 to update all formulas**), 2) one location map/graphic, 3) cost estimate (your own or the CDOT [cost estimate form](#)), 4) CDOT/RTD concurrence response (if applicable), 5) completed CDOT SEA-Local Agency Template, 6) project support form(s), and 7) any required documentation based on the application text (i.e., FHWA emissions calculators). Please DO NOT attach additional cover pages, embed graphics in the application, or otherwise change the format of the application form.
2. OPTIONAL: Submit **one additional** PDF document containing any supplemental materials, if applicable.
3. REQUIRED: Submit a single zipped GIS shapefile of your project. At a minimum, the shapefile should consist of project limits and planned equipment locations.

Other Notable items:

- **Eligibility:** Projects must align with the eligibility guidelines in the [Policies for FY2024-2027 TIP Set-Aside Programs](#). Proposed work on roadways must primarily be located on the [DRCOG Regional Roadway System](#) to be eligible for funding (the DRCOG RRS can also be viewed within the [DRCOG Data Tool](#)).
- **Call-for-Projects Pre-Application Webinar:** To be eligible to submit an application, at least one person from your agency must have attended the Regional Transportation Operations and Technology Set-Aside Pre-Application Webinar on April 26, 2023.
- **Application Data:** To assist sponsors in filling out the application, DRCOG has developed the [DRCOG Data Tool](#). A link to the instructions is also included. Additionally, sponsors may download datasets to run their own analyses from this same site.
- **Project Affirmation:** The application must be affirmed by either the applicant's City or County Manager, Chief Elected Official (Mayor or County Commission Chair) for local governments, or agency director or equivalent for other applicants.
- **Evaluation Process:** DRCOG staff will post all applications. DRCOG staff will assemble an evaluation panel to review and make recommendations for funding, including a ranked waiting list. The recommended list of projects will be presented to the Regional Transportation Operations Working Group and Advanced Mobility Partnership Working Group prior to action by the DRCOG committees and Board.
- If you have any questions or need assistance, contact gmackinnon@drcog.org or jluor@drcog.org.

APPLICATION FORMAT

The Regional Transportation Operations and Technology set-aside application contains two parts: *project information* and *evaluation questions*.

Project Information

Applicants enter **foundational** information for the *project/program/study* (hereafter referred to as *project*), including a problem statement, project description, and concurrence documentation from CDOT and/or RTD, if applicable. This section is not scored.

Evaluation Questions

This part includes four sections (A-E) for the **applicant to provide qualitative and quantitative responses** to use for scoring projects. The checkboxes and data entry fields should guide the applicant's responses. They are not directly scored but provide context as reviewers consider the full response to each question. Applicants may access the [DRCOG Data Tool](#) as well as other relevant data resources.

Scoring Methodology: Each section will be scored on a scale of 0 to 5, relative to other applications received. All questions will be factored into the final score, with any questions left blank receiving 0 points. The four sections are weighted and scored as follows:

Section A. Deployment of RTO&T Initiatives in RTO&T Strategic Plan 30%

Projects will be evaluated on the degree to which they address a significant subregional problem or benefit people throughout the subregion. Relevant quantitative data should be included within narrative responses.

5	The project implements or advances several Primary initiatives.
4	The project implements or advances one Primary initiative
3	The project implements or advances several Secondary initiatives.
2	The project implements or advances one Secondary initiative.
1	The project implements or advances one or more Tertiary initiatives.
0	The project implements no initiatives.

Section B. Regional Impact of Proposed Project 25%

Projects will be evaluated on the degree to which they address a significant subregional problem or benefit people throughout the subregion. Relevant quantitative data should be included within narrative responses.

5	The project benefits will substantially address a major subregional problem and benefit people and businesses in multiple communities.
4	The project benefits will significantly address a major subregional problem primarily benefiting people and businesses in one community.
3	The project benefits will either moderately address a major subregional problem or significantly address a moderate -level subregional problem.
2	The project benefits will moderately address a moderate -level subregional problem.
1	The project benefits will address a minor subregional problem.
0	The project does not address a subregional problem.

Section C. Metro Vision Regional Transportation Plan Priorities 25%

The TIP set-aside's investments should implement the 2050 Metro Vision Regional Transportation Plan (2050 MVRTP) regional project and program investment priorities, which contribute to addressing the Board-adopted Metro Vision objectives and the federal performance-based planning framework required by the Federal Highway Administration and Federal Transit Administration as outlined in current federal transportation legislation and regulations. Therefore, projects will be evaluated on the degree to which they address the six priorities identified in the 2050 MVRTP: safety, active transportation, air quality, multimodal mobility, freight, and regional transit. It is anticipated that projects may not be able to address all six priorities, but it's in the

applicant’s interest to address as many priority areas as possible. Relevant quantitative data is required to be included within narrative responses. The table below demonstrates how each priority area will be scored.

5	The project provides demonstrable substantial benefits in the 2050 MVRTP priority area and is determined to be in the top fifth of applications based on the magnitude of benefits in that priority area.
4	The project provides demonstrable significant benefits in the 2050 MVRTP priority area.
3	The project provides demonstrable moderate benefits in the 2050 MVRTP priority area and is determined to be in the middle fifth of applications based on the magnitude of benefits in that priority area.
2	The project provides demonstrable modest benefits in the 2050 MVRTP priority area.
1	The project provides demonstrable slight benefits in the 2050 MVRTP priority area and is determined to be in the bottom fifth of applications based on the magnitude of benefits in that priority area.
0	The project does not provide demonstrable benefits in the 2050 MVRTP priority area.

Section D. Financial Leveraging5%

Scores are assigned based on the percent of other non-federal funding sources.

Score	% non-Federal Funds
5	36% and above
4	31 - 35.9%
3	26 - 30.9%
2	21 - 25.9%
1	17.21 - 20.9%*
0	17.21%

*(includes 100% eligible projects with no match)

Section E. Project Readiness15%

Be sure to answer ALL questions. While “Yes” answers will generally reflect greater readiness, opportunities are given to provide additional details to assist reviewers in fully evaluating the readiness of your project.

5	Substantial readiness is demonstrated and all known obstacles that are likely to result in project delays have been mitigated.
4	Significant readiness is demonstrated and several known obstacles that are likely to result in project delays have been mitigated.
3	Moderate readiness is demonstrated and some known obstacles that are likely to result in project delays have been mitigated.
2	Slight readiness is demonstrated and some known obstacles that are likely to result in project delays have been mitigated.
1	Few mitigation or readiness activities have been demonstrated.
0	No mitigation or readiness activities have been demonstrated.

Project Information

1. Project Title	Jefferson County Traffic Camera System	
2. Project Location <i>Provide a map, as appropriate (see Page 1)</i>	Start point: Click or tap here to enter text. End point: Click or tap here to enter text. OR Geographic Area: Southeast Jefferson County (Unincorporated) Map File Attached	
3. Project Sponsor <i>(entity that will be financially responsible for the project)</i>	Jefferson County	
4. Project Contact Person:		
Name: Kelly Dunne	Title: Traffic Operations & Planning Manager	
Phone: 303-271-8457	Email: kdunne@jeffco.us	
5. Required Concurrence and Project Support: Does this project touch CDOT Right-of-Way, involve a CDOT roadway, connect to a CDOT system, access RTD property, or request RTD involvement to operate service? Does this project directly involve other local agency partners.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <i>If yes, provide a completed Peer Agency Support Form for each partner.</i>	
6. What planning document(s) identifies this project? <i>Provide link to document(s) and referenced page number if possible, or provide documentation in the supplement</i>	If this project is listed in the DRCOG 2050 Metro Vision Regional Transportation Plan (2050 MVRTP) , provide the staging period: Click or tap here to enter text.	
	Local/Regional plan:	Planning Document Title: N/A Adopting agency (local agency Council, CDOT, RTD, etc.): Click or tap here to enter text. Provide date of adoption by council/board/commission, if applicable: Click or tap here to enter text.
	Please describe public review/engagement to date:	Public input on the Climate Action Plan showed that the majority of the public is in favor of emissions-reducing initiatives
	Other pertinent details:	The County's 2020 Traffic Signal System Evaluation report identified replacement of loop detectors with new technologies
7. Identify the project's key phases and the anticipated schedule of phase milestones. (phases and dates should correspond with the "Phase to be Initiated" in the Funding Breakdown table below)		
Phases to be included:	Major phase milestones:	Anticipated completion date (based on October 2023 DRCOG approval date): (MM/YYYY)
<input type="checkbox"/> Preconstruction <input type="checkbox"/> Construction <input type="checkbox"/> Both		

<u>REQUIRED FOR ALL PHASES</u>	Intergovernmental Agreement (IGA) executed with CDOT/RTD (Assumed process is 4-9 months; any work performed before execution is NOT reimbursable)	06/2024
<input type="checkbox"/> Design	Design contract Notice to Proceed (NTP) issued (if using a consultant):	Enter Date
	Design scoping meeting held with CDOT (if no consultant):	Enter Date
	FIR (Field Inspection Review):	Enter Date
	FOR (Final Office Review):	Enter Date
<input type="checkbox"/> Environmental	Environmental contract Notice to Proceed (NTP) issued (if using a consultant):	Enter Date
	Environmental scoping meeting held with CDOT (if no consultant):	Enter Date
<input type="checkbox"/> Right-of-Way	Initial set of ROW plans submitted to CDOT:	Enter Date
	Estimated number of parcels to acquire: Enter Number	
	ROW acquisition completed:	Enter Date
<input type="checkbox"/> Construction	Required clearances:	Enter Date
	Project publicly advertised:	Enter Date
<input type="checkbox"/> Study	Kick-off meeting held after consultant NTP (or internal if no consultant):	Enter Date
<input checked="" type="checkbox"/> Equipment Purchase (Procurement)	RFP/RFQ/RFB (bids) issued:	01/2025
<input type="checkbox"/> Other Phase not Listed Describe: Describe	First invoice submitted to CDOT/RTD:	Enter Date

8. **Problem Statement:** What specific subregional problem/issue will the transportation project address?

12 intersections have been identified for 360° video detection system installation. The proposed intersections currently rely upon in-pavement loop detectors or antiquated overhead camera detectors that lack significant capabilities needed for real-time traffic management/video monitoring, continuous traffic data collection, and pedestrian/bicyclist detection. Funds requested will be utilized to procure the necessary video detector hardware and componentry. These 360° video detection systems will be able to provide real-time traffic management and video monitoring, traffic data collection, as well as pedestrian and bicyclist detection. Video monitoring and traffic data collection can be shared with neighboring agencies.

9. Identify the project's **key elements**. A single project may have multiple project elements.

Roadway

- ☒ Operational Improvements
- ☐ General Purpose Capacity (2050 MVRTP)
- ☐ Managed Lanes (2050 MVRTP)
- ☐ Pavement Reconstruction/Rehab
- ☐ Bridge Replace/Reconstruct/Rehab

Grade Separation

☒ **Safety Improvements**

Active Transportation Improvements

- ☒ Bicycle Facility
- ☒ Pedestrian Facility

☒ **Air Quality Improvements**

☐ **Improvements Impacting Freight**

- ☐ Roadway
- ☐ Railway
- ☐ Bicycle
- ☐ Pedestrian

Regional Transit¹

- ☐ Rapid Transit Capacity (2050 MVRTP)
- ☐ Mobility Hub(s)
- ☐ Transit Planning Corridors
- ☐ Transit Facilities (Expansion/New)

Multimodal Mobility (i.e., accommodating a broad range of users)

- ☐ Complete Streets Improvements

☐ Study

☒ **Other**, briefly describe: [Data Sharing](#)

¹For any project with transit elements, the sponsor must coordinate with RTD to ensure RTD agrees to the scope and cost. Be sure to include RTD's concurrence in your application submittal.

10. Define the **scope and **specific elements** of the project (including any elements checked in #9 above).**

***DO NOT** include scope elements that will not be part of the DRCOG funded project or your IGA scope of work (i.e., adjacent locally funded improvements or the project merits and benefits). Please keep the response to this question tailored to details of the scope only and no more than five sentences.*

Operational Improvements will be achieved due to real-time traffic monitoring. Traffic staff can monitor for excessive queuing and respond by modifying signal timing. Traffic data collection by the equipment can also be used to create current and efficient timing plans.

Safety can be improved through the system's ability to detect pedestrians, bicycles, and by providing live footage to the traffic operators. Incidents can be prevented or rapidly addressed once the County has consistent visual connection to the selected intersections.

Active transportation improvements include prioritization of pedestrian and bicycle detection. This will make commuting in these active manners more fluid, rapid, and safe.

Air quality improvements can also be anticipated following the implementation of this project. The Operational Improvements will help to limit idling at intersections, which is known to emit more potentially compared to motion.

The final key element of this project is to improve data sharing practices. Data from the detectors will be shared with DRCOG and will be potentially shared with relevant municipalities, once identified. Overall, this project will lead to improvements in roadway operation, safety, active transport, air quality, and data gathering/sharing.

11. What is the current status of the proposed scope as defined in Question 10 above? Note that overall project readiness is addressed in more detail in Section E below.

The roadways are currently lacking in the elements mentioned above. A critical component which is currently missing is live monitoring. Without this, our traffic operators lack sufficient surveillance capabilities, limiting incident response, signal timing improvements, and preventing pedestrian/bicycle detection. Our current loop detector system does not provide any traffic count abilities and requires upgrading.

12. Would a smaller DRCOG-allocation than requested be acceptable, while maintaining the original intent of the project?

☒ Yes ☐ No

If yes, smaller meaningful limits, size, service level, phases, or scopes, along with the cost, **MUST** be defined.

Smaller DRCOG funding request: \$150,000

Outline the differences between the scope outlined above and the reduced scope: This smaller scope reflects improvements made to only half of the initial request. Which would service six intersection video detection upgrades instead of twelve.

Project Financial Information and Funding Request (All funding amounts in \$1,000s)		
<i>To update the formulas below, enter your information, highlight the formulas, and press F9 or right-click and select Update Field.</i>		
Total amount of Federal Funding Request (in \$1,000's) (Not to exceed 82.79% of the total project cost)	\$248	82.7% of total project cost
Match Funds (in \$1,000's) List each funding source and contribution amount.	Contribution Amount	% Contribution to Overall Project Total
Click or tap here to enter text.	\$52	17.3%
Click or tap here to enter text.	\$Match Amount	0.0%
Click or tap here to enter text.	\$Match Amount	0.0%
Click or tap here to enter text.	\$Match Amount	0.0%
Click or tap here to enter text.	\$Match Amount	0.0%
Click or tap here to enter text.	\$Match Amount	0.0%
Total Match (private, local, state, regional, or federal)	\$ 52	17.3%
Project Total	\$ 300	

Funding Breakdown (in \$1,000s) (by program year)¹ (Total funding should match the Project Total from above)

To update the formulas below, enter your information, highlight the formulas (or Ctrl-A), and press F9. OR close and reopen the file.

	FY 2024	FY 2025	FY 2026	FY 2027	Total
DRCOG Requested Funds	\$Enter Amount	\$248	\$Enter Amount	\$Enter Amount	\$ 248
CDOT or RTD Supplied Funds ²	\$Enter Amount	\$Enter Amount	\$Enter Amount	\$Enter Amount	\$ 0
Local Funds (Funding from sources other than DRCOG, CDOT, or RTD)	\$Enter Amount	\$52	\$Enter Amount	\$Enter Amount	\$ 52
Total Funding	\$ 0	\$ 300	\$ 0	\$ 0	\$ 300
Phase to be Initiated	Select Phase	Equipment Purchase (Procurement)	Select Phase	Select Phase	
Notes:	<ol style="list-style-type: none">1. Fiscal years are October 1 through September 30 (e.g., FY 2024 is October 1, 2023 through September 30, 2024). The proposed funding plan is not guaranteed if the project is selected for funding. While DRCOG attempts to accommodate applicants' requests, final funding will be assigned at DRCOG's discretion. Funding amounts must be provided in year of expenditure dollars using a recommended 3% inflation factor.2. Only enter funding in this line if CDOT and/or RTD specifically give permission via concurrence letters or other written source.				
Affirmation:	By checking this box, the applicant's Chief Elected Official (Mayor or County Commission Chair/City or County Manager/Agency Director) has certified it allows this application to be submitted for potential DRCOG-allocated funding and will follow all local, DRCOG, state, and federal policies and regulations if funding is awarded. <input checked="" type="checkbox"/>				

Evaluation Questions

A. Deployment of RTO&T Initiatives in RTO&T Strategic Plan

WEIGHT

30%

Select the initiatives to be deployed or advanced by this proposed project. It is possible to select more than one initiative.

Primary initiatives

- | | |
|--|-------------------------------------|
| Develop a Regional Situational Awareness platform. | <input type="checkbox"/> |
| Develop processes to share traffic camera view and control between jurisdictions and public safety. | <input checked="" type="checkbox"/> |
| Develop a Regional Performance Monitoring Data Archive platform. | <input type="checkbox"/> |
| Develop strategies and processes to coordinate performance-based management. | <input type="checkbox"/> |
| Deploy additional supporting transportation surveillance and control systems and infrastructure. | <input checked="" type="checkbox"/> |
| Develop Traffic Incident Management standard operating procedures. | <input type="checkbox"/> |
| Standardize and implement transit signal priority performance management and system optimization procedures. | <input type="checkbox"/> |

Secondary initiatives

- | | |
|---|-------------------------------------|
| Develop evacuation and recovery plans and exercises. | <input type="checkbox"/> |
| Develop processes to coordinate traveler information messaging across the region. | <input type="checkbox"/> |
| Develop active work zone monitoring and management in the field. | <input type="checkbox"/> |
| Deploy additional safety-focused technology applications | <input checked="" type="checkbox"/> |
| Expand the Regional Performance Monitoring Data Archive platform. | <input checked="" type="checkbox"/> |
| Expand the Regional Situational Awareness platform. | <input type="checkbox"/> |
| Expand transit signal priority deployment. | <input type="checkbox"/> |

Tertiary initiatives

- | | |
|---|--------------------------|
| Develop a Regional Multimodal Traveler Information platform. | <input type="checkbox"/> |
| Develop a process to monitor regional parking availability, capacity and pricing. | <input type="checkbox"/> |
| Develop a multimodal trip planner and reservation/ payment system. | <input type="checkbox"/> |
| Develop and deploy dynamic ride-sharing. | <input type="checkbox"/> |
| Develop and implement curbside management standards. | <input type="checkbox"/> |
| Develop continuity of operations plans. | <input type="checkbox"/> |

Describe how this project will deploy, advance or achieve the selected initiatives.

The project will address two primary initiatives as well as two secondary initiatives. The first primary initiative it will address is to “develop processes to share traffic camera view and control between jurisdictions and public safety”. The 360° video detection systems will be able to transmit video data and live feed to a traffic control monitoring hub at Jefferson County. This data can be utilized to help inform on signal timing, safety concerns, and incident response. Plans will be made to share these live feeds as well as pertinent traffic data to DRCOG, as well as to relevant municipalities and jurisdictions in the greater region.

The project will also achieve the primary initiative to “deploy additional transportation surveillance and control systems and infrastructure”. The video detection systems will provide real time viewing for Jefferson County’s transportation staff. These live feeds will provide crucial insights to the transportation hub and can be used to collect traffic counts, plan traffic patterns to facilitate efficiency, or in respond to signal operations concerns, an incident, anomaly, or a pedestrian / bicyclist.

The project will also address two secondary initiatives, which are to “deploy additional safety focused applications” and to “expand the regional performance monitoring data archive platform”. The proposed video detectors would add to an existing network of detectors within the County which are used to prioritize public

safety. These detectors can detect pedestrians and bicycles, and the video monitoring can show crashes which may affect typical roadway traffic. These video detectors will add to the larger regional data archives and will offer up findings, live feeds, and relevant data to regional entities.

The project will facilitate improved traffic flow, safety enhancements, real-time traffic monitoring, and data-driven decision making at 12 critical intersections in unincorporated Jefferson County.

The Regional Transportation Operations and Technology Strategic Plan emphasizes a data management concept that requires interagency information sharing. Describe in detail how this project will share data with other regional entities.

Data will be shared with DRCOG via the Request for Annual Traffic Counts. This data can be utilized by the MPO and can be distributed to the other local governments which constitute it. Plans will also be made to share relevant insights and live camera feeds with other municipalities. The City of Littleton has been identified as a potentially relevant municipality to engage with and share data with for this project since the Bowles Ave corridor crosses from Jefferson County into Littleton. The intention of data or live feed sharing between municipalities, counties, and CDOT would be to ease congestion as it backs up out of unincorporated Jefferson County and affects other roadways.

B. Regional Impact of Proposed Project

WEIGHT

25%

Provide **qualitative and quantitative** responses to the following questions on the subregional impact of the proposed project. Be sure to provide all required information for each question. Quantitative data from is available from the [DRCOG Data Tool](#).

1. Why is this project regionally important? *Relevant quantitative data in your response is required.*

This project is regionally important for several reasons. First, the project's benefits will directly serve a diverse population of 98,645 community members who live within 0.5 miles of the sites. Hundreds of thousands of visitors to this region will be benefitted by the project as well. Second, this region is an economic hub with thousands of different businesses, shops, and commercial spaces. An estimated 35,408 jobs existed in this area in 2020; by 2040, this figure is projected to surpass 41,922. This growth projection also applies to regional population, which is expected to jump from 36,599 households in 2020 to 40,396 by 2040. This expected growth will be difficult to handle without infrastructure upgrades, as the region's transportation corridors are already overburdened. Several routes along the selected project location score between 3-5 in mobility score, which is relatively high. The project would significantly alleviate the pressure on these specific zones and reduce regional congestion overall. This reduction in congestion would not only help single-occupancy vehicles, but it would also assist the extensive bus transit network in the area. Within 0.5 miles of the project area there are 119 bus stops.

This project will be implemented upon several DRCOG corridors. 8 intersections are regional connector streets, with the remaining 4 being on neighborhood connector streets. 9 selected intersections are on the DRCOG Regional Vision Zero Injury Network, where safety enhancements are prioritized. This project will lead to safety enhancements on these corridors and will lead to a reduction in fatal, serious, and typical accidents. 3 intersections fall directly within or immediately adjacent to pedestrian focus areas. Additionally, 2 intersections are in short trip opportunity zones. There are also 3 existing urban centers within this project region, which will reap the benefits of the infrastructure upgrade. These urban centers are known as Southwest Plaza, Bowles, and C-470 Corridor. In conclusion, this project will greatly benefit a significantly important region with safety enhancements, congestion remedies, and overall infrastructure improvement.

2. How will the proposed project address the specific transportation problem described in the **Problem Statement** (as submitted in Project Information, #8)? *Relevant quantitative data in your response is required.*

This project aims to enhance traffic management and improve the overall efficiency and safety of intersections in Jefferson County by expanding the use of traffic camera systems in operation at the county. Presently, 360° overhead video detection systems that allow for real-time monitoring, data collection, and pedestrian/bicyclist detection are only available at 46% of the county-maintained intersections. The remainder of the intersections operate with an outdated and unreliable loop detector system or antiquated cameras. The county seeks to expand our traffic monitoring, data collection, and safety capabilities by installing 360° overhead video detection systems at 12 selected intersections along DRCOG Regionally Significant Corridors. Across the 12 intersections we estimate average daily volume between 14,000-28,000 per intersection. By installing these overhead video detection systems hundreds of thousands of trips each day can be monitored and analyzed. Action will be taken to increase safety, reduce travel time, and facilitate traffic flow.

3. Does the proposed project benefit multiple municipalities and/or subregions? If yes, which ones and how? Also describe any funding partnerships (*other subregions, regional agencies, municipalities, private, etc.*) established in association with this project.

This project will mainly benefit roadways within Jefferson County. However, the project will collect significant amounts of data which will be useful to the regional MPO, DRCOG, as well as to neighboring regions. Accurate data will be shared from this project with DRCOG via the Annual Request for Traffic Counts. This data will assist in planning and ideating for the future of this region. In addition, local municipalities such as Littleton have been identified as potentially relevant due to their proximity. Plans will be developed to reach out to local municipalities which could benefit from either the live traffic feeds or from the acquired data.

4. Disproportionately Impacted and Environmental Justice Communities

This data is available in the DRCOG Data Tool. Completing the below table and referencing *relevant* quantitative data in your response is required.

To update the formulas below, enter your information, highlight the formulas (or Ctrl-A), and press F9. OR close and reopen the file.

	DI & EJ Population Groups	Number within ½ mile	% of Total	Regional %
Use 2015-2019 American Community Survey Data (Use a 0.5 mile buffer distance) [Equity data tab]	a. Total population	98,645	-	-
	b. Total households	38,634	-	-
	c. Individuals with low-income	10,288	10.43%	20%
	d. Individuals of color	18,765	19.02%	33%
	e. Adults age 60 and over	23,641	23.97%	13%
	f. Youth under 18	22,013	22.31%	16%
	g. Individuals with limited English proficiency	1,832	1.86%	3%
	h. Individuals with a disability	7,843	7.95%	9%
	i. Households that are housing cost-burdened	9,562	9.69%	32%
	j. Households without a motor vehicle	927	0.93%	5%

For Lines c. – i. use definitions in the [DRCOG Title VI Implementation Plan](#). For Line j., as defined in C.R.S. 24-38.5-302(3)(b)(I): “‘cost-burdened’ means a household that spends more than thirty percent of its income on housing.”

Describe how this project will improve access and mobility for each of the applicable disproportionately impacted and environmental justice population groups identified in the table above, *including the required quantitative analysis*:

There are a multitude of disproportionately impacted groups which will benefit from this project. Low-income individuals (10.43% of project area) and individuals of color (19.02% of project area) have historically been more afflicted by negative health results as a consequence of tailpipe emissions and congestion related pollution. This project will benefit these groups as emissions will be reduced by maximizing traffic efficiency and reducing idling vehicles. Adults age over the age of 60 (23.97% of project area) are much more likely to have chronic illnesses, especially respiratory conditions, COPD, and other heart issues. Without clean air, these conditions are worsened, contributing to a rise in negative health outcomes and mortality. Reducing emissions in the areas in which these elderly community members live is critical and will improve air quality to contribute to a healthier and safer community.

Children Aged 5-17 (22.31% of project area) will be greatly benefitted by the pedestrian and bicycle identifying abilities of the video detection systems. This will create safer streets for children to cross, play near, and ride their bikes on. Children, who inhale more air per pound of body weight than adults, will also benefit disproportionately from an emissions reduction. In addition, children commuting to school via school bus or car will be benefitted by a reduction in travel time between locations. Individuals with disabilities (7.95% of project area) will be provided with catered crossing times once video detection systems are available, providing them safer and reliable mobility within the community. They will also likely be benefitted by the accompanying emissions and travel time reductions. Individuals on without a motor vehicle (>1% of project area) will be benefitted by the pedestrian detection capabilities and by the reducing congestion, which will benefit the extensive public bus network in this area (119 bus stops within 0.5 mi).

It is unclear how or if individuals with limited English proficiency or those who are housing cost-burdened will be specifically supported by this project. However, all members of the community will be benefitted by the reduced travel times, safety components, and improved air quality which will result from the project.

5. How will this project move the subregion toward achieving the shared [regional transportation outcomes](#) established in [Metro Vision](#) in terms of...
- Land Use, community, urban development, housing, employment? *(Improve the diversity and livability of communities. Contain urban development in locations designated for urban growth and services. Increase housing and employment in urban centers. Diversify the region's housing stock. Improve the region's competitive position.)*
 - The project will achieve outcomes relating to community employment, as outlined in the 'Metro Vision Regional Transportation Outcomes'. The project will meet the goal of 'improve access to opportunity'. A reduction and congestion around employment centers will increase access for workers, potential candidates, and for the public. The project will generally improve the flow of people, goods, services, and information within and through the region.
 - Multimodal transportation, safety, reliability, air quality? *(Improve and expand the region's multimodal transportation system, services, and connections. Operate, manage, and maintain a safe and reliable transportation system. Improve air quality and reduce greenhouse gas emissions. Reduce the risk of hazards and their impact.)*
 - Although this project will not directly upgrade multimodal systems, the project does generally improve traffic flow which benefits all forms of transport.
 - This project will simultaneously improve multimodal transportation system performance, reliability, safety, and air quality as defined in Regional Transportation Outcomes. The project will invest in enhancements along corridors and improve the operations of the multimodal regional roadway system by adding the 12 video detection systems which will benefit single occupancy vehicles, buses, bicycles, and pedestrians.
 - The detectors will also improve transportation system performance and reliability as traffic operators will be able to access live feeds and consistent, accurate data at these locations for the first time. This will allow them to take appropriate measures which will reduce congestion, hasten incident response, and improve roadway reliability.
 - Transportation safety and security will be improved following the installation of video detectors due to the technology's pedestrian and bicycle detection capabilities along with the aforementioned live feeds.
 - Air quality and reduce greenhouse gas emissions will be reduced as a result of traffic flow improvements and a reduction in vehicle idling.
 - The data sharing aspect will assist in increasing collaboration with local and regional partners on air quality initiatives.
 - Connection/accessibility to particular locations supporting healthy and active choices? *(Connect people to natural resource and recreational areas. Increase access to amenities that support healthy, active choices. Improve transportation connections to health care facilities and service providers. Improve access to opportunity.)*
 - This project will Improve multimodal linkages to and between the region's parks, open spaces, and developed areas. 3 of the detection systems will be placed upon W. Bowles Ave directly in line with the entrances to Robert F Clement Park. This sizeable park serves thousands of community members a day and is an important recreation destination for the County. In addition, there are many other recreation sites within 0.1 mi of the project locations such as Christensen Meadows Park, Eagle Meadows Park, Dakota Station Park, Deer Creek Park, Lily Gulch Park, Johnson Reservoir, Blue Heron Park, Raccoon Creek Golf Course, Ridge Recreation Center, Ken Caryl Ranch Recreation Center and Foothills Park & Recreation Center. Installing video detection systems in the vicinity of these locations will improve accessibility by reducing congestion and will enhance safety for those who walk, bike, and drive to these locations.

6. Items marked with an asterisk (*) below are available in the DRCOG Data Tool.

- Is there a DRCOG designated urban center within ½ mile of the project limits?*
- Does the project connect two or more urban centers?*
- Is there a transit stop or station within ½ mile of the project limits?*
- Is the project in a locally-defined priority growth and development area and/or an area with zoning that supports compact, mixed-use development patterns and a variety of housing options?

☒ Yes ☐ No If yes, please provide the name: Southwest Plaza, Bowles, C-470 Corridor

☒ Yes ☐ No If yes, please provide the names: Connection between Bowles-Southwest Plaza, Connection between Southwest Plaza and C-470 Corridor

Bus stop: ☒ Yes ☐ No If yes, how many:119

Rail station: ☐ Yes ☒ No If yes, how many: Click or tap here to enter text.

☐ Yes ☒ No

If yes, provide a link to the relevant planning document:

If yes, provide how the area is defined in the relevant planning document:

Provide households and employment data* [Population and Employment tab]	2020	2050
Jobs within ½ mile	35,408	44,879
Households within ½ mile	36,599	41,269

Describe how this project will improve transportation options in and between key geographic areas including DRCOG-defined urban centers, multimodal corridors, mixed-use areas, Transit Oriented Development (transit near high-density development), or locally defined priority growth areas, including the required quantitative analysis:

This project will improve transportation within several key geographic areas and in-between three DRCOG designated urban centers. The project will reduce traffic and increase safety in corridors linking the C-470 Corridor Urban zone, the Southwest Plaza urban zone, and the Bowles urban zone.

7. Describe how this project will improve **access** and **connections** to key employment centers or subregional destinations. In your answer, define the key destination(s) and clearly explain how the project improves **access** and/or **connectivity**.

There are multiple subregional destinations which will be more accessible and connected due to this project. One significant shopping location and major employment center which will be benefitted is the Southwest Plaza shopping mall (Zone ID 818). This mall hosts 150 stores or services, thousands of employees, and tens of thousands of visitors per day. 2 of the video detection systems will be placed at intersections within 0.2 miles of the mall, with an additional 3 on the roadway, W. Bowles Ave, which connects the mall regionally. The project will facilitate an ease of traffic flow on the main roadway and in the immediate vicinity of this destination. This will improve the visitor experience and improve safety for the many visitors of the mall. 2 of the video detection systems will be placed at intersections along the busy S. Kipling Pkwy in between Freeway C-470 and W. Ken Caryl Ave (Zone ID 805,829). These locations will ease traffic in a busy commercial district which has dozens of restaurants, stores, and businesses within 0.1 mile. There will also be a video detection upgrade at an intersection along W. Ken Caryl Ave near C-470. This upgrade will serve the over 1320 workers in this condensed shopping district (804). The 12 360° video detection systems will greatly benefit key employment centers and popular subregional destinations, benefitting the tens of thousands of workers in these areas and the hundreds of thousands of visitors.

8. Congestion Mitigation Process Mobility Score

*Completing the below table and referencing relevant quantitative data in your response is required. In the **DRCOG Data Tool**, use a **0.02 mile buffer distance**.*

Provide congestion mobility parameters* [Congestion Mobility Score tab]	2021
Sum: length-weighted score	64.35
Sum: miles	27.86
Congestion Mobility Score	2.31

(The Congestion Mobility Score will automatically calculate based on values entered. If this has not updated, select the box and click F9)

C. Metro Vision Regional Transportation Plan Priorities

WEIGHT

25%

- ***Qualitative and quantitative*** responses are **REQUIRED** for the following items on how the proposed project contributes to the project and program investment priorities in the adopted 2050 Metro Vision Regional Transportation Plan. **To be considered for full points, you must fully answer all parts of the question, including incorporating quantitative data into your answer.** (see scoring section for details). Quantitative data from is available from the [DRCOG Data Tool](#).
- Checkboxes and data tables help to provide context and guide responses, but do not account for the full range of potential improvements and are not directly scored, but are required to be completed.
- Not all proposed projects will necessarily be able to answer all questions, however it is in the applicant's interest to address as many priority areas as possible.

Multimodal Mobility

Provide improved travel options for all modes.

(drawn from [2050 MVRTP priorities](#); [federal travel time reliability, infrastructure condition, & transit asset management performance measures](#); & [Metro Vision objective 4](#))

Examples of Project Elements: combinations of improvements that support options for a broad range of users, such as complete streets improvements, or an interchange project that incorporates transit and freight improvements, etc.

- What modes will project improvements directly address?
☒ Walking ☒ Bicycling ☐ Transit ☒ SOV ☐ Freight ☐ Other: Click or tap here to enter text.
- List the elements of this project which will address the above modes (i.e., sidewalk, shared use path, bus stop improvements, new general purpose or managed lanes, etc.): [traffic prioritization](#),
- Will the completed project be a complete street as described in the [Regional Complete Streets Toolkit](#)? [Complete Streets Typology](#) is available in the [DRCOG Data Tool](#).
☐ Yes ☒ No If yes, describe how it implements the Toolkit's strategies in your response. Click or tap here to enter text.
- Does this project improve travel time reliability and reduce delay?
☒ Yes ☐ No
- Does this project improve asset management of roadway infrastructure, active transportation facilities, and/or transit facilities or vehicle fleets?
☐ Yes ☒ No
- Does this project implement resilient infrastructure that helps the subregion mitigate natural and/or human-made hazards?
☐ Yes ☒ No

Question: Describe how this project will help increase mobility choices for people, goods, and/or services. Please include quantitative information, including any items referenced above, in your response. *Note that the proposed roadway operational improvements must be primarily on the DRCOG [Regional Roadway System](#) and/or [Regional Managed Lanes System](#).*

The project will not necessarily increase mobility choices for people, goods, and services. However, the project will ensure greater safety for bicycles and pedestrians. Making these transportation mediums more viable for members of the community. In addition, the project is along major bus routes with 119 bus stops. By easing traffic and making data-driven decisions, bus routes will become more reliable and timely. Therefore, this project benefits many different mobility choices, while not directly increasing access to said choices.

Question: Describe how this project will help improve asset reliability and availability. Please include quantitative information in your response (for example, reduce mean time to repair and increase mean time between failures).

N/A

Question: Describe how this project will reduce delays and improve travel time reliability. Please include quantitative information in your response (for example, vehicle-hours traveled and travel time index).

The implementation of video detectors at the 12 intersections will help reduce delays and improve travel time reliability through the following mechanisms:

Real-time Traffic Monitoring: Video detectors provide real-time data on traffic conditions, including traffic volume, flow, and patterns. This information enables traffic engineers and operators to have a comprehensive understanding of the current traffic situation at each intersection.

Signal Timing Improvements: With access to real-time and current data, traffic control systems can be programmed based on the actual traffic demand, ensuring efficient traffic flow and minimizing delays.

Congestion Detection and Management: Video monitoring can identify congestion and queues forming at intersections. This information enables traffic staff to better manage traffic flow. In extreme circumstances, operators will be able to activate traffic diversion plans or implementing alternative routing strategies to mitigate congestion and minimize delays.

Incident Management: Video detectors can also assist in the detection and management of incidents, such as accidents or stalled vehicles, by providing visual confirmation and allowing staff to notify relevant authorities. Timely response to incidents helps in clearing the road quickly, reducing delays caused by such disruptions.

Coordination and Synchronization: By collecting real-time traffic data, modern detectors allow for better coordination and synchronization of signal timings along arterial routes. This coordination aims to create green waves, where vehicles encounter fewer red lights, resulting in smoother and more predictable travel.

By leveraging video detectors for real-time monitoring, signal timing improvements, incident management, and coordination, this project will reduce delays at the 12 intersections. Drivers will experience smoother traffic flow, optimized signal timings, and improved travel time reliability, contributing to enhanced efficiency and convenience in their daily journeys.

Quantitative Information: Under free flow conditions, the travel time along the Bowles, Kipling, and Ken Caryl corridors are 8 minutes, 7 minutes, and 7 minutes, respectively. The daily volumes on the corridors are approximately 24,000 on Bowles, 25,000 on Kipling, and 23,000 on Ken Caryl. The County does not have actual travel times for the corridors under congested conditions, but it is expected that live monitoring of traffic conditions can allow the County to identify and respond to excessive queues and split failures that it is not currently aware of, thereby reducing travel time along these corridors.

Air Quality

Improve air quality and reduce greenhouse gas emissions.

(drawn from [2050 MVRTP priorities](#); [state greenhouse gas rulemaking](#); [federal congestion & emissions reduction performance measures](#); [Metro Vision objectives 2, 3, & 6a](#))

Examples of Project Elements: active transportation, transit, or TDM elements; vehicle operational improvements; electric vehicle supportive infrastructure; etc.

- Does this project reduce congestion?
☒ Yes ☐ No
- Does this project reduce vehicle miles traveled (VMT)?
☐ Yes ☒ No
- Does this project reduce single-occupant vehicle (SOV) travel?
☐ Yes ☒ No

Emissions Reduced (kg/day)	CO	NOx	VOCs	PM 10	CO ₂ e
	1.355	0.065	0.043	0.021	167.142

Use the [FHWA CMAQ Calculators](#) or a similar reasonable methodology to determine emissions reduced. Base your calculations on the year of opening. Please attach a screenshot of your work (such as the FHWA calculator showing the inputs and outputs) as part of your submittal packet.

Note: if not using the FHWA Calculators, please describe your methodology and sources in your narrative below.

Question: Describe how this project helps reduce congestion and air pollutants, including but not limited to carbon monoxide, ground-level ozone precursors, particulate matter, and greenhouse gas emissions. Please include quantitative information, including any items referenced above, in your response.

The implementation of video detectors at 12 intersections is expected to have a positive impact on reducing congestion and air pollutants, including carbon monoxide (CO), ground-level ozone precursors, particulate matter (PM), and greenhouse gas (GHG) emissions. Here's a description of how this project helps in achieving these reductions, along with some quantitative information:

Congestion Reduction:

Video detectors can enhance traffic management systems by providing real-time data on traffic flow, volume, and patterns. This information enables traffic engineers to optimize signal timings and adjust signal phasing. By improving signal timing and optimizing traffic flow, congestion at intersections can be reduced. This leads to smoother traffic movement, shorter travel times, and reduced idling, all of which contribute to decreased congestion levels.

Carbon Monoxide (CO) Reduction:

Congestion causes increased fuel consumption and vehicle idling, leading to higher CO emissions. Improved traffic flow and reduced congestion achieved through video monitoring can decrease idling times, resulting in lower CO emissions.

Quantitative information: Implementation of video detectors has been observed to reduce CO emissions by approximately 1.355kg/day at congested intersections.

Ground-Level Ozone Precursors Reduction:

Ground-level ozone is formed when nitrogen oxides (NOx) and volatile organic compounds (VOCs) react in the presence of sunlight. Video detectors with data collection capabilities help optimize signal timings, leading to smoother traffic flow, reduced stop-and-go conditions, and minimized acceleration and deceleration cycles. These improvements reduce fuel consumption and, consequently, the emissions of NOx and VOCs.

Quantitative information: By reducing congestion and improving traffic flow, the project is estimated to reduce ground-level ozone precursors by 0.065kg/day at the intersections.

Particulate Matter (PM) Reduction:

PM refers to tiny particles suspended in the air, including fine particles (PM2.5) and coarse particles (PM10), which can have adverse health effects. Congested traffic conditions contribute to higher PM emissions due to increased vehicle exhaust and brake wear. The use of video detectors with data collection capabilities to optimize traffic flow reduces the time vehicles spend in congested conditions, leading to decreased PM emissions.

Quantitative information: The project's expected PM reduction ranges from 0.004kg/day to 0.021kg/day, depending on the severity of congestion at the intersections and the surrounding area.

Greenhouse Gas (GHG) Emissions Reduction:

GHG emissions, such as carbon dioxide (CO2) and methane (CH4), contribute to climate change. By reducing congestion and improving traffic flow, the implementation of video detectors can minimize fuel consumption, resulting in reduced CO2 and CH4 emissions.

Quantitative information: The project's estimated reduction in GHG emissions is around 167.142kg/day, primarily attributed to lower fuel consumption and decreased idling time.

Overall, the introduction of video detectors at the 12 intersections will contribute to congestion reduction and subsequently lead to improvements in air quality by reducing carbon monoxide, ground-level ozone precursors, particulate matter, and greenhouse gas emissions. The projected reduction percentages provided are approximate and can vary based on the specific conditions at each intersection and the level of congestion being addressed.

Regional Transit	<p>Expand and improve the subregion's transit network. (drawn from 2050 MVRTP priorities, Coordinated Transit Plan, RTD's Regional Bus Rapid Transit Feasibility Study) Examples of Project Elements: transit lanes, station improvements, etc. <i>Note:</i> For any project with transit elements, the sponsor must coordinate with RTD to ensure RTD agrees to the scope and cost. Be sure to include RTD's concurrence in your application submittal.</p>
-------------------------	--

Items marked with an asterisk (*) below are available in the [DRCOG Data Tool](#).

- Does this project implement a portion of the regional bus rapid transit (BRT) network (as defined in the [2050 MVRTP](#))?*
- ☐ Yes ☒ No If yes, which specific corridor will this project focus on: [Click or tap here to enter text.](#)
- Does this project involve a regional transit planning corridor (as defined in the [2050 MVRTP](#))?*
- ☒ Yes ☐ No If yes, which specific corridor will this project focus on: [Kipling St., W. Ken Caryl Ave, and W Bowles Ave.](#)
- Does this project implement a mobility hub (as defined in the [2050 MVRTP](#))?
- ☐ Yes ☒ No
- Does this project improve connections between transit and other modes?
- ☐ Yes ☒ No If yes, please describe in your response.
- Does this project improve transit travel time reliability?
- ☒ Yes ☐ No If yes, please describe in your response.

[This project improves the ability of Jefferson County's Transportation hub to make informed decisions on signal timing based on gathered data. These decisions will help ease congestion. It will also allow for more rapid incident response and detour creation. Thus, transit travel time reliability will be improved.](#)

- Does this project add and/or improve transit access to or within a DRCOG-defined urban center?*
- ☐ Yes ☒ No

Question: Describe how this project improves connections to or expands the subregion's transit system, as outlined in the [2050 MVRTP](#). Also describe how this project improves transit travel time reliability. Please include quantitative information, including any items referenced above, in your response. *Note that rapid transit improvements must be on the [Regional Rapid Transit System](#).*

[Within the selected region there are 119 RTD bus stops. The 12 video detectors will assist in traffic management along these corridors which will broadly affect the region. This technology will help Jefferson County ease congestion, increase safety, and improve travel time reliability. Thousands of daily bus users in this region will benefit from punctuality in bus timing, an ease in congestion, and general improvements in safety which could otherwise hinder the public transit experience.](#)

Safety	Increase the safety for all users of the transportation system. (drawn from 2050 MVRTP priorities , Taking Action on Regional Vision Zero , CDOT Strategic Transportation Safety Plan , & federal safety performance measures) Examples of Project Elements: bike/pedestrian crossing improvements, vehicle crash countermeasures, traffic calming, etc.	
Items marked with an asterisk (*) below are available in the DRCOG Data Tool .		
<ul style="list-style-type: none"> Does this project address a location on the DRCOG High-Injury Network or Critical Corridors or corridors defined in a local Vision Zero or equivalent safety plan?* <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Does this project implement a safety countermeasure listed in the countermeasure glossary? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Will this project result in a reduction of average roadway clearance time and incident clearance time and/or secondary incidents? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Will this project result in a reduction of first responder struck-bys? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No 		
Provide the current number of crashes involving motor vehicles, bicyclists, and pedestrians* (using the 2016-2020 period – in the DRCOG Data Tool , use a 0.02 mile buffer distance) [Crash Severity 2016-2020 tab] NOTE: if constructing a new facility, report crashes along closest existing alternative route		Sponsor must use industry accepted crash modification factors (CMF) or crash reduction factor (CRF) practices (e.g., CMF Clearinghouse , NCHRP Report 617 , or DiExSys methodology). Provide the methodology and sources below:
Fatal crashes	13	
Serious Injury crashes	74	
Other: Non-Serious Injury and Property Damage Only crashes	2781	
Estimated reduction in crashes applicable to the project scope (per the five-year period used above)		
Fatal crashes reduced	11	
Serious Injury crashes reduced	63	
Other: Non-Serious Injury and Property Damage Only crashes		2371

Question: Describe how this project will implement safety improvements (roadway, active transportation facility, etc.), particularly improvements in line with the recommendations in [Taking Action on Regional Vision Zero](#). Please include quantitative information, including any items referenced above, in your response. *Note that any improvements on roadways must be primarily on the DRCOG [Regional Roadway System](#).*

The project will provide several safety improvements which are in line with the Regional Vision Zero, which emphasizes the critical importance of preventing loss of life on roadways. Three specific countermeasures can be deployed with the help of the video detectors. The first of these is to extend pedestrian crossing time. The video detectors will be employed to lengthen signal clearance time for vulnerable age groups and the disabled. This will ensure safety for those who require additional accommodation while moving through intersections. The second is traffic signal bicycle detection. This countermeasure provides safety accommodations such as more frequent green lights for bicyclists and enhanced detection of red-light running. The third countermeasure provided is traffic incident management. This countermeasure aims to detect, respond to, and rapidly clear traffic incidents to maximize safety and restore normal traffic patterns.

Additionally, the project will improve safety by including the functions outlined in the Taking Action of Regional Vision Zero Document. Such as the planning focus areas of improve data collection and reporting and design and retrofit roadway features to prioritize safety.

Currently an estimated 60 bicyclists and 250 pedestrians travel on the 14.6 miles of the three corridors of the selected sites each day. In the five years (2016-2020) 46.15% (6/13) of fatal accidents in this specific region involved a pedestrian or cyclist. This statistic shows the vulnerability for non-vehicle bound commuters in this area. The video detection systems have specialized features to identify and respond with signal timing improvements for bicyclists and pedestrians which will make travel safer for these groups.

Question: Describe how this project will reduce average incident duration, secondary incidents and first responder struck-bys. Please include quantitative information in your response. *A “responder struck-by” incident is a collision between a motor vehicle in transit and a responder working a roadway incident. The responder may be a nonmotorist, an occupant of a stopped response vehicle or an unoccupied response vehicle.*

Incident response will be enhanced by the introduction of video detector technology at the selected intersections. The video detectors will provide live feeds to the traffic management center. This will allow immediate response and redirection of traffic by first responders. By decreasing congestion and moving vehicles away from incidents, first responders will have the opportunity to rapidly respond to the scene. First responder struck-by's could also be reduced as the video detector technology will allow for live overview of incidents, which can facilitate rerouting traffic away from the scene. Overall, the video detectors will make incident response faster, more effective, and ultimately safer for those involved and the first responders who are assisting.

Freight	<p>Maintain efficient movement of goods within and beyond the subregion.</p> <p>(drawn from 2050 MVRTP priorities; Regional Multimodal Freight Plan; Colorado Freight Plan, federal freight reliability performance measure; Metro Vision objective 14)</p> <p>Examples of Project Elements: bridge improvements, improved turning radii, increased roadway capacity, etc.</p>
----------------	---

Items marked with an asterisk (*) below are available in the DRCOG Data Tool.

- Is this project located in or impact access to a [Freight Focus Area](#)?*

☐ Yes ☒ No If yes, please provide the name: [Click or tap here to enter text.](#)
- If this project is located in a [Freight Focus Area](#) does it address the relevant Needs and Issues identified in the Plan (see text located within each Focus Area)?

☐ Yes ☒ No If yes, please describe in your response below.
- Is the project located on the [Tier 1 or Tier 2 Regional Highway Freight Vision Network](#)?*

☒ Yes ☐ No
- Check any items from the [Inventory of Current Needs](#) which this project will address:

☒ Truck Crash Location ☐ Rail Crossing Safety ([eligible locations](#))

☒ Truck Delay ☒ Truck Reliability ☐ Highway Bottleneck

☐ Low-Clearance or Weight-Restricted Bridge

 Please provide the location(s) being addressed: [W. Bowles Ave, S. Kipling St, W. Ken Caryl Ave.](#)
- Does this project include any innovative or non-traditional freight supportive elements (i.e., curb management strategies, cargo bike supportive infrastructure, etc.)?

☐ Yes ☒ No If yes, please describe in your response below.

Question: Describe how this project will improve the efficient movement of goods. In your response, identify those improvements identified in the [Regional Multimodal Freight Plan](#), include quantitative information, and include any items referenced above. *Note that any improvements on roadways must be primarily on the DRCOG [Regional Roadway System](#).*

All 12 video detection systems will be placed along Tier 2 Freight Network roadways. The anticipated benefits in traffic reduction, safety, and reliability will also be present for the trucks and freight vehicles which utilize these corridors.

Active Transportation	Expand and enhance active transportation travel options. (drawn from 2050 MVRTP priorities ; Denver Regional Active Transportation Plan ; & Metro Vision objectives 10 & 13) Examples of Project Elements: shared use paths, sidewalks, regional trails, grade separations, etc.	
Items marked with an asterisk (*) below are available in the DRCOG Data Tool.		
<ul style="list-style-type: none"> Does this project close a gap or extend a facility on a Regional Active Transportation Corridor or locally-defined priority corridor?* <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Does this project improve pedestrian accessibility and connectivity in a pedestrian focus area?* <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Does this project improve active transportation choices in a short trip opportunity zone?* <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Does this project include a high-comfort bikeway (like a sidepath, shared-use path, separated bike lane, bicycle boulevard)? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If yes, please describe in your response. 		
Bicycle Use <i>NOTE: if constructing a new facility, report bike usage along closest existing alternative route</i> To update the formulas below, enter your information, highlight the formulas (or Ctrl-A), and press F9. OR close and reopen the file.		
1. Current Average Single Weekday Bicyclists:	60	
Bicycle Use Calculations	Year of Opening	2050 Weekday Estimate
2. Enter estimated additional average weekday one-way bicycle trips on the facility after project is completed.	20	70
3. Enter number of the bicycle trips (in #2 above) that will be diverting from a different bicycling route. (Example: {#2 X 50%} or other percent, if justified on line 10 below)	10	35
4. = Initial number of new bicycle trips from project (#2 – #3)		
5. Enter number of the new trips produced (from #4 above) that are replacing a trip made by another non-SOV mode (bus, carpool, vanpool, walking, etc.). (Example: {#4 X 30%} or other percent, if justified on line 10 below)	3	10
6. = Number of SOV trips reduced per day (#4 - #5)	- 3.00	.00
7. Enter the value of {#6 x 2 miles}. (= the VMT reduced per day) (Values other than 2 miles must be justified by sponsor on line 10 below)	6.00	20.22
8. = Number of pounds GHG emissions reduced (#7 x 0.95 lbs.)		
9. If values would be distinctly greater for weekends, describe the magnitude of difference: Click or tap here to enter text.		
10. If different values other than the suggested are used, please explain here: Click or tap here to enter text.		
Pedestrian Use <i>NOTE: if constructing a new facility, report pedestrian usage along closest existing alternative route</i> To update the formulas below, enter your information, highlight the formulas (or Ctrl-A), and press F9. OR close and reopen the file.		
1. Current Average Single Weekday Pedestrians (including users of non-pedaled devices such as scooters and wheelchairs):	250	
Pedestrian Use Calculations	Year of Opening	2050 Weekday Estimate
2. Enter estimated additional average weekday pedestrian one-way trips on the facility after project is completed	50	75
3. Enter number of the new pedestrian trips (in #2 above) that will be diverting from a different walking route (Example: {#2 X 50%} or other percent, if justified on line 10 below)	25	37
4. = Number of new trips from project (#2 – #3)	25	38
5. Enter number of the new trips produced (from #4 above) that are replacing a trip made by another non-SOV mode (bus, carpool, vanpool, bike, etc.). (Example: {#4 X 30%} or other percent, if justified on line 10 below)	8	11
6. = Number of SOV trips reduced per day (#4 - #5)	.00	.00

7. Enter the value of {#6 x .4 miles} . (= the VMT reduced per day) (Values other than .4 miles must be justified by sponsor on line 10 below)	6.8	4.4
8. = Number of pounds GHG emissions reduced (#7 x 0.95 lbs.)	6.46	4.18
9. If values would be distinctly greater for weekends, describe the magnitude of difference: Click or tap here to enter text.		
10. If different values other than the suggested are used, please explain here: Click or tap here to enter text.		

Question: Describe how this project helps expand the active transportation network, closes gaps, improves comfort, and/or improves connections to key destinations, particularly improvements in line with the recommendations in the [Denver Regional Active Transportation Plan](#). Please include quantitative information, including any items referenced above, in your response.

The proposed project to introduce 12 360° video detection systems along corridors in unincorporated Jefferson County will benefit active transportation by easing congestion and enhancing safety. The project can utilize live feeds and data to address congestion and mitigate traffic. In addition, pedestrian and bicycle detection will allow for improved travel for these groups. This could come in the form of longer crosswalk times, detecting bicycles in bike lanes, and extending certain signals to allow bikes or pedestrians through. This enhances the active transportation network and facilitates a quicker commute for walkers and bicyclists.

D. Financial Leveraging		WEIGHT	5%
What percent of outside funding sources (non-federal funds) does this project have? <i>(Match percentage will automatically calculate based on values entered in the Funding Request table. If this has not updated, select the box to the right and click F9.)</i> [*includes 100% eligible projects with no match]	Enter score: <div>17.3%</div>	36%+ outside funding sources 5 31 - 35.9%..... 4 26 - 30.9%..... 3 21 - 25.9%..... 2 17.21 - 20.9%* 1 17.21%..... 0	
E. Project Readiness		WEIGHT	15%
<i>Provide responses to the following items to demonstrate the readiness of the project. DRCOG is prioritizing those projects that have a higher likelihood to move forward in a timely manner and are less likely to experience a delay.</i>			
Subsection 1. Avoiding Pitfalls and Roadblocks			
<p>a. Has a licensed engineer (CDOT, consultant, local agency, etc.) reviewed the impact the proposed project will have on utilities, railroads, ROW, historic and environmental resources, etc. and have those impacts and pitfalls been mitigated as much as possible to date before this submittal?</p> <p><input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A (for projects which do not require engineering services)</p> <p>If yes, please type in the engineer's name below which certifies their review and that impacts have been evaluated and mitigated as much as possible before your application is submitted:</p> <p>Kelly Dunne, PE – Traffic Operations & Planning Manager</p> <p>Please describe the status to date on each, including 1) anticipated/known pitfalls/roadblocks, and 2) mitigation activities taken to date:</p> <ul style="list-style-type: none"> Utilities: Equipment Procurement Only - No Utilities involved Railroad: No Railroad involvement Right-of-Way: Equipment Procurement Only - No impacts to ROW Environmental/Historic: Equipment Procurement Only – No Environmental/Historical impacts Other: Click or tap here to enter text. 			
<p>b. Have additional project risks been identified?</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A</p> <p>If yes, please provide a brief description of the known risks and planned mitigation activities.</p> <p>There are no additional project risks</p>			
<p>c. Is this application for a single project phase only (i.e., design, environmental, ROW acquisition, construction only, study, equipment purchase, etc.)?</p> <p><input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>If yes, are the other prerequisite phases complete? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A</p>			
<p>d. Will this project seek a Finding in the Public Interest as part of equipment procurement?</p> <p><input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>If yes, please provide an explanation of the need for a Finding in the Public Interest. Do not reference specific products trade names.</p>			

Jefferson County completed a comparison analysis of several different detection technologies and determined a specific system that best meets the County's specific needs. Since then, the County has specified only this system for detection upgrades.

- e. Has all required ROW been identified? ☐ Yes ☐ No ☒ N/A

Has all required ROW already been acquired and cleared by CDOT? ☐ Yes ☐ No ☒ N/A

Is existing equipment within ROW? ☒ Yes ☐ No ☐ N/A

Will subsurface utility engineering be a factor in this project? ☐ Yes ☒ No

Has subsurface utility engineering been accounted for in the project scoping, phasing and estimate? ☐ Yes ☐ No ☒ N/A

- f. Based on the current status provided in Project Information, question 11, do you foresee being able to execute your IGA by October 1 of your first year of funding (or if requesting first year funding, beginning discussions on your IGA as soon as possible), so you can begin your project on time?

☒ Yes ☐ No

Does your agency have the appropriate staff available to work on this project? ☒ Yes ☐ No

If yes, are they knowledgeable with the federal-aid process? ☒ Yes ☐ No ☐ N/A

- g. Have other stakeholders in your project been identified and involved in project development?

☐ Yes ☐ No ☒ N/A

If yes, who are the stakeholders?

[Click or tap here to enter text.](#)

Please provide any additional details on any of the items in Subsection 1, if applicable.

[Project is solely for purchase of equipment, so there are limited risks, minimal coordination needed, and overall a fairly simple execution for implementation.](#)

Subsection 2. Local Match Availability

- a. Is all the local match identified in your application currently available and not contingent on any additional decisions, and if a partnering agency is also committing match, do you have a commitment letter?

☒ Yes ☐ No

Please describe:

[Click or tap here to enter text.](#)

- b. Is all funding for this project currently identified in the sponsor agency's Capital Improvement Program (CIP)?

☐ Yes ☒ No

Please describe:

[Local match funding has tentatively been programmed for 2025. If awarded this project in October 2023, staff will include funding for 2025 at subsequent budget development \(summer 2024\).](#)

Subsection 3. Systems Engineering Analysis Documentation

Systems Engineering Analysis (SEA) is a federally required process for deployment of transportation technology projects using funds from the Highway Trust Fund. CDOT established and administers a formal [SEA process](#) for transportation technology projects in the state, including local agency projects.

Please complete at least the first seven sections of the required [SEA-Local Agency Template](#). Submit the completed form with this application.

Submit completed applications to jluor@drcog.org no later than 5pm on July 7, 2023.

Prior to submitting, press Ctrl+A to select all, then press F9 to update all formulas. You can then print to PDF.

Jefferson County Traffic Camera System



Cost Estimate

Project Name: Jefferson County Traffic Camera System
Road/Facility Name: Kipling Pkwy, Bowles Ave, Ken Caryl Ave
Completed by: Kelly Dunne, PE, PTOE

Line Item	Quantity	Description	Unit Cost	Costs
1	1	Kipling & Coal Mine - 360° Camera Detection System (equipment only)	\$ 25,000	\$ 25,000
2	1	Kipling & Geddes - 360° Camera Detection System (equipment only)	\$ 25,000	\$ 25,000
3	1	Kipling & 8150 Block - 360° Camera Detection System (equipment only)	\$ 25,000	\$ 25,000
4	1	Kipling & Remington - 360° Camera Detection System (equipment only)	\$ 25,000	\$ 25,000
5	1	Bowles & Simms - 360° Camera Detection System (equipment only)	\$ 25,000	\$ 25,000
6	1	Bowles & Chanson Plaza - 360° Camera Detection System (equipment only)	\$ 25,000	\$ 25,000
7	1	Bowles & Long - 360° Camera Detection System (equipment only)	\$ 25,000	\$ 25,000
8	1	Bowles & Pierce - 360° Camera Detection System (equipment only)	\$ 25,000	\$ 25,000
9	1	Bowles & Grant Ranch - 360° Camera Detection System (equipment only)	\$ 25,000	\$ 25,000
10	1	Ken Caryl & Alkire - 360° Camera Detection System (equipment only)	\$ 25,000	\$ 25,000
11	1	Ken Caryl & Continental Divide - 360° Camera Detection System (equipment only)	\$ 25,000	\$ 25,000
12	1	Ken Caryl & Carr - 360° Camera Detection System (equipment only)	\$ 25,000	\$ 25,000
				Total \$ 300,000



Requirement: The [systems engineering analysis \(SEA\)](#) process is required per [23 CFR 940](#).

The SEA is the project delivery process for the technology element of the project. If the project does not have technology, the project still needs documentation that the scope was evaluated and no additional SEA documentation is required beyond section two of this form. As a matter of policy, CDOT has committed to following the intent and requirements of the SEA process for all transportation projects, regardless whether the project is state or federally funded.

Purpose: The SEA is intended to help design a robust and sustainable technology system. The SEA prompts discussions during design with stakeholders and is intended to document those critical discussions. Since technology does require maintenance and has relatively short life cycles, the SEA also helps projects plan for how to keep the system maintained and operating after construction is completed.

Who is responsible: The local agency will be required to complete this form. This form shall be submitted to CDOT a minimum of two weeks prior to the FOR meeting. It must be reviewed and approved prior to receiving CDOT Concurrence to Advertise for construction. The ITS & Network Services Branch needs at least two weeks to review documents.

Section 1 - Project Overview
1.1 Local Public Agency Project Manager and Contact Information Kelly Dunne, Jefferson County, Kdunne@jeffco.us 303-271-8457
1.2 Consultant Project Manager and Contact Information (X N/A) N/A
1.3 CDOT Project Manager and Contact Information TBD
1.4 Project Location, Route Beginning and Ending MM, or Nearest Intersection Bowles Ave, Ken Caryl Ave, and Kipling Ave
1.5 Project Description, Title, and Type of Work – This should include identification of the problem and the purpose of the project Jefferson County Traffic Camera System. Purchase of 12 video detection systems to be installed at traffic



signals that currently operate under loop detection or antiquated video detection; new system will allow for real-time video monitoring, traffic data collection, and pedestrian/bicycle detection.

1.6 CDOT Project Number and Sub Account Code

TBD

1.7 Federal-Aid ☒ Yes ☐ No

1.8 Is the project within CDOT's Right of Way (ROW)? ☐ Yes ☒ No

1.9 Funding and Source of Each (Including State and Federal)

Local: Jefferson County. Grant: DRCOG RTO&T

1.10 Fiscal Year of Funding: 2025

Section 2 - SEA Required?

Federal Requirement: 23 CFR 940.11 Project Implementation

2.1 Are there any technology elements included in the scope of the project?

The [National Regulation \(23 CFR 940\)](#) defines ITS as “electronics, communications, or information processing used singly or in combination to improve the efficiency or safety of a surface transportation system.” An ITS project is “any project that in whole or in part funds the acquisition of technologies or systems of technologies that provide or significantly contribute to the provision of one or more ITS user services as defined in the National ITS Architecture.”

Technology includes any type of device or system that is used to improve the roadways. This could include, but is not limited to, intelligent transportation systems devices. Examples are CCTV, DMS, VTMS, VSL, wrong way detection, RWIS, connected vehicles, [non-traditional signals](#) (click on link to understand which signals projects require an SEA), on board equipment in vehicles, and anything that has to be communicated to ATMS or other traffic management systems. Additionally, creating or modifying systems and software that impacts the roadway is included in the SEA classification. If there is still confusion on what is classified as technology, please reach out to the ITS & Network Services Branch.

☒ Yes ☐ No



If the answer to 2.1 is “**yes**” then a **SEA is required**.

If the answer to 2.1 is “**no**” then a **SEA is not required** and the rest of this form does not need to be completed, but Sections 1 and 2 will need to be submitted for documentation purposes.

2.2 Which SEA process should be followed?

☐ Yes ☒ No Will the system be owned, operated, or maintained by CDOT?

☐ Yes ☒ No Does the project involve CDOT technology assets?

☐ Yes ☒ No Will the project connect to the CDOT network?

☐ Yes ☒ No Will the project be on CDOT right of way?

☐ Yes ☒ No Does the project involve multiple municipalities?

If “**yes**” is selected for any of the above questions, then the [Robust SEA Process](#) needs to be followed and this form is no longer applicable.

If “**no**” is selected for all questions, then completing this entire form will fulfill the [23 CFR 940](#) requirements for local agency projects only.

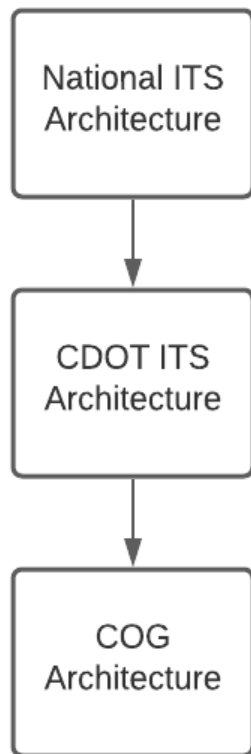
Section 3 - ITS Architecture Conformance

Federal Requirement: 23 CFR 940.11(c)(1) - “Identification of portions of the regional ITS architecture being implemented (or if a regional ITS architecture does not exist, the applicable portions of the National ITS Architecture)”

Per [23 CFR 940](#), every project has to comply with an ITS Architecture Plan. For background information, there is a [National ITS Architecture Plan](#) that is maintained by FHWA. The National Architecture Plan consists of Service Packages that identifies a problem that needs to be solved or a certain application of a technology. A service package states the basic requirements the project must achieve to create consistency. CDOT is then required to select the service packages from the National ITS Architecture Plan that will assist in fulfilling CDOT’s technology vision and make them CDOT specific. From there the local Council of Governments (COG’s) have to make their ITS Architectures as well. The local agencies should



use the COG's architecture plan if one exists. If one does not, the CDOT Architecture Plan should be followed.



Service packages are critical to identify as part of compiling required SEA documentation. Service packages focus on how the technology is being used rather than specific devices. For example, there is no Dynamic Message Sign (DMS) service package. It will be critical to understand the intent of use for the DMS in order to determine the applicable service package(s). A DMS could fall within the TM06 Traffic Information Dissemination if the intent is to provide drivers with information. If a DMS is being installed as part of a tunnel, then it could fall under TM24 Tunnel Management. The key is focusing on what application the DMS is being used in. It is possible for a project to fall within multiple service packages. Please reach out to the ITS & Network Services Branch with any questions.

3.1 Which architecture plan will be used?

- ☐ National ITS Architecture ☐ CDOT ITS Architecture
- ☒ COG

3.2 If using a COG/MPO/TPR Architecture Plan, what COG? N/A for using the National or CDOT Architecture Plan.

Denver Regional Council of Governments (DRCOG)

3.3 List service packages that will be implemented on this project:

1. TM01: 021 Local Jurisdiction Detector Surveillance
2. TM01: 022 Local Jurisdiction Video Surveillance



3. TM03: 01 Local Jurisdiction Traffic Control
4. TM07: 01 Traffic Camera Sharing
5. DM01: 02 Local Jurisdiction Data Warehouse

To add additional service packages click in the line item 2 box and hit enter.

Section 4 - Procurement

Federal Requirement: 23 CFR 940.11(c)(5) Procurement options

4.1 State the procurement method for the project.

☐ Competitively Bid

☒ Sole Source

4.2 If 4.1 is competitively bid, then what kind is the project delivery method?

☐ Design, Bid, Build

☐ Design Build

☐ Construction Manager/General Contractor

☐ Other (Please specify) _____

Section 5 - Alternative Analysis

Federal Requirement: 23 CFR 940.11(c)(4) - Analysis of alternative system configurations and technology options to meet requirements

Instructions: Document alternatives considered. When thinking of alternatives it is important to consider maintenance resources and costs into the selected alternative. An alternative can also include not implementing the project. More rows can be added as needed.

Alternative Title	Alternative Description	Selected (Yes/No)	Reason
Not implementing the project	Take no action	No	If no action is taken, the County would have to continue to have limited ability to monitor traffic conditions remotely, fewer locations with data collection, and fewer intersections with ped/bike detection
Specific video detection system	County's preferred video detection system as determined by analysis	Yes	Purchasing this system best meets the needs of the County. The County has mostly span wire signals, so 360 degree cameras are more effective. Selecting



			this system ensures uniformity throughout the County's signal infrastructure.
Other video detection system	Video detection system not as determined by County's analysis	No	Another system may not function as effectively on the County's signal assets, and may not have all of the expected functionality as the specified system.

To add additional rows, right click on a row, select "insert", select "row below"

Section 6 - Roles & Responsibilities				
Federal Requirement: 23 CFR 940.11(c)(2) - Identification of participating agencies roles and responsibilities				
Instructions: Determine roles and responsibilities of the proposed technology system throughout the entire life cycle. More rows can be added as needed.				
Agency	Role/Position	Contact Info	Phase*	Responsibility
Jefferson County	Local Agency, Owner, Operator	Kelly Dunne, Kdunne@jeffco.us	Construction, Operations	Procure equipment, facilitate installation, oversee operations and maintenance

*Phase: Design, Construction, Operations

To add additional rows, right click on a row, select "insert", select "row below"

Section 7 - Requirements & Corresponding Standards				
Federal Requirement: 23 CFR 940.11(c)(3) Requirements definitions and 23 CFR 940.11(c)(6) Identification of applicable ITS standards and testing procedures				
Instructions: Determine the functional requirements of the system and how these requirements will be implemented. Implementation could be specifications or included in the general design of the system. More rows can be added as needed.				



Functional Requirement	How is the requirement included in the project? Spec, plan set, etc
Integrate with the County's existing signal asset infrastructure	Spec
Have the ability to be monitored remotely in real-time	Spec
Have the ability to collect continuous traffic counts	Spec
Have the ability to detect pedestrians and bicycles	Spec

To add additional rows, right click on a row, select "insert", select "row below"

Section 8 - Devices & System				
Federal Requirement: 23 CFR 940.11(c)(6) Identification of applicable ITS standards and testing procedures and 23 CFR 940.11(c)(7) Procedures and resources necessary for operations and management of the system				
8.1 Is a list or a map with all of the proposed devices attached? <input type="checkbox"/> Yes <input type="checkbox"/> No				
8.2 Determine how each device type installed or modified on the project will be specified, tested, and operation of the devices documented. If the project is a whole system, then there may need to be a system wide test as well to ensure all devices are working together properly. More rows can be added as needed.				
Device and system type included in project	Is there a supporting specification(s)? If yes, give specification title.	Is there a supporting test document? If yes, give testing procedure title.	Is this device documented in a Standard Operating Procedure (SOP) Document? If yes, give SOP title.	Is this device documented in a Maintenance Plan document? If Yes, give maintenance plan title.



--	--	--	--	--

To add additional rows, right click on a row, select "insert", select "row below"

Section 9 - FHWA Involvement

9.1 Has FHWA classified this project as a Project of Division Involvement (PODI) and requires involvement in the review of SEA documents?

☐ Yes ☐ No

Section 10 - Schedule

10.1 Design Start Date:

10.2 AD date:

10.3 Construction Start:

10.4 Construction completion:

10.5 Relationship to other Federal, State, and local projects and phases. Tip: Does this project depend on another project to operate successfully? Is this project one of a series or projects for a phased approach?

Bicycle and Pedestrian Improvements

This calculator will estimate the reduction in emissions resulting from improvements to bicycle and pedestrian infrastructure and associated mode shift from passenger vehicles to bicycling or walking, including but not limited to sidewalks, dedicated bicycle infrastructure, improved wayfinding, mid-block crossing installations, bike share systems, and bike parking improvements.

INPUT

(1) What is your project evaluation year?

(2) Estimate the shift in daily motorized passenger vehicle trips to non-motorized travel due to the bicycle and pedestrian project.

Daily Passenger Vehicle Trips		
Before	After	Change
72000	71928	72

(3a) Select the data type used for entering the typical one-way trip distance of passenger vehicles below:

Trip Distance Source

(3b) If you selected "Average" above, enter the typical one-way trip distance. If you selected "Distribution" above, enter the typical distribution of one-way trip distances.

Typical Trip Distance
(miles one way)

Distribution of Trip Distances (daily fraction per mileage bin)

$x < 1$	$1 \leq x < 2$	$2 \leq x < 3$	$3 \leq x < 4$	$4 \leq x \leq 5$	Sum
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

OUTPUT

EMISSION REDUCTIONS

Pollutant	Total	*Units in kg/day unless otherwise noted
Carbon Monoxide (CO)	1.355	
Particulate Matter <2.5 μm (PM _{2.5})	0.004	
Particulate Matter <10 μm (PM ₁₀)	0.021	
Nitrogen Oxide (NOx)	0.065	
Volatile Organic Compounds (VOC)	0.043	
Carbon Dioxide (CO ₂)	166.580	
Carbon Dioxide Equivalent (CO ₂ e)	167.142	
Total Energy Consumption (MMBTU/day)	2.249	

Total daily volume on Bowles, Kipling, and Ken Caryl corridors = 72,000

Average length of the three corridors = 6.5 miles

Conservative estimate of .1% drivers shifting modes to walk/bike due to project (bike detection and extended pedestrian times)